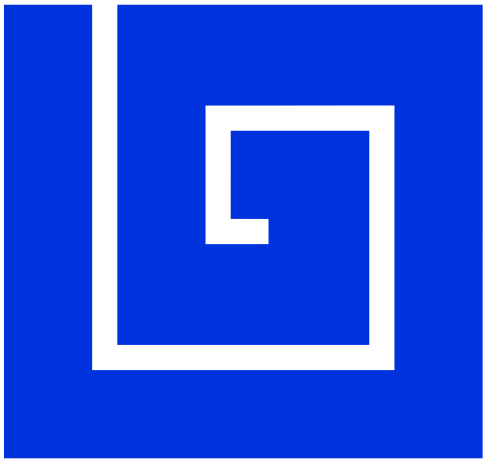
2025

PSYCHIATRIA FENNICA



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EDITORIAL

TUULA KIESEPPÄ

The thematic focus for this year's Psychiatria Fennica volume was initiated last autumn in collaboration with members of the Board of the Finnish Foundation for Psychiatric Research. It was discussed that the journal should expand its scope to encompass a broader perspective on mental health—beyond traditional medical and psychological frameworks and associated interventions. As editors, we found this suggestion both refreshing and timely.

Throughout the year, public discourse has pointed out the rising prevalence of mental health symptoms, particularly anxiety, behavioural regulation difficulties and challenges with concentration. In 2024, the most common reason for sickness allowance in Finland was mental health disorder (1), and over 50,000 individuals received sickness allowance due to an anxiety disorder. The School Health Promotion study 2025 reports that approximately one third of young girls experienced moderate or severe anxiety (2). Recent register-based cohort study followed the entire population of Finland from 2000 to 2020 and estimated the cumulative incidence of diagnosed mental disorders (3). The study reports that anxiety disorders had the highest cumulative incidence, and most individuals experience at least one type of mental disorder, often during youth. The researchers comment that this should be noticed in working life, schools, public services and everyday life, and they consider whether certain diagnosed conditions might be more appropriately conceptualized as mental health problems rather than disorders.

Some commentators argue that mental health is becoming overly medicalized, while others highlight the scarcity of treatment options and significant gaps in service provision. There is a growing demand for more accessible and cost-effective forms of support. Against this backdrop, the idea of gathering diverse approaches to mental health has proved to be both relevant and inspiring.

The process of curating these unconventional perspectives and the research underpinning them has been both challenging and rewarding. We extend our sincere thanks to all contributing authors who embraced the opportunity with open-mindedness and intellectual curiosity. This year, the role of the peer reviewers has been especially vital, providing insightful feedback that has helped uphold the high academic standards of Psychiatria Fennica.

We are proud to present a wide-ranging collection of research articles that explore mental health from multiple vantage points—including the influence of environment, social relationships, creative therapeutic modalities, physical activity and the role of work. Additionally, this volume features contributions on the development of mental health service systems, covering topics such as management, implementation and education.

The journal opens with an excellent overview by Kristian Wahlbeck, who examines mental health as a phenomenon situated within society, service systems and individual experience. This is followed by Timo Partonen's editorial, which delves into the significance of sleep and circadian rhythms—an area that affects us all and for which we bear personal responsibility along with specific treatment needs. These invited editorials elegantly crystallize the overarching theme of Psychiatria Fennica 2025.

Certainly, our content is not all-encompassing. For instance, bibliotherapy has a long-standing tradition, and reading may contribute positively to mental wellbeing. A study published in Plos ONE 2022 (4) shows that reading fiction can have a positive impact on measures of mood and emotion. Reading or listening to books written by other humans offers a special way to learn about other people's minds and emotions. This can deepen the connection with the social world, and at its finest decrease loneliness. However, for such positive effects to occur, there must be an infrastructure that systematically supports readers in evaluating their experiences through reflection and discussion. Nevertheless, both reading and deep reading literacy appear to be in decline. In her recent book, sociologist Riie Heikkilä analyses this phenomenon and argues that the observed decline is rooted in broader societal and structural factors (5). As inequality in society increases, disparities in reading practices also grow. This illustrates the diverse and multifaceted nature of perspectives and determinants associated with mental health.

I sincerely hope and believe that the readers of Psychiatria Fennica 2025 will enjoy the large variety of topics and gain new ideas to apply in practice or develop further. Our editorial team is already looking ahead to next year. The forthcoming volume will focus on psychoses and other serious mental disorders, which still often remain overshadowed in the expansive and flowing discourse surrounding mental health. We warmly encourage all researchers working in this vital field to submit manuscripts for publication in the next volume, scheduled for autumn 2026.

Tuula Kieseppä
Editor-in-Chief, Psychiatria Fennica

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KRISTIAN WAHLBECK

MENTAL HEALTH PROMOTION IS AT THE CORE OF PUBLIC HEALTH

KEYWORDS: HEALTH POLICY, MENTAL HEALTH PROMOTION, MENTAL HEALTH POLICY, MENTAL WELLBEING, POSITIVE MENTAL HEALTH

Despite positive trends in population physical health in Finland, similar progress has not been seen in mental health. Deteriorating mental health is the global health trend of our time. In every region of the world, younger generations are struggling (1). Promoting mental health must therefore be a key objective of any health policy.

In the discussion of mental health, it is important to avoid conceptual confusion for the sake of clarity. Mental health is an umbrella term, encompassing mental wellbeing (a.k.a. positive mental health), mental health problems and mental disorders. For conceptual clarity, it needs to be kept in mind that most mental health problems, such as the presence of various common anxieties, mood symptoms or insomnia, do not necessarily fulfil the diagnostic criteria for a mental disorder. Consequently, an increase in mental health problems does not necessarily translate into an increase in mental disorders.

Several Finnish studies show an increase in mental health problems. The Finnish Institute for Health and Welfare's (THL) Healthy Finland Survey 2022-2023 study showed that psychological distress remains high in the population even after the coronavirus pandemic (2). The proportion of working-age Finns experiencing significant mental stress had risen to one fifth and suicidal thoughts had become more common. Mental health problems were highest among young women with low education.

The national School Health Promotion survey 2023 with over 250,000 respondents aged 11-18 showed that more young people, especially girls, are experiencing anxiety and depression. In 2023, one third of girls reported moderate or severe anxiety. Anxiety had particularly increased among secondary school girls compared to previous school surveys (3). Preliminary results from 2025 indicate that the negative trend has prevailed (4).

The Finnish Government's Citizens' Pulse survey has regularly measured perceived stress since April 2020. The level of stress has risen throughout the 2020's, peaking in February 2024 (5). The Citizens' Pulse also shows that stress levels are significantly higher in younger age groups.

The consequences of declining mental health are far-reaching, as positive mental health is crucial for general health and predicts physical health and lower mortality (6). Similarly, various psychiatric conditions predict significant excess mortality (7).

However, it is not yet clear whether the increase in psychological distress has also led to an increase in the prevalence of mental disorders in Finland. A reliable prevalence assessment requires health surveys and psychiatric interviews in a representative population sample. Since THL's Health 2011 survey, which was conducted in 2011-2012, representative psychiatric interview data have not been collected. However, several proxy measures indicate that the prevalence of various psychiatric conditions has increased. For example, according to the national health insurer Kela, sick leave of at least 10 days due to psychiatric conditions has increased significantly during the last 10 years (8), and the use of antidepressants has multiplied since 2000 (9). The number of young people prescribed medication for attention deficit hyperactivity disorder (ADHD) has also increased many times over since 2015 (10). Since the corona pandemic, more and more minors in Finland have received a new psychiatric diagnosis: the number of diagnoses increased by 20 per cent after 2020, with a 33 per cent increase among girls. Eating disorders were the diagnosis group that increased the most (11).

EARLY PROMOTION OF MENTAL HEALTH

Action is now needed to reverse the negative trends in mental health. Mental health foundations are established in childhood, making it crucial to focus on promotion and prevention efforts

for children and young people. Epidemiological research has shown that half of all mental disorders present before the age of 15 (12).

Intergenerational transmission of psychiatric conditions is high but can be prevented through evidence-based interventions (13). Prevention of intergenerational transmission is crucial to reverse the negative trends in mental health.

Research shows that interventions in childhood have significant potential to prevent ill health in adulthood. Adult health is currently threatened not only by childhood obesity and low levels of physical activity, for example, but also by various adverse childhood events (ACEs). Genetic research has highlighted the importance of childhood environmental factors in the expression of gene effects (14). The focus of research lies therefore once again on environmental effects, and the term ACE has been coined to describe events that pose a risk to long-term mental health in particular. The focus of population-level mental health promotion has therefore shifted from the individual to the strengthening of environmental protective factors and prevention of ACEs.

A concrete example of the interaction between the environment and mental disorders and the need for mental health promotion actions is the surge of attention deficit hyperactivity disorder (ADHD) diagnoses. A new Finnish school curriculum strongly emphasising self-direction, new school architecture without classrooms, and increased screen time with snappy social media have combined to cause an explosive increase in ADHD diagnoses among boys in particular. More than 10 per cent of boys aged 10-12 were prescribed ADHD medication in 2023, a threefold increase since 2015 (15). When young people's everyday environment does not support concentration and attention, the medicalization of the phenomenon can lead to a focus on the individual's problems rather than on interventions that address the underlying environmental factors that are the root cause.

Parental support in the early years of a child's life is crucial to minimize ACEs and create a strong foundation for the child's mental health and resilience. In particular, maternity and child health clinics, school health services and student welfare services have important roles to play in promoting mental health, including supporting early interaction between children and parents. Socio-emotional skills, sense of security and daily living skills can be strengthened from an early age.

Finland is currently experiencing a period with high unemployment, austerity measures and economic hardship in many families. Accumulated evidence from economic crises shows that social support measures for families and active labour market programmes can prevent or mitigate the negative effects of economic recession on mental health (16).

Poverty and unemployment in the family, or parental mental health problems including harmful substance use, can drain parental resources and reduce the ability to provide a diverse and stimulating home environment for the child. To support parenting in vulnerable families, several interventions have been developed in order to support children's mental wellbeing, prevent their mental health problems and break the intergenerational nature of the problems. Evidence-based programmes suitable for the Finnish environment can be found in the Early Intervention database, run by the Itla Foundation (itla.fi/en/early-intervention).

If the child exhibits behavioural problems, there is strong documented effect of parental support from the parenting group model The Incredible Years and the digital parenting training programme Voimaperheet, developed at University of Turku. In vulnerable families, where parents have problems, the Family Talk intervention has a reasonable amount of documented evidence of effectiveness (17). The International Child Development Programme (ICDP) is a group intervention to strengthen caregiver responsiveness to the child and has a reasonable amount of documented evidence of effectiveness.

Early interventions to promote mental health are highly cost-effective. Nobel Laureate James Heckman has shown that investing in the wellbeing of vulnerable children is the most profitable investment a society can make (18).

School bullying is a significant ACE factor that precedes mental health problems. There is strong evidence of a causal relationship between bullying and mental illness (19). Interventions to prevent bullying and create a safe environment for children and young people are therefore an important part of mental health work. The KiVa anti-bullying programme has strong documentation of proven effectiveness (20). According to the 2023 School Health Promotion Study, bullying, violence and harassment are still common phenomena. Almost one in ten pupils in grades 1-6 and grades 7-9 in primary schools reported being bullied every week by other pupils (3). The continued high prevalence of school bullying and other school violence reported by students suggests that the implementation of anti-bullying programmes needs to be strengthened in schools.

Programmes that strengthen children and young people's socio-emotional skills have been shown to improve both learning and psychological wellbeing (21) (22). Encouragingly, many municipalities in Finland have introduced various programmes to strengthen children's emotional and communication skills in early childhood and basic education. Evidence suggests that teacher training and parental and management involvement

are important components of the effectiveness of such school programmes.

PROMOTING MENTAL HEALTH IN ADULTHOOD

Anxiety and depressive disorders account for an increasing proportion of sick leaves (8), with mental disorders accounting for one in three days of sickness benefit in Finland. One contributing factor is the shift from manual labour to more complex tasks, which has increased psychosocial strain in working life. Different types of psychosocial strain, such as workplace bullying, high job demands and low control over work, unequal treatment and job insecurity have been shown to be associated with increased prevalence of mental health conditions (23).

Interventions to strengthen workers' mental health can be done both at the individual level and at the workplace level. At the individual level, strengthening skills in managing work-related stress and training in mindfulness have yielded good results (24). Creating supportive work environments with flexible but controlled working hours, good opportunities for self-realization and learning, and good management practices can reduce psychosocial strain and improve workers' mental wellbeing (25).

Alcohol policy is a key element in the promotion of mental health. The negative impact of alcohol on mental health is both direct and intergenerational. Binge drinking and alcohol problems are negatively correlated with mental health in Finland (26). Research shows that restrictions on access to alcohol have a positive public health impact. Access to outlets is positively correlated with alcohol consumption (27). In Finland, harmful use of alcohol is a significant background factor in both psychiatric conditions and suicide. In Finland, at least 80,000 children live in families where both parents or one parent has an alcohol or drug problem (28), and these children are at increased risk of mental disorders in adulthood.

Mental health literacy supports the mental wellbeing of individuals. Mental health first aid training can increase public awareness and reduce stigma around mental health problems (29). Targeted campaigns to promote public mental health have been shown to have positive effects. The ABC (Act, Belong, Commit) programme, implemented in Denmark and elsewhere, has been shown to reduce stigma around mental illness, prevent psychiatric conditions, reduce healthcare costs and increase mental wellbeing (30).

Health, income level and social role are associated with older adults' mental wellbeing (35). Social interactions and participation in community activities are crucial for older adults' mental health. Interventions that promote social engagement can improve quality of life and reduce symptoms of depression.

Mental health is also promoted by whole health interventions. Social capital and healthy lifestyles favour both physical and mental health. Peer connections and support networks are part of an individual's social capital. Strong social capital is linked to mental and physical health and low mortality (31). Even small increases in physical activity can have positive effects on mental wellbeing.

MENTAL HEALTH IN ALL POLICIES

There is strong evidence that many early interventions to promote mental health are highly cost-effective. In practice, such interventions remain under-implemented, despite the fact that investing in the mental wellbeing of children and parents yields high returns for society. The wellbeing economy remains an overlooked area in spite of plentiful opportunities to strengthen the national economy.

Promoting mental health requires action in many sectors of society. Mental health needs wellbeing-oriented policies across the government. Decisions in different sectors have an impact on people's mental health, and ex ante assessments of possible mental health impacts should be carried out to a much greater extent than at present (32). For example, urban planning that promotes social interaction and access to green spaces can improve the mental health of residents. Abandoned urban spaces, like the Lapinlahti former mental hospital area in Helsinki, can be transformed to community spaces that support mental health through inclusion, participation, arts and nature (33).

There is a need for better implementation of evidence-based mental health promotion strategies. Policy makers, whose time horizon is often no longer than the electoral term, may find it difficult to invest in long-term interventions at community level, such as supporting family interactions and ensuring safe childhood environments, even if the measures are highly cost-effective in the long run. Both the human and societal perspectives argue in favour of intensified efforts to promote mental health and prevent mental health problems. Research has given us effective tools that are waiting to be put into practice.

Author

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TIMO PARTONEN

SLEEP REGULARITY IS A MAJOR KEY, SOCIAL JETLAG A MINOR, TO MENTAL WELLBEING

KEYWORDS: CIRCADIAN RHYTHM, DIETARY INTAKE, MENTAL HEALTH, PHYSICAL ACTIVITY

Human behaviour is characterized by timing and regularity of activities. On the one hand, chronotype indicates the local clock time which coincides with the midpoint of the longest (usually night-time) sleep period of the day, so that the later it is, the more evening type of person the individual is. On the other hand, diurnal (only seldom nocturnal) preference indicates the most convenient schedule for time usage. Usually, people tend to time their daily activities following local time indicated by clocks. Individuals who prefer being more active in the morning hours lie on the one end of this dimension, whereas on the other end of this dimension are those who prefer being more active in the evening hours.

Thinking beyond the phenotype seen by the naked eye may deepen our understanding of the mechanisms of action which contribute to the diurnal preference or chronotype we have. It might open, if not an avenue, but a view on the actions by which mental health can be promoted. Chronotype is deduced from the timing of the longest sleep period, whereas the diurnal preference estimates the daily rhythm of feeling at one's best from schedules for sleep, dietary intake, physical activity and cognitive exercise. Further, circadian misalignment, also known as social jetlag, is characterized by great differences in bedtimes and wake-up times from weekdays to days off and back again, as the longest sleep period is mistimed relative to the phase of the circadian rhythms. However, chronotype, circadian misalignment and diurnal preference reflect the same physiological basis of human behaviour, that is the intrinsic clock (i.e. the circadian pacemaker) which consists of the suprachiasmatic nucleus in the anterior hypothalamus and generates and maintains the circadian rhythms.

Dysfunction of the intrinsic clock is tightly linked to sleep disturbances as well as depressive episodes. To elucidate the causal contribution of diurnal preference on mood and general wellbeing, a Mendelian randomization study quantified and tested the hypothesis that the more misaligned the physiological circadian rhythms are, relative to the physical light-dark transitions and subsequently the behavioural sleep-wakefulness cycle, the poorer mental health status the individual has (1). A higher genetic liability of earlier diurnal preference (morningness) was associated with lower odds of depressive symptoms. Another Mendelian randomization study corroborated this by showing that earlier diurnal preference (morningness) was associated with lower odds of major depressive disorder (2). Behavioural factors may thus influence the link from the chronotype or diurnal preference to the emergence of sleep disturbances and depressive episodes. Individuals can, however, counteract this with their choices for activities and so shape their schedules. The timing of sleep, dietary intake and physical activity altogether makes a difference here.

SCHEDULES

Within the 24 hours of the day, there is a time window for long enough sleep. When, due to any reason, sleep must be scheduled for during the day due to night shift work, it is never longer than 6 hours in duration on average, and when initiated between 1 p.m. and 7 p.m., it is not longer than 4 hours in duration on average (3). As a positive contrast, it is highly probable that sleep will be 8 hours or longer in duration on average if a person falls asleep within the time window of 9 p.m. to 1 a.m.

One calorie ingested at 8 a.m. is not equal to one calorie ingested at 8 p.m., if judged by its metabolic ramifications. After poor sleep, hunger will be more intensive than usual toward the evening hours, coinciding with a decline in resting energy expenditure and macronutrient metabolism. This may lead to metabolic jetlag and eating late, with less than 25% of calories being consumed before noon, more than 35% after 6

p.m., and the duration for dietary intake exceeding 14 hours from the first to the last bite of the day (4). However, when overweight individuals ate within a self-selected time window of 10 to 12 hours, e.g. from 7 a.m. to 6 p.m., each day for 16 weeks, they reduced body weight, reported being energetic and having improved sleep. These benefits may persist for a year.

Phases of the circadian rhythms are timed by the intrinsic clock, but subject to influence of physical activity. In response to physical exercise of moderate intensity, the circadian rhythms will shift their phase by advances with physical exercise for one hour started at 7 a.m. or from 1 p.m. to 4 p.m., but by delays during the remaining hours of the day (5). The early afternoon hours are recommended for the elderly, less physically active individuals, and those with cardiovascular diseases.

OUTCOMES

The timing of the longest sleep period of the day impacts health status (6). The more of an evening type a person is at baseline, the more often there will be sedentary lifestyle, unhealthy dietary intake, longer screen time, alcohol use disorders, cannabis use disorders, insomnia, anxiety disorders, depressive disorders, cardiovascular diseases and premature deaths during the follow-up. Usage of the summertime arrangements, as governed by Directive 2000/84/EC, will trigger the shift toward more evening-oriented activities each year for seven months and thereby gradually make them the most common.

The circadian misalignment across days of the week impacts health status (7). The greater social jetlag a person has, the more often there will weight gain and adverse changes in levels of blood glucose and lipids during the follow-up. There are, however, effective countermeasures which deliver benefits within three weeks if the timing of night sleep, dietary intake and physical activity are in sync and aligned logically with the hands of the intrinsic clock (8). In a nutshell, these countermeasures are listed in *Table 1*. The benefits from them include reduced sleepiness in the morning, reduced stress, elevated mood, and improved cognitive and physical performance.

Table 1. Instructions for countermeasures against circadian misalignment.

Intervention	Instructions given
Wake-up time	Try and wake up 2-3 hours before the habitual wake-up time.
	Maximize daylight exposure during the mornings. If there is not enough daylight, use artificial bright light exposure.
Bedtime	Try and go to sleep 2-3 hours before the habitual bedtime.
	Minimize light exposure during the evenings.
	Do not take a mobile phone in the bedroom.
Sleep regularity	Try and keep the wake-up and bedtimes as fixed as possible between weekdays and days off.
Dietary intake	Keep a regular schedule for daily meals.
	Have breakfast as soon after wake-up as possible.
	Eat lunch at the same time every day.
	Do not have dinner after 7 p.m.
Caffeine	Do not drink any caffeine after 3 p.m.
Physical activity	If you do exercise, exercise in the morning or early afternoon.
Naps	Do not nap. If you take a nap, do not nap after 4 p.m. nor longer than for 20 minutes.

The regularity of the longest sleep period of the day impacts health status (9). The more regular sleep-wake cycle a person has at baseline, the less often there will be relapses in heavy alcohol use, insomnia, depressive symptoms, metabolic syndrome, cardiovascular diseases, sleep apnoea and premature death during the follow-up. Further, the more regular sleep-wake cycle a person has at baseline, the more often the person will have a physically active lifestyle during the follow-up. Recent evidence demonstrates that sleep regularity is an even stronger predictor of mortality risk than average sleep duration.

PROJECTIONS

There are two main drivers for sleep habits in transition among people living in Finland. Both bear health hazards and thereby have key importance in terms of not only mental health but also public health at large. We can change the first one, but it needs that we reschedule our 24/7 society, whereas the second one changes us so we can only adapt.

One of the drivers is the evening-oriented preference for daily activities, or the late chronotype. Earlier, until the 2010's, there were more morning-oriented than evening-oriented individuals among adults living in Finland, as of the 17,386 study participants, 21.3% assessed themselves as definite morning persons and 15.2% as definite evening persons during the period of 2007 to 2017 (10). However, these proportions have been turned upside down during the 2020's (11). Having seen this trajectory from the 1980's onward, it is of no surprise if those health hazards which have been associated with the behavioural trait toward eveningness would become more common among adults currently living in Finland.

Another of the drivers is the ongoing climate change. It will slowly influence mental health (12). The current scenario for Finland tells us that days will become warmer and sunnier in summer as well as warmer and darker in winter (13). At the population level, on the one hand, positive impacts include increases in the level of physical activity with rising temperatures, but higher temperature in summer and darkness and greater precipitation in winter may however rule each other out (14). On the other hand, negative impacts are forecast for nutrition and sleep at a population level, where there might be decreases in consumption of fruits and vegetables, as well as already seen increases in sleep disturbances and depressive symptoms (15). It may mean that their health-related hazards will become more common than they currently are in a population. All this will also most probably challenge schedules for the daily activities that we and the generations after us follow.

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THE POTENTIAL OF NATURAL ENVIRONMENTS IN MENTAL HEALTH PROMOTION AND PREVENTION

ABSTRACT

Natural environments have been investigated for over two decades as determinants of mental health and wellbeing. However, urbanization has changed living environments, with more and more people spending time indoors and living in built environments that have limited access to natural ones. To provide a coherent view of the research evidence of nature environments on mental health in Nordic countries we conducted an extensive literature search spanning the years 2004 to 2025. The research evidence was narratively analysed by three age groups: children and youth, working-age and older adults, and separately for therapeutic settings. We found that the field has implemented many different definitions of nature exposure as well as outcome measures. High-quality evidence regarding the effects of nature on mental wellbeing of children and the older adults was limited. Studies on adults have been conducted in experimental and observational settings and provide more consistent evidence that nature environments can contribute to prevention of mental health problems. Studies comparing nature-based rehabilitation with other therapeutic approaches, including those using virtual nature exposures, suggest that both have potential for mental health promotion. This accumulated knowledge could be more widely integrated into preventive healthcare and actively promoted by healthcare professionals. In conclusion, to prevent mental health problems, it is essential to ensure equitable access to high-quality natural environments. This review also indicates that fully realizing the benefits of natural environments for mental health promotion and prevention requires tailored approaches depending on the target population.

KEYWORDS: DEPRESSION, EXHAUSTION DISORDER, GREEN AREAS, FORESTS, MENTAL HEALTH, MENTAL WELLBEING, NATURE-ASSISTED TREATMENTS, STRESS, WORK STRESS

INTRODUCTION

Urbanizing societies are globally increasingly facing public health challenges, particularly linked to mental health problems. Modern lifestyles have led to increased physical inactivity and exposure to environmental stressors, contributing to stress-related mental disorders such as depression. Moreover, urbanization has changed living environments, with more and more people spending time indoors and living in built environments that have limited access to natural ones. Linked to these societal and behavioural changes, visiting nature or engaging in physical exercise in natural settings have been proposed as convenient approaches to mental illness prevention and health promotion (1,2).

The first international environmental psychology studies on the beneficial effects of nature exposure on mental wellbeing were published already in the 1980s, and reported that viewing natural landscapes and images of nature improved mood and recovery from surgery (3). In Finland, studies on the wellbeing effects of natural environments began in the late 1990s. Since then, studies have focused on the wellbeing effects of visiting favourite places and the effects of recreational use of nature, as well as the importance of the quality and attractiveness of natural environments in generating wellbeing benefits (4,5). Korpela et al. (4) found that the most favourite places of the Finns are in nature. Typically, people visit these places to calm down and clear their thoughts, contributing to regulation of one's emotions (6).

The mental wellbeing effects of nature visits have further been studied with population-level surveys and experimental studies. These studies showed that visiting nature can improve mood (5,7) and recovery from stress (5) as well as support attention restoration (8). Exercising in nature has also been found to boost self-esteem and feelings of capability and ability (9). Moreover, physiological relaxation has been demonstrated, for example, in studying forest and park walks where heart rate was found to be lower and heart rate variability higher than when walking in a built environment (10). More recently, beneficial associations between natural environments and mental health outcomes have been identified in epidemiological research conducted in urban contexts, including a lower risk of psychotic and mood disorders (11), as well as depression and depressive symptoms (12,13), in areas with greater neighbourhood greenness.

Furthermore, experimental studies conducted in real nature environments have led to exploring the effects of virtual nature exposure indoors. These studies show that virtual nature experiences seem to have similar effects on mental wellbeing as real nature (7,14). Ojala et al. (15) found that 15-minute virtual nature breaks with high-quality nature videos with nature sounds were more effective than other breaks in recovering from stress during the workday. The positive effects were reflected both in psychological measures and in reduced central stress. The results suggest that virtual nature environments can provide a stress relief and restoration method during short breaks, for example, in workplaces and where nature is not easily accessible.

Based on this cumulated research knowledge, natural environments seem to hold significant potential for promoting mental health and wellbeing. These benefits of natural environments are typically derived from living and working environments, but also from nature walks and other leisure activities outside everyday settings. Although the number of local outdoor recreation visits has increased over the past ten years (16), there is also a mounting group of people with decreased contact with natural environments. The main self-reported motives for outdoor recreation include opportunities to maintain physical fitness, recover from stress, experience peace and quiet and enjoy beautiful natural landscapes (16).

Nature is experienced through multiple senses, and a significant proportion of the wellbeing effects, especially mental health benefits, require no effort (17). The health and wellbeing effects of nature are generated through many pathways, including lower exposure to noise and air pollution and high temperatures compared with built environments. Moreover, nature environments support stress reduction and relaxation and may also encourage people to be physically active. They can also allow withdrawal from social interaction or support strengthening social connections, depending on situational needs. In practice, different pathways may operate simultaneously, and the significance of these pathways may vary among different individuals or in different natural environments. The benefits received are also influenced by the perceived quality of the nature site, the attractiveness of the environment, its suitability for personal use and the sense of safety (2).

AIMS OF THE STUDY

The aims of this study were to describe, summarize and evaluate the available research evidence on the effects of natural environments on mental health in the Nordic countries. Moreover, the aim was to identify key target groups studied, as well as characteristics and factors related to measuring nature exposure and health and wellbeing outcomes in this research area. We also discuss knowledge gaps in the research and the applicability of the research findings in practice.

An assessment of the available research evidence was initially conducted through an extensive literature search spanning the years 2004 to 2024, performed in February 2024. The results of this initial search were reported in a non-peer-reviewed report in Finnish, which also covered other dimensions of health and calculation examples of the economic value of the health benefits of exposure to urban nature environments in Finland (2). For the present article, the literature search was complemented in April 2025, covering the years 2024–2025. The review focused on Nordic studies for reasons of applicability and transferability, with a focus on urban areas, where most Nordic people live. Research evidence between nature environments and mental health was analysed by three age groups: children and youth (under 18 years old), working-age and older adults (typically over 70 years old).

In line with the dual continuum model of mental health suggesting that mental illness and positive mental health reflect distinct continua (18), we separately assessed studies examining positive mental health (e.g. subjective wellbeing) and negative mental health (e.g. psychological distress and disorders).

LITERATURE REVIEW

For the review of the available evidence for links between natural environments and mental health, a literature search was conducted for the period 2004–2024 (until April) according to the selected mental health outcomes. Search terms and search databases are listed in Supplement 1. The search was limited to peer-reviewed publications in English. After excluding

refereed articles that were clearly outside the objectives, the original search (2004-2024) and the renewed search for period 2024-2025 (until April) produced altogether 661 articles.

The titles and abstracts of the publications were reviewed by one researcher initially, and unclear cases were discussed with two or three researchers. Peer-reviewed publications with original results from at least one Nordic country were selected for review. They had to include results for mental health diagnoses (such as depression and schizophrenia), short-term outcomes (such as mood and stress) or positive mental health (such as subjective wellbeing).

In addition, the publications selected for the review had used a quantitative measure of the nature exposure, such as the amount of greenery in a residential area measured by a vegetation index (e.g. Normalized Difference Vegetation Index, NDVI) or biodiversity index, or the number of visits to natural areas. Finally, a few other articles known to the research team that did not appear in the search results, but which were considered by the experts to be significant, were added to the review.

An article was excluded from the analysis if it was not peer-reviewed and did not contain actual result estimates or an interpretation of results from any of the Nordic countries. In addition, publications were excluded if they did not define the exposure measure in a comprehensible way or in a more specific way than the general context (e.g. description of agricultural environment, rural vs. urban environment, virtual nature, natural elements indoors). Studies with a small number of observations (less than 20 participants in intervention studies, less than 100 participants in observational studies) and intervention studies with no control group or using covid pandemic as the intervention were also excluded. In addition, studies using only qualitative research methods, on animal-assisted therapy, learning and development, and sleep or body image were excluded. After these selections, 55 scientific articles remained from the original literature search and 10 articles from the complementary search for further review and analysis. As the research area was relatively new in the beginning of the 2000s, the research methods and indicators used were not yet well established. As a result, many of the pioneering studies in the field were not included in this review. Since the literature was highly heterogeneous, we analysed the data narratively.

HOW NATURE CONTRIBUTES TO MENTAL HEALTH AND WELLBEING

USED MEASURES FOR NATURE EXPOSURE, HEALTH AND WELLBEING

The research has implemented a relatively large number of different definitions of exposure to nature as well as outcome measures. Differences in research design were partly due to the different scientific backgrounds of the researchers and partly to the type of nature exposure in the study setting. In Finland, for example, wellbeing benefits of forests has been studied, while in Denmark and southern Sweden interest has focused on gardens and parks. In recent years, the number and scale of research have increased, with a growing focus on the effects of the provision and use of urban nature at the population level. Furthermore, larger and higher quality experimental studies in different types of urban areas have been conducted during the past five years (*Table 1*).

The exposure measures used in observational studies included, for example, self-reported or measured distances to the nearest green space, park or forest, as well as objectively quantified supply of green areas in the home environment using indicators such as the NDVI, which is based on satellite data. Moreover, studies included self-reported measures quantifying the actual use of nature environments such as frequency of visiting nature or participation in outdoor activities.

Table 1. Used measures for nature exposure in Nordic mental health studies.

Research on children and adolescents	Reference
Intervention studies	
Classes indoors vs outdoors in nature	Mygind et al. (2018)
Observational studies	
Green and open spaces or parks within 800m or 5000m from home	Nordbø et al. (2020)
Normalized Difference Vegetation Index (NDVI)	Engemann et al. 2018; 2020b, Thygesen et al. 2020, Fernandes et al. (2024)
Frequency of outdoor recreation activities, e.g. hiking and cross-country skiing	Redzovic et al. (2025)
Time spent outdoors	Wales et al. (2024)

Research on adults	Reference
Intervention studies	
Less than an hour visit to a green space (urban parks, urban forests, health forests)	Tyrväinen et al. (2014), Lanki et al. (2017), Ojala et al. (2019), Stigsdotter et al. (2017)
Daily 15-minute walk in a park during lunch break for two weeks (in comparison to relaxation indoors or normal lunch break)	de Bloom et al. (2017)
Workplace greenery index, based on view and access to green outdoor environment at work	Lottrup et al. (2013)
Nature-based rehabilitation. Visits to green areas near healthcare centres, biodiverse green and blue areas, activities in nature such as gardening, guided walks or relaxation practises	Hyvönen et al. (2023), Sahlin et al. (2015), Kolster et al. (2023), Høegmark et al. (2021), Gonzalez et al. (2011), Dolling et al. (2017)
90-min visits to three different forest environments and one city environment in randomized order	Sonntag-Öström et al. (2014)
Between individual comparisons using 3-hour group sessions with individual therapeutic conversation and individual nature-based activities introduced by the gardener. Individual 1-hour therapeutic conversation sessions with one therapist. Both lasted for 10 weeks	Stigsdotter et al. (2018)
3-hour nature therapy sessions three times a week, during a ten-week treatment period	Corazon et al. (2018)
10 3-hour sessions all of which took place at the University of Copenhagen's therapy garden	Corazon et al. (2024)
Rehabilitation after stroke in rehabilitation garden scheduled for 2 days a week, with each session lasting 3.5 hours	Pálsdóttir et al. (2020)
Observational studies	
Access to garden or nearby green space, self-reported distance to nearest recreational area (own estimate), number of visits to different types of green areas per week	Nielsen and Hansen (2007)
Number of or presence of nature qualities of the neighbourhood (within 300m or within 1km² from home); serenity, wildness, species richness, spaciousness and cultural history were defined with land use data	Annerstedt van den Bosch et al. (2015), Weimann et al. (2015)

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Self-reported distance to nearest green space, frequency of visiting nature (different types asked separately)	Toftager et al. (2011), Stigsdotter et al. (2010)
In rural or suburban areas qualities of the neighbourhood; serenity, wildness, species richness, spaciousness and cultural history (serene, space, wild, culture, lush) combined with Corine land cover dataset	Annerstedt et al. (2012)
Distance (m) to the nearest park and forest as the crow flies based on Corine land cover dataset	Rautio et al. (2024)
Vegetation cover greenness within an area (median size 0.02–0.6 km2) based on satellite images in 10 categories, e.g. water (0 % greenness), dense urban settlement (10 %), grass, agricultural land, deciduous and mixed forest, marshland (100 %)	Ihlebaek et al. (2018)
Availability of accessible green space near home/in the home neighbourhood based on land use data	Ihlebaek et al. (2018), Klein et al. (2022), Stenfors et al. (2024)
Normalized Difference Vegetation Index (NDVI)	Kivimäki et al. (2021), Engemann et al. (2019; 2020a; 2020b; 2020c; 2021), Rautio et al. (2024), Gonzales-Inca et al. (2022), Cadman et al. (2024)
Proportion of green and blue areas within 1km buffer around home	Turunen ym. (2023)
Number of visits to nature/green area/blue area	Hiscock et al. (2017), Vitale et al. (2022), Stigsdotter et al. (2010), Turunen et al. (2023), Klein et al. (2024), MgDougall et al. (2024), Nordbo & Nordh (2024)
Satisfaction with distance to green space	Hiscock et al. (2017)
Physical activity in nature	Pasanen etc. (2014, 2018, 2021), Kajosaari and Pasanen (2021), Konijnenberg et al. (2023)
5 profiles based on frequency of nature visits during leisure time in summer and winter, the frequency of nature visits at work, and the types of outdoor activities in nature environments during leisure time: high, versatile, unilateral, average and low (ref.)	Hyvönen et al. (2018)

Research on older adults populations	**Reference**
Observational studies	
Self-reported access to green space	Lyshol & Johansen (2024)
Shannon Diversity Index (SHDI), based on Corine Land Cover classes at 500m zone around home	Rantakokko et al. (2018)
Frequency of visiting garden or being in the balcony overlooking the garden at a long-term care facility	Rappe and Kivelä (2005)
An index based on the total number of natural view components and natural elements in the garden/patio area	Dahlkvist et al. (2016)

The articles on effects of nature exposure on mental health had also used many outcome variables reflecting the diversity of the scientific fields. To illustrate the breadth and diversity of the research approaches, the outcome measures used in studies are listed by population group in *Table 2*. The studies focusing on children and youth targeted inattention and hyperactivity, depression and anxiety, as well as changes in wellbeing, using altogether nine different outcomes and measurement scales. Studies focusing on adults and the older adults examined the effects of nature exposure on morbidity and depressive symptoms, using a total of 12 different outcome scales. The studies examining effects on mental wellbeing and mood also employed a relatively large number of outcome measures, with eight different scales used. Additionally, stress and restoration were assessed in a considerable number of studies.

Table 2. Outcome measures used in studies by population group.

Population	Mental health dimension	Measure
Children	Inattention and hyperactivity	Teacher ratings by Early Childhood Attention Deficit Disorders Evaluation and Treatment Scale (ECADDES), and Strengths and Difficulties Questionnaire (SDQ)
		Parent ratings
		Self-rated
		d2 Test of Attention
	Depression and anxiety	The Depression, Anxiety and Stress Scale-21 (DASS-21)
		Symptoms Checklist 5 (SCL-5)
	Wellbeing	Short Mood and Feelings Questionnaire (SMFQ)
		Life Satisfaction Scale (SLSS)
		Multidimensional Student Life Satisfaction Scale (MSLSS)
		Rosenberg's Self-Esteem Scale (RSES)

Population	Mental health dimension	Measure
Adults & older adults	Morbidity and depressive symptoms	Beck Depression Inventory (BDI)
		General Health Questionnaire (GHQ12 & GHQ60)
		Psychiatric disorders
		Psychotropic medication use
		Symptom Checklist Core Depression Scale (SCL-CD6)
		Centre for Epidemiologic Studies Depression Scale (CESD)
		Zung Self-rating Depression Scale (SDS)
		Hopkins Symptom Check List (HSCL-5; mental distress)
		General Anxiety Disorder scale (GAD-7)
		Depressive symptoms Patient Health Questionnaire (PHQ-9)
		Symptoms Distress Checklist (SCL-90)
		Edinburgh Postnatal Depression Scale (EPDS)
	Mental well-being and mood	Warwick-Edinbugh Mental Well-being Scale (WEMWBS)
		Psychological General Well-Being Index (PGWBI)
		World Health Organization's subjective well-being scale (WHO5)
		WHO Quality of Life-BREF scale (WHOQOL-BREF), psychological domain
		State-Trait Anxiety Inventory (STAI)
		Positive and Negative Affect Scale (PANAS)
		Profile of Mood States (POMS)
		Short Form Health Survey (SF-36/RAND-36), emotional wellbeing subscale/mental component score (MCS)
	Stress and restoration	Perceived stress scale (PSS)
		Restoration outcome scale (ROS)
		Single-item on stress
Employees	Burnout	Shirom-Melamed Burnout Questionnaire (SMBQ)
		Bergen Burnout Inventory (BBI)
	Occupational wellbeing	Job satisfaction
Patients		Sick leaves
		Healthcare consumption
		The Mental Fatigue Scale (MFS)
		The Warwick–Edinburgh Mental Wellbeing Scale (WEMWBS)

BENEFITS OF NATURE ENVIRONMENTS FOR CHILDREN

We identified five studies involving children that met our inclusion criteria. Mygind et al. (19) conducted a quasi-experimental study in Denmark to assess attention task performance among 10–12-year-old pupils from two outdoor-oriented schools. Participants attended a class either indoors or outdoors in a natural setting. The study found no significant differences in attention scores between the two learning environments. Nordbø et al. (20) linked cross-sectional cohort data from Norwegian 8-year-old children with geospatial data using the NDVI. The analysis revealed no statistically significant association between children's wellbeing, measured using the Short Mood and Feelings Questionnaire (SMFQ), and distance from home to green spaces. Fernandes et al. (21) conducted a large European cohort study investigating the association between residential distance to green space and various health outcomes in children from birth to 12 years of age. Outcomes included attention deficit hyperactivity disorder (ADHD) symptom scores and neurodevelopmental assessments. No significant associations were observed in the Nordic countries (Denmark and Norway). Redzovic et al. (22) examined associations between wildlife activities and anxiety and psychological distress in a cross-sectional study of Norwegian adolescents aged 13–19. An unexpected weak but statistically significant relationship was observed between higher levels of wildlife activity (time spent outdoors) and elevated levels of psychological distress, with a multivariate linear regression effect estimate for the Symptoms Checklist 5 (SCL-5) of 0.05 ($p<0.001$). Wales et al. (23) explored the relationship between time spent outdoors, perceived environmental quality and psychological wellbeing among Swedish adolescents aged 12–15. Time spent outdoors, perceived benefits of outdoor activity and the quality of outdoor life were positively associated with self-esteem and negatively to the scores on the Depression Anxiety Stress Scales (DASS-21).

Six observational nationwide cohort studies from Denmark investigated the associations between growing up surroundings and the prevalence of psychiatric disorders later in life. Engemann et al. have published altogether five studies using the cohort sample of individuals born in Denmark between 1985 and 2003. Of those, two studies showed that living at the highest levels of nature elements during childhood (NDVI at age 10), compared to those living at the lowest levels of nature elements, was associated with fewer diagnoses of various mental illnesses in adolescence or adulthood (24,25). Three studies concentrated exclusively on childhood living environment and schizophrenia diagnosis. Living with the lowest amount of green space was associated with a 1.52-fold increased risk of developing schizophrenia later in life compared to persons living with the highest level of green space (26). The protective effect seemed strongest for blue space, followed by farmland and then near-natural green space, compared to growing up in urban environments (27). The protective effect of childhood green space exposure against schizophrenia was independent of genetic liability (28). In addition, a cohort study by Thygesen et al. (29) included individuals who were born in Denmark between 1992 and 2007 and who were diagnosed with ADHD from age 5 during the period 1997–2016. The study showed that individuals living in the lowest decile of NDVI had an increased risk of developing ADHD, compared with individuals living in areas within the highest decile of NDVI (IRR=1.55; 95% CI: 1.46, 1.65).

BENEFITS OF NATURE EXPOSURE TO ADULT POPULATION

The adult population has been the most commonly studied group. Studies involving adults have been conducted in both experimental and observational settings.

EXPERIMENTAL STUDIES

Experimental studies in Nordic countries have shown generally positive effects of nature exposure on psychological and physiological wellbeing. In Norway, Konijnenberg et al. (30) studied the effects of a snowy winter nature walk on anxiety, perceived stress and cortisol levels in a university campus, compared to treadmill walking indoors without windows. Both the winter nature and indoor treadmill walks reduced significantly cortisol levels. In Denmark, therapeutic forest walks improved mood and reduced fatigue more effectively than urban walks among young adults aged 20–36 years. However, no strong associations were found in blood pressure (31). In Finland, participants visited urban park, urban forest and city centre as a control, for stress reduction after their working day. The forest and park visits enhanced restoration, increased positive emotions and reduced negative emotions compared to city centre visits (5). Forest environment was especially effective for participants who were less urban-oriented or noise-sensitive (32). Physiologically, lower heart rates and higher heart rate variability during forest and park visits suggest greater relaxation (10). In the randomized field experiment by Korpilo et al. (33), psychological and physiological restoration

was significantly greater in environments with higher visual (% of visual natural elements) and acoustic (Normalized Difference Soundscape Index (NDSI)) naturalness, such as beach and forest, compared to urban park (control).

For studies targeting employees, we found one intervention that met the inclusion criteria. De Bloom et al. (34) conducted two randomized controlled trials in the spring and fall, using the same protocol, to examine how different lunch break activities affect recovery from job stress among Finnish knowledge workers. Participants engaged in daily 15-minute sessions over ten working days, assigned to one of three groups: park walking, indoor relaxation exercises or a control group continuing their normal lunch break activity. In the spring trial, recovery and wellbeing improved only slightly, with the greatest gains seen in the control group that did not receive the intervention. In the fall trial, both a 15-minute park walk and indoor relaxation exercises during lunch breaks over two weeks improved wellbeing and recovery compared to the control group.

OBSERVATIONAL STUDIES

We found seven longitudinal and five cross-sectional studies examining mental health (see used outcomes in Table 2), mostly in relation to the availability of nature near residence, measured using geospatial data. Two studies used visits to green/nature areas as the exposure indicator.

In a nationwide Finnish study by Gonzales-Inca et al. (12), the availability of nature, based on NDVI, was examined at 100, 500 and 1,000 metre zones around residence. The study showed that over a five-year follow-up, NDVI between 0.5-0.7 at a 100 metrer range was associated with smaller odds of depression diagnosis compared to an NDVI value below 0.3. The result was similar over a 14-year follow-up period. Similarly, Kivimäki et al. (11) observed that as the greenness of the residential area (likewise measured with NDVI) increased during a five-year period from below to above the median level over a five-year follow-up, the risk of psychotic and mood disorders decreased compared to situations where greenness remained below median. A decrease in greenness, however, did not associate with the risk of psychotic or mood disorders.

In a longitudinal Swedish study, mental health improved more likely among those who had moved to an environment with more serene nature. Other examined landscape qualities such as wildness or spaciousness (*Table 1*) were not associated with mental health (35). In two other longitudinal Swedish studies, higher self-assessed quality of nearby green areas was either weakly associated with better mental health (36) or the association was found only among women for a specific quality factor (37). Klein et al. (38) examined visiting different types of nature areas in relation to anxiety and depressive symptoms, cross-sectionally and longitudinally. They concluded that the respondents who visited nature more frequently (during the pandemic) reported less symptoms both cross-sectionally and longitudinally. Almost all different types of nature areas – e.g. gardens, parks, forests – were associated with less symptoms, except for green playgrounds which showed few associations.

In a cross-sectional Norwegian study, Ihlebæk et al. (39) observed that the likelihood of mental health disorders was lower in greener residential areas (measured by NDVI) compared to the least green areas. The association between green areas assessed by land use classification and mental health disorders was similar but weaker and not statistically significant. Two cross-sectional studies examined residential environments in relation to depressive symptoms. In a Finnish study, depressive symptoms were less frequent if there was more overall greenery (13), but there was no association with distance to the nearest green area (13) or green areas within 50–500 metres from home in a Swedish study (40). In a study conducted across 12 European countries, post-partum depression was examined in relation to NDVI and access to green and blue spaces. Associations between nature exposure and post-partum depression were found to be close to null in the Danish and Norwegian cohorts (41).

Turunen et al. (42) reported that green space around home was not associated with the use of psychotropic medications, but visits to green areas were. Those who reported 1–2 visits to green areas per week, compared with less visits, had a lower likelihood of using psychotropic medication. The association strengthened with more frequent visits. Stenfors et al. (43) likewise assessed medication use as the outcome, in relation to residential green space at 50m, 100m, 300m and 500m zones. More green space was associated with lower odds of depression medication use cross-sectionally (all zones) and longitudinally during a 3-year follow-up (at 50m range). Generally, lowest odds ratios (OR) were observed at smaller zones.

Mental wellbeing was measured using indicators such as positive mental health, stress and psychological recovery (Table 2). Almost all studies addressing these were cross-sectional and based on self-reported surveys. In contrast, exposure to nature was measured using multiple indicators (*Table 1*).

A total of seven observational cross-sectional studies examined nature exposure in relation to mental wellbeing. All of these found some positive associations. Visiting or being physically active in nature (44–48), shorter self-assessed distance to green areas or satisfaction with green areas (44,47) and spending time near blue space during childhood (48) were

associated with higher mental wellbeing. Two studies examined nature using objective geospatial data.

Engemann et al. (49) assessed green space at current and childhood residence and found that both current and childhood residential greenness were associated with higher mental wellbeing, but the associations disappeared when the degree of urbanization and air pollution were controlled for. Blue spaces such as rivers, lakes and seas were not associated with mental wellbeing in these analyses. McDougal et al. (50) examined associations between self-reported visits to green or blue spaces the day before and visits in the past 4 weeks in relation to four dimensions of subjective wellbeing, including cohorts from Finland and Sweden. In the Finnish sample, no associations were found. In the Swedish sample, having visited a greenspace the day before was positively associated with happiness (in line with the majority of the other 16 countries) but no other associations were found (50).

Four observational articles examined nature visits in relation to stress or psychological restoration. All reported a positive association with at least one type of nature exposure. In the study by Stigsdotter et al. (47), shorter distance from home to green areas and more frequent visits were associated with a lower likelihood of being stressed. Kajosaari and Pasanen (51) compared different types of outdoor environments for physical activity and associated benefits and observed that stress reduction was most common if physical activity took place in large forests (>30 hectares) and near water areas, compared with built outdoor environments, smaller urban forests (<30 hectares) and maintained green environments (e.g. parks and gardens). Nielsen and Hansen (52) divided survey respondents into four equally sized groups based on their stress levels and found that weekly visits to green areas and access to a garden were associated with a lower likelihood of belonging to the more stressed groups. However, there were some inconsistencies in the results, and the confidence intervals were large. Pasanen et al. (53) compared recalled psychological restoration from the most recent bout of physical activity and found that restoration was overall slightly greater after physical activity in natural environment compared with indoor or built outdoor environments.

Two observational cross-sectional surveys targeting work wellbeing reported some positive associations between nature near or visible from workplace (54) or nature exposure during work and leisure time (55) and work wellbeing, measured either as stress (54) or burnout symptoms (55). However, both used very different, non-standardized measures, making it difficult to generalize the results.

WELLBEING EFFECT OF NATURE ON OLDER ADULTS

Four observational studies focused on older adults residing either in nursing homes (56,57) or in their own homes (58,59). In each of these studies, both nature exposure and mental health were defined in different ways. A Finnish study (n=848), conducted through home interviews, found no association between biodiversity within 500 metres of the home and depressive symptoms (58). The other study for home-dwelling older adults, conducted in Norway, found that the odds of low mental distress were greater among those who evaluated their access to nature or recreational areas to be good, even after controlling for confounders and health status (59). Among older adults residing in nursing homes, Rappe and Kivelä's (57) study (n=30) found a weak association between visits to the garden or balcony facing the garden and fewer depression symptoms. However, the study did not control for potential confounding factors. In another study conducted in a nursing home environment (n=290), an indirect association was observed between green views and various green elements and better perceived health, mediated by psychological restoration. Green views or elements did not, however, have a total effect on health (56).

MENTAL HEALTH BENEFITS OF NATURE-BASED INTERVENTIONS IN THERAPEUTIC SETTINGS

A total of eleven studies included participants with impaired physical health or mental health conditions. Comparing these studies is challenging due to considerable variation in how health status, treatment modalities and environmental settings were defined. In most cases, the intervention was not limited to a single type of environment; rather, it often included a combination of activities such as gardening, walking in various settings or engaging in structured tasks across different natural environments.

Several studies compared nature-based rehabilitation with other therapeutic approaches. For example, Corazon et al. (60) and Stigsdotter et al. (61) examined the effects of nature-based interventions in comparison to cognitive therapy. Corazon et al. (62) further explored the impact of psychoeducation, relaxation and physical activity exercises conducted in a forest therapy garden. Other studies included comparison between nature-based activities and craft-based activities (63), health-promoting physical activity interventions (64) or standard care and rehabilitation practices (65–68). Moreover, one

study specifically compared visits to different types of forest environment (69).

All studies reported some positive effects of the interventions on participants. However, only a few demonstrated statistically significant differences between treatment groups. For instance, Kolster et al. (64) found improvements in mental health following nature visits, whereas no significant changes were observed in the physical activity group. In the study by Høegmark et al. (65), the only significant difference between the intervention and control groups after six months was in self-reported physical health. Sahlin et al. (67) reported that participants in the nature-based rehabilitation group experienced reductions in burnout, depression and anxiety, along with increased wellbeing and decreased healthcare consumption. Similarly, Gonzalez et al. (70) found that a 12-week small gardening group programme provided alongside standard care led to reduced stress, increased positive affect, decreased negative affect and reduction in depressive symptoms. However, only the reduction in depressive symptoms persisted at the three-month follow-up. In a study involving individuals with post-concussion symptoms, Corazon et al. (62) reported a significant decrease in mental fatigue scores following a nature-based intervention ($p<0.01$), with a moderate effect size ($r=0.55$). Although the mean score remained above the suggested threshold of 10.5 (indicating no to mild symptoms), the mean improvement of 3.48 points on the Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS) exceeded the minimal clinically important difference (>3).

DISCUSSION AND CONCLUSIONS

KEY RESEARCH FINDINGS

Over the past two decades, a substantial body of evidence has accumulated demonstrating the benefits of natural environments for mental wellbeing and health in the Nordic countries. Most studies have been conducted in Finland, Sweden and Denmark, while relatively few have been carried out in Norway and Iceland. The overall findings indicate that exposure to green environments is associated with significant improvements in mental wellbeing and the prevention of mental health disorders. Documented benefits include, for example, stress reduction, enhanced mood and increased vitality needed in everyday life.

The evidence base is strongest for adult populations, supported by a relatively large number of good-quality studies. Most evidence suggests that visiting or being physically active in nature is associated with higher mental wellbeing. There is also increasing evidence that high provision of green areas around home environments may protect individuals from mental health disorders. In contrast, evidence for children and older adults remains limited, primarily due to the small number of experimental studies and their relatively small sample sizes.

High-quality evidence regarding the effects of nature on children's mental wellbeing remains limited. There are only a few studies focusing on younger children, and findings from the Nordic countries indicate no significant effects of nature exposure in this age group. Studies involving adolescents have reported mixed associations between nature exposure and wellbeing outcomes. The cohort studies from Denmark show promising results about the importance of childhood exposure to nature in reducing the risk of developing mental disorders later in life.

Considerable heterogeneity in study designs and outcome measures further limits comparability across these studies. The effects of nature exposure during childhood on mental health in adulthood were mainly conducted in Denmark during the past five years using register-based data. While register-based studies may have large sample sizes, like the Danish studies (24–28), they are not able to control many behavioural variables possibly affecting mental health outcomes.

Variability in findings may be partly attributed to differences in research design and limitations in the measures employed. For instance, a well-documented limitation of using spatial data to quantify residential greenness—as a proxy for nature exposure—is that it fails to account for time individuals spend in nature, the types of activities they engage in or the extent to which green spaces are accessible and suitable for residents' own use (42). Thus, the mere presence or area of green space, as used in most studies to date, may not adequately capture its usability, quality or attractiveness from the perspective of potential users.

The Nordic countries have been at the forefront of piloting various types of nature-assisted therapies. These typically involve the use of garden or forest environments for specific groups, such as people with mental health problems or older adults. Overall, most interventions conducted in the Nordic countries have demonstrated a broad spectrum of positive outcomes (71). However, most of the intervention studies conducted to date were excluded from this review because they were pilot studies with small sample size and had methodological limitations, e.g. lacked a control group without therapeutic intervention.

Although qualitative studies were excluded from this review, they should be acknowledged as a valuable source of information for understanding the perceptions and responses of smaller user groups, as well as the complex behavioural and contextual factors associated with the benefits of nature-

based interventions in mental healthcare. Such groups include, for example, young children, diverse patient populations, veterans and immigrants. While qualitative studies cannot be generalized to larger populations and do not provide effect estimates indicating strength of associations, they offer essential insight that complement quantitative findings and deepen our understanding of how and why nature-based approaches may be effective.

Further research is needed on the effects of natural environments on mental health, with particular attention to actual usage patterns, individual-level responses to nature exposure and findings from population-based longitudinal studies. A more nuanced understanding is required concerning the type and extent of nature exposure. This includes measuring the frequency and duration of visits to natural environments and the specific activities undertaken. Analysing the dose–response relationship across different population groups, including among the vulnerable children and older adults, as well as the long-term impact on mental health and wellbeing are also of importance. Furthermore, research is needed to identify which types of natural and green spaces are most effective in promoting health and wellbeing outcomes.

More detailed information is also needed on the use of natural environments in care and nursing environments in promoting the wellbeing of children, youth and the older adults. This knowledge can help to identify critical points in the life course when exposure to natural environments is most beneficial and to understand the different mechanisms through which disease prevention and health can be promoted.

Rigorous evaluation of structured nature-based interventions—such as nature prescriptions—should also be expanded across diverse patient populations, both within the context of health promotion and as part of rehabilitation and secondary prevention strategies for mental health disorders.

IMPLICATIONS TO MENTAL HEALTH PROMOTION AND TREATMENT OF MENTAL DISORDERS

Overall, the growing body of research suggests that natural environments offer substantial potential for mental health promotion and prevention, as well as for reducing related healthcare costs. Although the mental health benefits of nature are increasingly recognized, they are not yet well integrated into preventive healthcare or widely utilized in the treatment of mental disorders. Nonetheless, such approaches could support mental wellbeing at the population level and potentially generate positive economic impact through decreased healthcare expenditure.

Recently, Tyrväinen et al. (2) presented illustrative calculations of potential cost savings in a scenario where the health benefits of nature were more effectively integrated into health promotion efforts in Finland. One of the three examples focused on the impact of changes in the provision of local supply of green areas on the incidence of depression. The model estimated how a 10% decrease or increase in the availability of green areas could affect the annual treatment costs of depression within the urban population. The modelling was based on findings from a Finnish study by Gonzales-Inca et al. (12), and it assumed that the effects of green space availability in the residential environment would continue across the lifespan. The estimated potential economic benefits from increasing nearby residential green space by 10% included €45 million in direct and indirect cost savings, and an additional €26–79 million in welfare gains through quality-adjusted life years (QALYs), resulting in a total annual benefit of €71–150 million, depending on the valuation of QALYs.

To date, the most robust evidence derives from intervention and epidemiological studies, which demonstrate that regular exposure to natural environments or greater availability of green space in residential areas can significantly enhance mental wellbeing and overall health. Therefore, this knowledge should be more widely utilized in preventive healthcare. In contrast, the evidence supporting nature-assisted treatments (e.g. therapies) to promote mental health remains weaker, primarily due to the smaller scale and limited number of studies. Nevertheless, these approaches also show considerable potential for practical applications.

The findings of Hyvönen et al. (66), for example, suggest that nature-based treatment models can be safely integrated in the secondary and tertiary prevention of mental health disorders in health services and rehabilitation centres. An increasing number of countries have implemented or are piloting nature prescription initiatives, encouraging a patient to spend time in nature to improve their mental health or nature-assisted therapies within healthcare systems. Nature prescriptions typically involve self-directed visits to natural environments recommended by healthcare providers, whereas nature therapy consists of professionally guided interventions conducted in natural settings. However, empirical evidence on their effectiveness remains limited.

One of the key steps towards integrating nature more comprehensively into mental healthcare is raising awareness among healthcare professionals about the health benefits of nature environments. Nature-based interventions should not be viewed as replacements for conventional medical or mental health treatments, but rather as complementary approaches. Instead

of emphasizing potential risks or discouraging engagement with nature environments, health professionals could actively promote their benefits, bearing in mind safety considerations possibly related to engagement with nature. To this end, social and healthcare providers should systematically encourage more nature visits for suitable target groups, such as people with high risk for mental disorders but no mobility limitations, potentially in collaboration with non-governmental organizations active in engaging people with nature. Occupational health services could also advise employers to facilitate breaks in local nature environments during the workday and encourage employees to engage with nature during their leisure time.

Furthermore, in places where people work or study and where nature is not easily accessible, exposure to virtual nature could bring similar types of mental health benefits as visits to real nature. Findings from Nordic studies (72–76) align with international systematic reviews, which have demonstrated virtual nature's potential to induce positive outcomes in psychophysiological wellbeing (77). Further, studies (78,79) have shown that solutions utilizing virtual nature have potential in promoting green exercise. However, some studies have observed real nature to be more restorative than its virtual counterpart (7). Hence, virtual nature should not be understood as a replacement but rather as an alternative to real nature in specific situations. For example, virtual nature environments could be more widely integrated into hospitals, clinics, high-stress job settings and other relevant workplaces with limited access to nature to promote relaxation and support stress recovery.

CONCLUSIONS

In summary, fully realizing the benefits of nature environments—both real and virtual—requires tailored approaches depending on the target group. To prevent mental health problems at the population level, it is essential to ensure the availability of natural environments in residential areas and to provide good, equitable access to them. Achieving these calls for the involvement of municipal and regional actors in land use planning as well as green space planning and management. For promoting mental health in specific treatment groups, a good understanding of user needs and clearly defined goals, such as reducing anxiety, enhancing recovery or improving staff wellbeing, is crucial. Co-design processes involving end users and stakeholders are therefore essential in developing effective nature-based services for mental wellbeing and health.

Supplementary Material

Supplementary data are available at Psychiatria Fennica online.

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MAIJU KAHLMAN, LINDA ENROTH, JAANA I. HALONEN, TYTTI PASANEN

ASSOCIATIONS OF URBAN GREEN SPACE USE WITH ANXIETY, STRESS AND INSOMNIA SYMPTOMS AMONG FINNISH SUBURBAN RESIDENTS

ABSTRACT

***Objectives**: There is compelling evidence of the positive effects of nature exposure on mental health. However, a growing proportion of the population lives in cities, where the incidence of mental health problems is higher than in rural environments. To examine whether nature in suburban areas associates with mental health indicators, we examined the association of visiting and viewing of green spaces with anxiety, stress and insomnia symptoms among suburban residents. **Materials and methods:** The data consisted of a postal and online survey collected in ten suburban areas of Finland in 2021 (n=1667). We analysed the association of visiting and viewing of green spaces with anxiety, stress and insomnia symptoms using multinomial regression analysis, in the whole dataset and stratified by gender and age tertiles. **Results:** Visits to green spaces during the warm season 1–2 times a week (vs. no visits) were associated with higher likelihood of the absence of anxiety symptoms in men, women and those over 56 years old. Visits to green spaces during the warm season were also associated with no stress in women and those over 56 years old, and no insomnia symptoms in men. Viewing green spaces was associated with no stress and low level of insomnia symptoms only in those over 56 years old. **Conclusions:** Viewing and visiting green spaces are associated with lower levels of anxiety, stress and insomnia symptoms. The associations were stronger among women and those aged over 56 years. Further research is needed on the association of urban green space use on young people's mental health.*

KEYWORDS: URBAN NATURE, NATURAL ENVIRONMENTS, MENTAL HEALTH, PUBLIC HEALTH, ENVIRONMENTAL PSYCHOLOGY

INTRODUCTION

In 2023, over 100,000 Finns were paid a sickness allowance due to mental health disorders, accounting for 30% of all sickness allowances [1]. Among 16–34-year-olds, mental health disorders accounted for up to 46% of all reimbursed sickness absence periods (i.e. those lasting over 9 weekdays) [1]. According to the OECD, the direct and indirect costs of mental health disorders in Finland are the second highest in Europe relative to GDP, after Denmark. These costs mainly consist of social and unemployment benefits. However, only 5.6% of all healthcare spending is allocated to mental health, which is significantly less than in other Nordic countries [2].

Anxiety disorders contribute significantly to the global burden of disease. Due to their high prevalence, chronicity and comorbidity, they are ranked as the sixth leading cause of years lived with disability (YLD) [3]. Between 2010 and 2021, anxiety disorders showed the largest increase in disability-adjusted life years (DALY) among 25 diseases [3]. They are associated with poorer perceived quality of life [4] and greater loss of quality-adjusted life years (QALY) [5]. According to the Healthy Finland study, 6% of Finnish women and 4% of men reported experiencing generalized anxiety [6].

Anxiety disorders are preceded by symptoms. Anxiety symptoms have been associated with more harmful health behaviours [7], while anxiety disorders have further been associated with the incidence of somatic diseases and risk factors for chronic diseases, such as hypertension, in the general population [8].

Stress can be defined as a response to environmental demands that exceed an individual's adaptive resources and threaten their wellbeing [9]. Stress is associated with anxiety

disorders, major depression, insomnia, migraines, irritable bowel syndrome and substance abuse [10]. Stress and anxiety increase psychological distress. Additionally, loneliness, job dissatisfaction and work-family conflicts are associated with psychological symptoms [11]. According to the Healthy Finland study, one in five working-age individuals experiences significant psychological distress [12]. When considering not only clinically diagnosed mental disorders but also the milder feelings of anxiety and stress experienced by people, not captured in official statistics, the impact of psychological symptoms on individuals and society is significant.

Insomnia is a contributing factor in many mental and somatic chronic diseases [13,14] and it increases the risk of overall mortality [14,15]. Sleep deprivation impairs performance in tasks requiring attention [16] and the ability to make decisions [17]. According to the 2024 Healthy Finland study, 24.1% of Finns aged 20–64 reported sleeping too little [18]. Insomnia is estimated to have economic impacts not only through direct healthcare costs but also through indirect costs due to reduced productivity, accidents and decreased wellbeing [19].

With urbanization, an increasing proportion of the world's population lives in urban environments. Living in urban areas is associated with a higher prevalence of mental health disorders compared to rural environments [20–22]. In Finland, as the population grew rapidly after World War II, new residential areas representing a new type of construction were built outside city centres, in the middle of fields and forests – the suburbs were born [23]. Initially, moving to a suburb meant moving to the tranquillity of nature, away from the dirty and crowded city centre [24]. The emphasis on proximity to nature was used to describe the relative superiority of suburbs compared to urban centres [25]. In his book "Asemakaavaoppi" published in 1947, architect Otto-Iivari Meurman, who introduced the concept of Finnish residential suburbs, emphasized the consideration of health aspects in the city planning [26]. One of the leading principles of planning, according to him, was to preserve nature throughout the residential area, to provide sufficient recreational space, sports and hiking areas for residents, and to place these areas so that they are easily accessible to citizens. According to Meurman, city residents should have the opportunity to swim in the waters during the summer and have recreational areas for skiing in the winter [26].

Nature in urban environment is often referred to as green spaces, while the definition of green space varies in the literature. In studies examining the interactions between green spaces and human health, green spaces are most often defined as areas covered with vegetation, which can be public or private. A green space can be built, such as gardens or parks, or more natural, such as forests [27].

The psychological effects of nature experiences have been the subject of research for several decades. According to Rachel and Stephen Kaplan's Attention Restoration Theory (1989), a fatigued person recovers and their attention is restored through nature experiences [28]. In nature, attention is drawn to the environment spontaneously, without conscious direction of attention, which helps in recovery. According to the Kaplans, the restorative effects of natural environments can be divided into four components: Nature allows for detachment from the demands of everyday life (being away), immersion and connection with nature (extent), fascination with interesting natural elements (fascination), and nature resonates with the individual's inherent needs, to be and relax (compatibility). At the core of the Kaplans' theory is the restorative effect of nature and the restoration of attention. They defined fatigue as psychological stress resulting from tasks requiring attention and focus, distinguishing it from stress [28].

Ulrich et al. (1991), on the other hand, observed the restorative effect of nature even after a stressful situation in an experiment where participants' physiological responses were monitored while they watched videos of natural and urban landscapes [29]. Participants exposed to natural landscapes recovered from stress more quickly. In Ulrich et al.'s experimental study design, the stressful situation did not require specific attention, as in the Kaplans' theory. The restorative effect of nature was attributed to a change in emotional state to a more positive one [29].

Since then, a significant amount of research evidence on the wellbeing effects of nature experiences has been accumulated, in relation to both mental health symptoms and diagnosed disorders [30]. In their pilot study, Ward Thompson et al. (2012) found that the greenness of the neighbourhood was associated with lower salivary cortisol levels and lower perceived stress, particularly among low-income residents [31]. Exposure to green spaces has also been found to be associated with lower heart rate, diastolic blood pressure, HDL cholesterol and reduced risk of cardiovascular mortality [32,33]. In a recent cohort study of 46-year-olds, greater greenness of the residential environment was associated with a lower risk of experiencing severe depressive symptoms [34]. In experimental research, viewing a natural landscape (vs. viewing a built environment) before an acute stressful event was associated with positive physiological responses, such as increased heart rate variability during stress recovery [35]. In addition, even a short walk in urban green spaces increased participants' perceived psychological recovery compared to walking in the

city centre [36]. Viewing a natural landscape through a window after tasks requiring cognitive processing has also been found to lower participants' heart rate [37].

Living in a greener residential area has been found to reduce the risk of sleeping less than six hours a night [38]. Additionally, the use of green spaces has been associated with better sleep quality [39]. Afternoon forest walks have been found to increase the duration of sleep the following night, calm night-time movements, and improve perceived sleep quality and depth [40]. The health benefits of green spaces are thought to be mediated through psychological and physiological recovery, increased physical activity and reduced exposure to urban stressors such as noise and traffic [41]. There is also evidence that the health effects of nature differ between genders and age groups. For men, living near a green space was associated with better mental health in early and middle adulthood, while for women, a similar association was observed in older age [42]. Furthermore, several sociodemographic factors such as education, employment status, income and household status are known to associate with both mental health and nature visitation patterns [43,44] due to, e.g. selection of living area and the amount of leisure time. Therefore, adjusting for these potential confounders has been a recommended practice [41].

Van den Berg et al. studied the association of visiting green spaces with mental health and vitality in four European cities [45]. A positive association between time spent in green spaces and perceived mental health was found in all cities, regardless of cultural and climatic conditions [45]. In a Swedish study involving nine cities, a protective association was found between visiting urban green spaces and the prevalence of self-reported stress-related illnesses [46].

There is evidence on the short-term effects of visiting and viewing urban green spaces on psychological recovery conducted by experimental study designs. However, there is relatively little research on the association between visiting and viewing green spaces and less severe mental health and insomnia symptoms in everyday life. Therefore, in our study, we investigate whether visiting green spaces and viewing green spaces from home are associated with anxiety, stress or insomnia symptoms experienced by suburban residents. Our research questions are: 'Are visiting or viewing green spaces associated with anxiety, stress and insomnia symptoms among suburban residents?' and 'Do age or gender affect these associations?' The purpose of this study is to provide information on the association between use of green spaces by suburban residents and less severe mental health symptoms. The information can be used in urban planning efforts to promote mental wellbeing, and in the self-care of those suffering from anxiety, stress or insomnia.

MATERIALS AND METHODS

PARTICIPANTS AND DATA COLLECTION

The data for this study were collected as part of the Wellbeing Factors in the Residential Environment survey conducted by the Finnish Institute for Health and Welfare (THL) and the Finnish Environment Institute (SYKE). The survey was part of the Spatial information and residents' experiences for development of comfortable living environments (HYVIÖ) research project, funded by the Ministry of the Environment. The questionnaire, entitled "Determinants of wellbeing in living environment survey", included nearly 70 items concerning characteristics of residential areas, housing conditions, as well as wellbeing, health status and lifestyle. Recipients were given information about the aims of the project and the main themes in the survey, including the availability of services and perception of environmental characteristics in the respondents' residential areas, as well as their health, wellbeing and health behaviour.

The survey was sent to 5,000 randomly selected suburban residents aged 18 or older from two postal code areas in five Finnish cities (Helsinki, Kuopio, Oulu, Vantaa, Vaasa) 500 residents from each postal code area. The sample was provided by Finnish Digital and Population Data Services Agency, the official Finnish population registry, using simple randomization. The selected suburbs were predominantly apartment building areas located a few kilometres from the city centres, except for Helsinki, where the suburbs were located approximately ten kilometres from the city centre. In addition, the survey was sent to 1,000 residents in the central areas of Helsinki and Kuopio. Data collection was conducted via email and postal survey between October and December 2021. A total of 2,072 urban residents aged 18–97 responded to the survey. Compared with the target population in the study areas, women and older respondents were over-represented: 55% of respondents specified their gender as female (vs 52% in the target population), and 40% were aged 65 or older (vs 23% in the target population). To enhance representativeness, the data were weighted to match the age and gender distribution of the target suburban populations.

Fifteen respondents were excluded from the dataset for completing the survey twice (n=6), not residing in the target postal code area (n=6), or not completing the survey themselves (n=3). For this study, respondents living in central city areas (n=370) were also excluded. A total of 18 respondents (1.1%) reported their gender as "other" or chose not to specify their gender. There were also 2 missing responses (0.1%) for gender.

These cases were excluded from the dataset. The final suburban sample consisted of 1,667 respondents.

VARIABLES

Exposure to green spaces was assessed through questions about viewing green spaces from the apartment window and spending time or engaging in outdoor activities in green spaces. The latter was asked separately for the warm and cold seasons.

Viewing Green Spaces

Viewing green spaces was based on the question: "Can you see green spaces from any of your apartment windows?" The response options were: "yes, I often view the scenery," "yes, I occasionally view the scenery," "yes, but I rarely view the scenery" and "no." These four response options were recoded into a three-category variable by combining the last two options. The resulting categories were: "does not view green spaces," "occasionally views green spaces" and "often views green spaces."

Visiting Green Spaces

Time spent in green spaces was assessed with two questions: "How often do you engage in outdoor activities or spend time in green spaces during the warm season (May–September)?" and "How often do you engage in outdoor activities or spend time in green spaces during the cold season (October–April)?" The instructions included a description of green spaces: "In the following questions, green spaces refer to forests, parks, fields, meadows, bogs and rocky areas." The response options were: "never," "less than once a week," "1–2 times a week," "3–4 times a week" and "5 times a week or more." For both warm and cold seasons, responses were regrouped into three categories: less than once a week ("never" or "less than once a week"), 1–2 times a week and at least 3 times a week ("3–4 times a week" or "5 times a week or more").

Health Variables

Anxiety and stress were assessed with the question: "Think about the past month (30 days). Indicate how often the following issue has been on your mind or the symptom has bothered you." The symptoms were "felt anxious" and "suffered from stress." The response options were: "never," "rarely," "occasionally," "often" and "constantly." These were categorized into three groups: no ("never" or "rarely"), occasionally ("occasionally") and often ("often" or "constantly").

Symptoms of insomnia were assessed using the Jenkins Sleep Scale (JSS) [47]. The scale includes four items on insomnia symptoms: "Think about the past month (30 days). Indicate how often you have experienced the following symptoms: trouble falling asleep, waking up several times per night, trouble staying asleep (including waking too early), and feeling tired and worn out after a usual amount of sleep." Respondents rated each symptom on a scale: "not at all," "1–3 nights/month," "about one night/week," "2–4 nights/week," "5–6 nights/week" or "almost every night." Each symptom was classified into two categories: the symptom occurred at most one night per week, or the symptom occurred at least two nights per week. A binary variable was then created: no insomnia symptoms (none of the symptoms occurred more than once per week) and insomnia symptoms (at least one symptom occurred at least two nights per week) (similar to Halonen et al. [48]).

Background Variables

The gender options in the survey were "female," "male" and "other or prefer not to say." Age was derived from the respondent's reported year of birth. In adjusted models, age was included as a continuous variable. For analyses examining associations between green space exposure and health variables across age groups, age was categorized into tertiles to ensure adequate sample sizes: 18–33 years, 34–56 years and over 56 years.

Other potential confounding variables were selected based on previous literature [43,44]. These included educational attainment (basic education/secondary education/higher education), employment status (employed/retired/other), total gross annual household income (less than 15,000 € / 15,001–30,000 € / 30,001–50,000 € / over 50,000 €), cohabitation with a partner (yes/no or no partner) and presence of children under 18 in the household (yes/no).

STATISTICAL METHODS

First, distributions were described for health, green space and background variables by gender and age. The statistical significance of bivariate associations was assessed using the chi-square test. Also, the bivariate associations between green space variables (viewing and visiting) and health outcomes (anxiety, stress and insomnia) were analysed by cross-tabulating each health variable with each green space variable, stratified by gender and age tertiles, and tested using the chi-square test.

To control for background variables, the associations of viewing and visiting green spaces with health variables were further analysed using multinomial regression analysis. The

associations were first assessed in unadjusted models and then by adjusting for potential confounders one at a time. Finally, for each green space variable and health outcome, a fully adjusted model was constructed including all covariates: age, gender, educational level, employment status, total gross annual household income, cohabitation with a partner and presence of children in the household. In the adjusted models stratified by age, we excluded employment status and presence of children in the household (only in the model for over 56-year-olds) due to small prevalence in some categories (e.g. being retired in the youngest age group), which caused issues with convergence. In the analyses, the reference group consisted of those who used green spaces less than once a week.

Multinomial models (both unadjusted and adjusted) were run for the full sample, separately for men and women, and separately for each age tertile. The results are presented as Odds ratios (OR) for absence of symptoms, with 95% confidence intervals and p-values. Results showing the estimates for occasional symptoms of stress and anxiety are provided as Supplements (*Tables S2b, S3b, S4b, S5b*). A p-value of <0.05 was considered statistically significant. The data were analysed using IBM SPSS Statistics version 29.0.2.

RESULTS

DESCRIPTIVE RESULTS

The average age of the respondents was 46.4 years (standard deviation 19.5 years). The average age was 45.8 years for men and 46.9 years for women. The distributions of exposure, outcome and background variables by gender are presented in *Table 1*. Among women, 56% reported viewing green spaces from their window often, compared to 39% of men. The frequency of visiting green spaces during warm season also differed by gender: 59% of women reported spending time in green spaces at least three times per week, compared to 48% of men.

During cold season, visiting green spaces was less frequent for both genders. Among women, 36% reported visiting green spaces at least three times a week, compared to 28% of men. Gender differences in visiting and viewing green spaces were statistically significant across all variables (*Table 1*). Men and women also differed in terms of health variables: women were significantly more likely to report anxiety, stress and insomnia symptoms. Insomnia symptoms were relatively common, with 61% of women and 50% of men reporting symptoms.

The prevalence of anxiety and stress, as well as green space viewing and visiting, varied by age group (*Table S1*). Respondents aged 18–33 reported higher levels of anxiety and stress than older age groups. Insomnia was similarly prevalent across all age groups. Older age was associated with more frequent viewing of green spaces (among over 56 years old 63% reported viewing often, among 18–33 years old 35%).

Most respondents lived with a partner and had no children under the age of 18 (*Table 1*). Nearly 90% had at least secondary level of education. There were no statistically significant gender differences in educational level or employment status. However, income levels differed: 33% of men reported a total annual household income over 50,000 €, compared to 25% of women.

Table 1. Distributions for exposure, outcome and background variables by gender.

	Total (n=1602–1665)		Men (n=779–810)		Women (n=816–855)		p-value[1]
	n	% or mean (sd)	n	% or mean (sd)	n	% or mean (sd)	
Age	**1665**	**46.4 (19.5)**	**810**	**45.8 (18.7)**	**855**	**46.9 (20.2)**	
Viewing green spaces							**<0.001**
Does not view green spaces	355	21.4	204	25.2	151	17.8	
Occasionally views green spaces	512	30.9	286	35.4	226	26.6	
Often views green spaces	792	47.7	319	39.4	473	55.6	
Visiting green spaces during warm season							**<0.001**
Less than once a week	296	18.0	168	21.2	127	15.0	
1–2 times a week	465	28.4	247	31.1	218	25.8	
At least 3 times a week	877	53.6	378	47.7	499	59.1	
Visiting green spaces during cold season							**<0.001**
Less than once a week	600	36.0	321	40.3	278	32.8	
1–2 times a week	515	30.9	252	31.6	264	31.2	
At least 3 times a week	529	32.2	224	28.1	305	36.0	
Felt anxious							**<0.001**
No	968	59.7	537	67.9	431	51.9	
Occasionally	365	22.5	143	18.1	222	26.7	
Often	289	17.8	111	14.0	178	21.4	
Suffered from stress							**<0.001**
No	708	43.8	407	51.5	301	36.4	
Occasionally	503	31.1	238	30.1	265	32.0	
Often	406	25.1	145	18.4	261	31.6	
Insomnia symptoms							**<0.001**
No	716	44.5	392	50.3	324	38.9	
Yes	895	55.5	387	49.7	508	61.1	

	Total (n=1602–1665)		Men (n=779–810)		Women (n=816–855)		p-value[1]
	n	% or mean (sd)	n	% or mean (sd)	n	% or mean (sd)	
Educational attainment							**0.241**
Basic education	187	11.2	100	12.4	87	10.2	
Secondary education	805	48.5	377	46.8	428	50.1	
Higher education	668	40.3	328	40.7	340	39.8	
Total gross annual household income							**0.003**
Less than 15,000 €	354	22.1	178	22.6	176	21.6	
15,001 € – 30,000 €	409	25.5	180	22.9	229	28.1	
30,001 € – 50,000 €	377	23.6	172	21.9	206	25.2	
Over 50,000 €	463	28.9	257	32.7	205	25.1	
Employment status							**0.087**
Employed	809	48.6	416	51.4	393	46.0	
Retired	425	25.5	197	24.3	228	26.7	
Other	432	25.9	197	24.3	234	27.4	
Presence of children in the household							**0.385**
No	1332	80.2	641	79.3	692	81.0	
Yes	329	19.8	167	20.7	162	19.0	
Cohabitation with a partner							**0.156**
Yes	861	52.0	435	53.8	426	50.4	
No or no partner	793	48.0	373	46.2	420	49.6	

[1] Pearson's chi-square -test

CROSS-TABULATIONS AND MULTINOMIAL REGRESSION MODELS

Anxiety

Based on cross-tabulations, women who frequently viewed green spaces from the window had lower levels of anxiety (χ^2=14.15; df=4; p=0.007). In adjusted multinomial regression models, the association remained in the same direction but was no longer statistically significant (*Table 2*). When examined by age group, no association was observed between viewing green spaces and anxiety symptoms (*Table S3a*).

Among both women and men, visiting green spaces during the warm season was associated with less anxiety symptoms. Those who visited green spaces 1–2 times per week were more likely to report no anxiety symptoms compared to those who visited green spaces less than once a week (men: OR for no anxiety = 2.24; 95% CI 1.17–4.26; women: OR = 1.99; 95% CI 1.04–3.84) (*Table 2*). Among women, but not men, a similar association was also observed for those who visited green spaces

at least three times per week. When analysed by age group, more frequent visits to green spaces were associated with no anxiety symptoms only among those over 56 years old (1–2 times/week: OR = 3.44; 95% CI 1.05–11.23; ≥3 times/week: OR = 2.88; 95% CI 1.21–6.84).

During the cold season, visiting green spaces at least three times per week was associated with no anxiety symptoms among women (OR for no anxiety = 1.72; 95% CI 1.06–2.81; *Table 2*). Among men, no such association was observed. In age-stratified analyses, the association was observed only among those over 56 years old (1–2 times/week: OR = 3.42; 95% CI 1.16–10.11; ≥3 times/week: OR = 2.95; 95% CI 1.22–7.13). No associations between green space use and anxiety symptoms were observed in the younger age groups (18–56 years). The unadjusted odds rations for the absence of anxiety by gender and age tertile are presented in *Tables S2a* and *S3a*.

Table 2. Adjusted Odds Ratios (OR) for the association between green space exposure and absence of / no anxiety.

	No Anxiety								
	Total (n=1542–1553)			Men (n=779–810)			Women (n=816–855)		
	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
Viewing green spaces									
Does not view green spaces	1.00			1.00			1.00		
Occasionally views green spaces	0.98	(0.66–1.44)	0.905	0.68	(0.39–1.18)	0.173	1.42	(0.81–2.48)	0.223
Often views green spaces	0.87	(0.60–1.27)	0.480	0.62	(0.35–1.11)	0.106	1.19	(0.71–1.98)	0.519
Visiting green spaces during warm season									
Less than once a week	1.00			1.00			1.00		
1–2 times a week	1.86	(1.20–2.89)	**0.006**	2.24	(1.17–4.26)	**0.014**	1.99	(1.04–3.84)	**0.039**
At least 3 times a week	1.42	(0.97–2.09)	0.075	1.12	(0.66–1.91)	0.672	1.93	(1.08–3.45)	**0.026**
Visiting green spaces during cold season									
Less than once a week	1.00			1.00			1.00		
1–2 times a week	1.05	(0.74–1.49)	0.790	0.82	(0.48–1.38)	0.447	1.37	(0.85–2.21)	0.198
At least 3 times a week	1.22	(0.85–1.75)	0.294	0.81	(0.46–1.43)	0.469	1.72	(1.06–2.81)	**0.030**

Note: Adjusted for age, educational attainment, employment status, annual gross household income, cohabitation with a partner and presence of children under 18 in the household

Stress

Based on cross-tabulation, those frequently viewing green spaces more often reported no stress symptoms compared to those who did not view green spaces (men: χ^2=12.56; df=4; p=0.014; women: χ^2=19.17; df=4; p<0.001). In unadjusted multinomial regression models, the association was statistically significant only among women, but after adjusting by background variables, the association was no longer statistically significant (*Tables 3, S4a*). When analysed by age group, frequent viewing of green spaces from the window (vs. not viewing) was associated with no stress among those over 56 years old (OR for no stress = 2.69; 95% CI 1.04–6.94).

Visiting green spaces during the warm season, both 1–2 times per week and at least three times per week, was associated with no stress symptoms among women (*Table 3*) and among those over 56 years old, compared to those who visited green spaces less than once a week (≥3 times/week, over 56 years: OR for no stress = 2.48; 95% CI 1.13–5.47). Among men and those aged 18–56, visiting green spaces during the warm season was not associated with stress.

Among those over 56 years old, frequent visits to green spaces during the cold season were associated with no stress (≥3 times/week: OR for no stress = 2.70; 95% CI 1.20–6.05). No associations between visits to green spaces during the cold season and stress were observed when analysed by gender or among those aged 18–56. The unadjusted odds rations for the absence of stress by gender and age tertile are presented in *Tables S4a* and *S5a*.

Table 3. Adjusted Odds Ratios (OR) for the association between green space exposure and absence of / no stress.

	No Stress								
	Total (n=1540–1550)			**Men (n=758–765)**			**Women (n=782–786)**		
	OR	**95% CI**	**p-value**	**OR**	**95% CI**	**p-value**	**OR**	**95% CI**	**p-value**
Viewing green spaces									
Does not view green spaces	1.00			1.00			1.00		
Occasionally views green spaces	1.03	(0.70–1.52)	0.866	0.74	(0.43–1.26)	0.270	1.57	(0.87–2.83)	0.137
Often views green spaces	1.04	(0.72–1.51)	0.822	0.73	(0.43–1.25)	0.253	1.46	(0.84–2.52)	0.180
Visiting green spaces during warm season									
Less than once a week	1.00			1.00			1.00		
1–2 times a week	1.57	(1.02–2.41)	**0.039**	1.44	(0.79–2.65)	0.238	2.29	(1.18–4.45)	**0.015**
At least 3 times a week	1.11	(0.76–1.64)	0.588	0.67	(0.29–1.15)	0.146	2.10	(1.16–3.80)	**0.014**

→

	No Stress								
	Total (n=1540–1550)			Men (n=758–765)			Women (n=782–786)		
	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
Visiting green spaces during cold season									
Less than once a week	1.00			1.00			1.00		
1–2 times a week	1.08	(0.77–1.52)	0.651	1.13	(0.68–1.90)	0.635	1.04	(0.64–1.69)	0.878
At least 3 times a week	0.99	(0.70–1.41)	0.960	0.56	(0.33–0.94)	**0.027**	1.50	(0.92–2.44)	0.101

Note: Adjusted for age, educational attainment, employment status, annual gross household income, cohabitation with a partner and presence of children under 18 in the household

Insomnia Symptoms

Viewing green spaces was not associated with the prevalence of insomnia symptoms in the total sample or when analysed by gender. However, in age-stratified multinomial regression models, frequent viewing of green spaces was associated with the absence of insomnia among individuals over 56 years old (OR for no insomnia symptoms = 1.95; 95% CI 1.06–3.59).

Visiting green spaces during the warm season 1–2 times per week was associated with better sleep among men (OR for no insomnia symptoms = 1.77; 95% CI 1.16–2.70; *Table 4*) and among those aged 34–56 (OR = 1.99; 95% CI 1.13–3.50). No association was observed between visiting during the warm season and insomnia among women or in other age groups.

During the cold season, visiting green spaces was not associated with insomnia symptoms (*Table 4*). The unadjusted odds rations for no insomnia symptoms by gender and age tertile are presented in *Tables S6a* and *S6b*.

Table 4. Adjusted Odds Ratios (OR) for the association between green space exposure and absence of / no insomnia symptoms.

	No Insomnia Symptoms								
	Total (n=1538–1548)			Men (n=749–755)			Women (n=789–792)		
	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
Viewing green spaces									
Does not view green spaces	1.00			1.00			1.00		
Occasionally views green spaces	1.07	(0.80–1.42)	0.643	0.96	(0.66–1.40)	0.826	1.27	(0.81–1.99)	0.299
Often views green spaces	1.16	(0.86–1.52)	0.309	1.07	(0.73–1.57)	0.729	1.27	(0.84–1.93)	0.256
Visiting green spaces during warm season									
Less than once a week	1.00			1.00			1.00		
1–2 times a week	1.59	(1.16–2.16)	**0.004**	1.77	(1.16–2.70)	**0.008**	1.39	(0.85–2.29)	0.194
At least 3 times a week	1.08	(0.81–1.45)	0.594	1.04	(0.70–1.53)	0.854	1.07	(0.68–1.68)	0.760
Visiting green spaces during cold season									
Less than once a week	1.00			1.00			1.00		
1–2 times a week	0.96	(0.74–1.23)	0.725	0.99	(0.70–1.33)	0.963	0.91	(0.63–1.32)	0.627
At least 3 times a week	1.04	(0.81–1.34)	0.743	0.92	(0.64–1.33)	0.666	1.10	(0.77–1.57)	0.614

Note: Adjusted for age, educational attainment, employment status, annual gross household income, cohabitation with a partner and presence of children under 18 in the household

Background Variables

Adjustment for the background variables had some effects on the main results, mainly in terms of significance, so that p-values below 0.05 were more typical in the unadjusted models. In the few cases where the estimates were significant in the adjusted but not unadjusted models (e.g. anxiety and stress symptoms in women), the estimates were mostly to the same direction.

The associations between the background variables and the outcomes (*Tables S7*, *S8*, *S9*) were largely as expected. For example, being employed was associated with higher likelihood of stress and insomnia symptoms, and low income was associated with higher likelihood of anxiety symptoms. Contrary to expected, residing with children or a partner showed no associations with the outcomes.

DISCUSSION AND CONCLUSIONS

In this study, we analysed the associations of viewing and visiting green spaces during both warm and cold seasons with symptoms of anxiety, stress and insomnia among Finnish suburban residents. We also analysed these associations by age and gender. Our findings indicate that more frequent visits to green spaces, particularly during the warm season, is associated with absence of anxiety, stress and insomnia symptoms. Most associations were stronger among women compared to men, and among individuals aged over 56 years compared to younger age groups.

Viewing green spaces was associated with lower stress and insomnia symptoms only among those over 56 years old. These findings are consistent with previous research. A recent study by Zhang et al. found that greener window views were associated with better sleep quality among individuals over 70 years old [49]. The authors suggested that the improvement in sleep quality may be mediated by the stress-reducing effects of exposure to green spaces through the window [49]. Similarly, having a bedroom window view of a yard, water or green space has been associated with a lower risk of reporting poor sleep quality [50]. Hazer et al. also found that more frequent viewing of green spaces was associated with reduced stress in urban populations [51]. One possible explanation for the age-specific association found in this study is that older individuals may have mobility limitations, making window views a more important source of nature exposure. Similar findings have been reported during COVID-19 lockdowns [52]. While the immediate mood-enhancing effects of viewing natural landscapes have been widely studied in experimental psychology [53], these effects may not always translate into improved mental health at the population level.

In addition to viewing green spaces, visiting green spaces—especially during summer—appears beneficial. Visits to green spaces 1–2 times per week during the warm season were associated with higher likelihood of absence of anxiety symptoms among men, women and individuals over 56 years old. Among women and those aged over 56, more frequent visits (at least three times per week) indicated similar association. Among men, increasing the frequency of weekly visits to green spaces did not yield additional health benefits for the outcomes studied. A similar pattern was observed in a study from UK, where self-reported health and wellbeing peaked among those who spent 2–3 hours per week in green spaces [54]. On the other hand, Hazer et al. found that the more time participants spent in green spaces per week, the lower their stress levels were [51]. The threshold for health benefits appears to vary depending on the type of exposure and the outcome.

In our study, visiting green spaces 1–2 times and at least three times per week during the warm season was also associated with lower stress among women and individuals aged over 56. Among men, visiting green spaces 1–2 times per week during the warm season was associated with a lower likelihood of reporting insomnia symptoms. Similarly, in the study by Grigsby-Toussaint et al., greater access to green spaces was associated with a lower likelihood of reporting insufficient sleep among men [55].

The associations between visits to green spaces and health outcomes were weaker during the cold than warm season. Visiting at least three times per week during the cold season was associated with lower anxiety symptoms among women and individuals over 56. In the oldest age group, cold season visitation was also associated with lower stress. However, no associations were observed for insomnia. In large-scale population studies using satellite imagery and geospatial data, as well as experimental studies on short-term effects of green space exposure, data collection often occurs during the summer when vegetation is at its greenest [41]. Summer soundscapes, that are missing during Finnish winters, such as birdsong, leaf sound and flowing water, have been shown to reduce stress [56]. In Finland, the amount of daylight also varies with the seasons, being very low in winter, which can affect mood and sleep [57]. Although season inevitably affects the landscape and soundscape, and potentially visitation patterns to green spaces, previous studies suggest that nature visits can still promote health during the cold season. For example, a large 18-country study, including Finland, found that the association between nature visits and wellbeing and reduced psychological distress persisted regardless of season [58]. Brooks et al. also found that nature contact had a positive effect on mood and reduced mental health symptoms in a wintertime experimental study [59].

The response rate in our study was relatively low (34%), although typical for population surveys. The generalizability of the findings is supported by the geographic and sociodemographic diversity of the selected suburbs. The responses were also weighted to match the age and gender distribution of the target suburbs to maximize representativeness of the analytic sample. However, it is likely that those with keener interest in their residential area, as well as health and wellbeing, were more likely to respond to a survey on these themes. It is also possible that individuals experiencing severe anxiety, stress or insomnia symptoms were less likely to complete the survey. These may have further affected the representativeness of the sample. The reliability of the results is strengthened by the inclusion of several potential confounding variables, whose addition affected in

some cases the significance level but mostly not the direction of the estimates. Anxiety and stress symptoms were based on self-reported experiences and possibly reflect mild mental health issues. However, if mild symptoms can be prevented through nature visits, this may help prevent more serious health problems. This should be confirmed in longitudinal studies. The anxiety and stress symptoms experienced during the month prior to the survey were assessed using a single-item measure, rather than a validated scale, which may have compromised the reliability of the measurement. Insomnia symptoms were assessed using the Jenkins Sleep Scale, which has been shown to be a consistent and useful tool for studying sleep difficulties [60].

We had no information on the purpose or duration of visits to green spaces, which may have influenced the results. However, even brief contact with nature has been shown to improve immediate mood [61]. If the purpose of outdoor activity was exercise, such as jogging, the positive effects may be mediated through physical activity, whose positive connection with mental health has been well established [62]. The cross-sectional design of the study further limits causal inference. It is possible that mental health symptoms reduce the tendency to engage in outdoor activities, which may affect the interpretation of association. However, there is also some evidence that those experiencing anxiety are more likely to visit nature weekly compared to those without such symptoms [63]. Stronger evidence on the association of green space use with stress, anxiety and insomnia symptoms would require longitudinal studies with more detailed data on the purpose and duration of green space use. This would also allow for more precise dose–response analyses.

The youngest age group (18–33-year-olds) reported the highest levels of anxiety and stress but showed no association with green space exposure. They also viewed and visited green spaces less frequently than older age groups. In line with our study, in the study by Pyky et al., older age and female gender were associated with more frequent nature activity among suburban residents, regardless of overall physical activity levels [43]. Among older adults, this may be explained by a stronger orientation towards nature [64], as nature connectedness also increases time spent in nature [43]. The role of age in the association between green space use and health outcomes among suburban residents should be further examined with larger samples, as the age-stratified analyses in our study had somewhat limited statistical power.

In conclusion, visiting green spaces even 1–2 times per week (vs. less than once a week) was associated with higher likelihood of absence of anxiety, stress and insomnia symptoms among residents of Finnish suburbs. These associations were particularly evident among women and individuals over 56. The findings suggest that green space use could be recommended as a preventive measure for mental health problems.

Supplementary Material

Supplementary tables are available at Psychiatria Fennica online.

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PATHWAYS TO WORK AND WELLBEING: EMPLOYMENT PREDICTORS AND CHANGES IN HEALTH AND WELLBEING IN INDIVIDUALS PARTICIPATING IN THE INDIVIDUAL PLACEMENT AND SUPPORT PROGRAMME

ABSTRACT

Background: *IPS (Individual Placement and Support) programme is an evidence-based practice to promote the employment of people with severe mental health disorders in the competitive labour market. There is already a considerable body of research evidence on the employment outcomes of the IPS programme, but more knowledge is needed about the factors that contribute to successful employment. Further, more understanding is needed on potential of the IPS programme to also promote, besides employment, the health and wellbeing of programme participants.* ***Objectives:*** *The present study aims, firstly, to determine the factors that predict employment among IPS programme participants, and secondly, to investigate the changes in health and wellbeing in individuals participating in the IPS programme.* ***Materials and methods:*** *The study sample consisted of 249 individuals participating in the IPS programme in Finland, all of them diagnosed with a mental illness, most of them with psychotic disorders. The data were collected through questionnaires from programme participants at baseline and at one-year follow-up, and from IPS employment specialists at the end of the programme. The questionnaire for the participants included several validated scales measuring, e.g. self-esteem, mental health symptoms and experience of social inclusion. The data used for the study also included IPS client documentation in terms of employment.* ***Results****: Of the programme participants, 49% found employment in the competitive labour market at least once. Educational attainment and factors related to client-coach relationship (client's level of engagement, the presence of a trustworthy client-coach relationship and the frequency of meetings between client and employment specialist) emerged as the primary predictors of employment. Neither participants' sociodemographic characteristics nor health and wellbeing related factors statistically significantly explained employment outcomes. At the one-year follow-up, health and wellbeing of programme participants had improved in terms of self-rated health, perceived social inclusion, self-esteem and mental health symptoms. These changes were primarily statistically significant among the participants who gained employment. Nevertheless, self-rated health showed improvement irrespective of employment status.* ***Conclusion:*** *The study highlights the crucial role of the quality of the client–coach relationship within the IPS programme as a central mechanism of getting employed. The findings also challenge the traditional assumptions about who is "ready" for employment and highlights the inclusive potential of IPS, which emphasizes motivation and relational support over clinical or diagnostic thresholds. Positive changes in the health and wellbeing of IPS programme participants seem to be primarily related to employment, supporting the assumption that work can support recovery from mental illness and promote social inclusion.*

KEYWORDS: SUPPORTED EMPLOYMENT, INDIVIDUAL PLACEMENT AND SUPPORT (IPS), REHABILITATION, VOCATIONAL OUTCOMES, MENTAL HEALTH

BACKGROUND

Entering the labour market or returning to work is often challenging for individuals with severe mental illness, such as schizophrenia or other psychotic disorders (1,2,3,4). Disability pension rate has been estimated to be 41-56% among individuals with schizophrenia (5,6). The majority of individuals who experience a first episode of psychosis remain permanently outside the labour force, and their employment prospects tend to decline with age. This trend has remained unchanged over the past 50 years (7). Despite these challenges, on average around 60% of individuals with severe mental illness express a desire to work (8).

IPS (Individual Placement and Support) programme is an evidence-based practice developed in the USA to promote the employment of people with severe mental health disorders in the competitive labour market. IPS programme is intended to be implemented as an integrated part of psychiatric care. The IPS employment specialist and the client start the job search immediately, focusing on work that matches the client's preferences. There are no preparatory phases, and support continues as long as needed (9). The basic idea of the programme is strongly linked to the framework of recovery orientation (e.g. 10,11), highlighting the idea that finding employment and being employed play a key role in recovering from mental health disorders and participating in society (12).

IPS programme offers individually tailored, hands-on support of unlimited duration in finding employment. The employment specialist integrates into the psychiatric care team and collaborates with the client to map out the vocational profile, searches for job opportunities, listens to employers' needs, and ensures that the client receives guidance and advice regarding financial benefits and entitlements. The implementation of IPS is guided by eight core principles (9) and a 25-item fidelity scale (9), which outlines the content of the service, its organization and the required staffing.

Positive employment outcomes of IPS have been particularly evident among individuals with severe mental illness, such as schizophrenia (13), but also in other diagnosis groups, such as individuals with bipolar disorder and substance use disorder (14) as well as those diagnosed with personality disorder (15), autism spectrum disorder (16), anxiety, depression and post-traumatic stress disorder (17).

Previous studies have found various factors that predict attainment of employment goals of individuals with severe mental health disorders. Most of the studies have highlighted educational and previous working experience related factors as the most significant predictive factors related to successful employment outcomes (18,19,20,21,22). In terms of health and well-being related factors, previous studies have identified that lower cognitive functioning, negative symptoms, psychiatric hospitalizations, skills deficits and physical health problems may weaken successful employment outcomes among individuals with severe mental illness (e.g. 18,23,24,22,19,25). The client-coach relationship has gained less attention, even though some evidence exists on the importance of this relationship (26,27).

In addition to employment outcomes, IPS programme has been found to have some positive non-vocational effects, especially on participants' quality of life (28,29), but the evidence regarding these effects is mixed (29). It has been suggested that the observed benefits may be more closely related to employment itself rather than to the IPS model per se (29,30,31).

In Finland, the first nationwide implementation of IPS programme in psychiatric care was launched as part of the national Mental Health Strategy (2020–2030). Internationally, there is already a considerable body of research evidence on the employment outcomes of the IPS programme. However, deeper insight is needed on the factors that contribute to successful employment. Further, more knowledge and coherent understanding is needed on potential of the IPS programme to also promote, besides employment, the psychosocial wellbeing of programme participants. Moreover, evidence regarding IPS programme in the Finnish context is currently non-existent, highlighting the need for country-specific insight.

The present study aims, firstly, to determine the factors that predict employment among IPS programme participants. The focus is on sociodemographic and socio-economic factors, client-coach relationship related factors and factors related to health and wellbeing of the programme participants at the baseline. Secondly, the study aims to investigate the changes in health and wellbeing in individuals participating in the IPS programme.

METHODS

DESIGN

The present study is based on the IPS evaluation study (2020–2023) which was conducted to evaluate the implementation process and to examine the feasibility and effectiveness of the programme in Finland. The study was carried out within the first three Finnish regional pilot projects that implemented IPS programme in their psychiatric outpatient clinics: HUS (Helsinki University Hospital) Psychiatry (13 clinics), Helsinki

Psychosis Services (2 clinics) and Mental Health and Substance Abuse Services of North Karelia Hospital District (7 clinics) (32).

The target group consisted of individuals aged 18 to 64 with severe mental health disorders who were motivated to seek employment, with a particular focus on clients diagnosed with psychotic disorder. All clients who met the criteria of the target group were entitled to the IPS programme according to IPS principles (9). In most cases, before entering the programme, the IPS employment specialist, the case manager and the client held a joint discussion to decide on the referral. Clients were not screened by the psychiatric care provider, and for those who expressed interest a referral to the service was made by the case manager or other psychiatric care professional (32).

The research material for the present study was collected through questionnaires from individuals participating in IPS programme and from IPS employment specialists providing the programme. The material also included IPS client documentation related to employment, as well as IPS referral forms from which the client-specific diagnoses were extracted.

Questionnaire data from programme participants examining the changes in health and wellbeing were collected at three different time points: at baseline and at 6- and 12-month follow-ups. Data from baseline and 12-month follow-up are used for the present study. Further, the IPS employment specialists filled out a final assessment questionnaire for each of their clients at the end of the programme. The questionnaire included questions, e.g. on the coach-client relationship and on the feasibility, benefits, outcomes and effects of the programme for each client assessed by the IPS employment specialist. Data on all employment periods during the follow-up was also gathered from IPS employment specialists.

MEASURES

Employment. The IPS employment specialist collected client-specific and detailed information on each employment contract established during the IPS programme. This documentation was collected as research data at 6-month and one-year follow-up points, as well as at the end of the programme. Because clients entered the programme at different times during the monitoring period, their individual follow-up durations varied. Not all participants were able to complete the full follow-up period within the study timeframe. For each participant the longest possible follow-up time was used.

Employment was defined as having at least one employment contract lasting a minimum of one day. Only paid employment was considered as a positive employment outcome, excluding, for example, work trials, internships and other forms of unpaid employment.

Health and Wellbeing. Health, work ability and psychosocial wellbeing were measured at the baseline and at the one-year follow-up with the following self-report scales and questions used in the client questionnaire: *Self-assessed health* was measured with a single-item scale, where participants rated their current health on a scale from 0 (worst possible health) to 10 (best possible health). *Cognitive functioning* was assessed using a questionnaire with a five-point Likert scale ranging from "very good" to "very poor". Three separate items measured recent memory, learning ability and concentration. For the purposes of analysis, each variable was recoded into a three-category variable by combining the two extreme response categories. The questionnaire has been used in earlier intervention studies on mental health rehabilitation (e.g. 33). *Psychological distress* was assessed using the Kessler Psychological Distress Scale (K6) (34), a six-item measure evaluating symptoms of psychological distress over the past month on a scale of 0 (none of the time) to 4 (all of the time). The total score, ranging from 0 to 24 is obtained by summing the individual item scores.

Self-esteem was assessed using the Rosenberg Self-Esteem Scale (RSE) (35), a ten-item scale measuring self-worth and self-acceptance. All items were assessed using a four-point Likert scale ranging from "strongly agree" to "strongly disagree" and the total score ranging from 10 to 40 is a sum of individual items. *Perceived social inclusion* was measured using the ten-item Experiences of Social Inclusion Scale (ESIS) (36) in a five-point Likert scale ranging from "strongly disagree" to "strongly agree". The items are summed up and the total converted to a score ranging from 0 to 100. *Perceived work ability* was measured with a single-item Work Ability Scale (37), on a scale from 0 (not able to work) to 10 (best possible work ability). *Return to work self-efficacy* was assessed using the Return-to-Work Self-Efficacy Scale (RTW-SE) (38), an eleven-item measure on a scale from 0 (strongly disagree) to 6 (strongly agree) evaluating beliefs and attitudes related to returning to work. The total score of 22 or below indicates low self-efficacy. Further, information on somatic and psychiatric comorbidity was extracted from IPS programme referral forms which systematically recorded primary and secondary psychiatric diagnoses along with any somatic conditions. For both *somatic and psychiatric conditions*, participants were categorized as either having no secondary diagnosis or having at least one secondary diagnosis.

Client-coach Relationship. Data on each client-coach relationship was collected from the IPS employment specialists with the final assessment questionnaire filled out at the end of the programme. The IPS employment specialists rated the client-coach relationships on a five-point Likert scale ranging from "strongly disagree" to "strongly agree" in terms of the quality or smoothness of cooperation with the client, the effectiveness of interaction, the level of trust in the coaching relationship and the client's commitment to the coaching process. For the analysis, the variables were dichotomized by separating the "strongly agree" responses from other categories, which were grouped together. The distribution of the variables was skewed, and a cut-off point was selected to best differentiate between responses. It was assumed that even a minor concern expressed by a IPS employment specialist indicated some level of uncertainty present in the client-coach relationship. Further, information on the frequency of meetings (four-point scale ranging from "weekly or more often" to "less than once a month") between the employment specialist and the client was also used in the present study. For analysis, the variable was dichotomized by grouping the "weekly" and "2–3 times a month" responses into one category and "once a month" and "less than once a month" to another.

The study also included an assessment of the adequacy of collaboration with psychiatric outpatient care, as reported in the questionnaire by the employment specialists. This was evaluated using a three-point scale. For analysis, the responses were dichotomized by combining the categories "no" and "does not concern the client" and separating the "yes" responses.

Sociodemographic and Socio-Economic Measures. The following sociodemographic and socio-economic variables were derived from the questionnaire data at the baseline and from IPS client documentation: age (grouped into 10-year age groups), gender (dichotomized to female and male by excluding persons choosing category "other" (n=4) from the data), marital status, principal activity, basic education, vocational education, work experience and time since last employment or studying period.

ETHICAL APPROVAL AND INFORMED CONSENT

The study was approved by the Institutional review board (IRB) of The Finnish Institute for Health and Welfare (THL), and all participants provided written informed consent prior to participation, in accordance with the Declaration of Helsinki.

SAMPLE

Altogether 455 individuals participated in the IPS programme during the data collection period 2021–2022, and of them, 310 (68%) consented to participate in the evaluation study. Participation in the study required providing consent for at least one method of data collection. The evaluation study comprised a total of five data collection methods, of which three were used in the current analyses: baseline and one-year follow-up questionnaires for the clients, IPS programme client documentation (referral, employment data) and a final assessment questionnaire completed by IPS employment specialist at the end of the programme.

The study sample used in the analyses consisted of participants for whom employment data was available (n=249). Employment data was missing for 61 individuals, of whom 51 had participated in the IPS programme for less than six months which was the first follow-up point, and 10 had not consented to the use of their employment data.

Of the study sample, 242 individuals consented to the baseline survey. A one-year follow-up survey was possible for individuals who had participated in the intervention for at least 12 months within the timeframe of the study (n=181), and of them, 145 participated in the follow-up survey. Altogether, 246 participants consented to the data collection from their IPS employment specialists' assessments. Due to some missing data in some variables, the baseline sample size varied by variable between 232 and 249, and in analyses using one-year follow-up data, it ranged between 136 and 143.

All programme participants had a diagnosed mental illness, 92% of them with a psychotic disorder (ICD-10 F20-29), 7% with mood (affective) disorder (ICD-10 F30-39) and 0.4% with other severe condition, were at least 18 years old and had expressed the wish to find employment. The duration of the completed IPS programme was approximately eight months (mean 239 days, range 9–616 days) in the study sample.

ANALYSIS

All analyses were conducted using IBM SPSS 29.0.2.0 Statistics version. A p-value of <0.05 was considered the threshold for statistical significance.

To answer the first research question, the analysis began by examining the associations between the explanatory variables (sociodemographic and socio-economic factors, health and wellbeing and the client-coach relationship) and the outcome variable (paid employment). For categorical variables, cross-tabulation and chi-square tests were used. For continuous variables, group differences were assessed comparing means

and using independent samples t-tests. Next, all variables that showed a statistically significant association with employment in the descriptive analysis were included in the logistic regression analysis. In addition, variable on work experience was also included based on prior literature indicating its predictive value for employment (18,23). For continuous variables, the assumption of normal distribution was assessed using histograms. Two logistic regression models were formed: 1) unadjusted and 2) adjusted for age and gender.

To address the second research question, changes in health and wellbeing variables between the baseline and one-year follow-up time points were examined by comparing means and using paired samples t-tests for statistical testing. First, changes were assessed for the entire sample, followed by separate analyses for those who gained employment and those who did not.

Missing data analysis was conducted by comparing participants with one-year follow-up survey data to those without it. Differences between the groups were analysed using cross-tabulation and chi-square tests for main activity and gender, as well as mean and independent samples t-tests for age, self-rated health and work ability.

RESULTS

DETERMINANTS OF PAID EMPLOYMENT

The characteristics of the study population are presented in *Table 1*. All individuals in the study group had a psychiatric diagnosis, the majority (64%) were men and the most common main activity status at the baseline was disability pension (54%) (*Table 1*). Among participants with follow-up data on employment, 49% were competitively employed. The associations between sociodemographic and socio-economic factors and employment outcomes are presented in *Table 2*. Age and level of vocational education were found to be statistically significantly associated with employment. Individuals aged 40–49 years were more likely to be employed compared to the other age groups (p=.034), and higher levels of vocational education were associated with increased likelihood of employment (p=.009). Other variables in this category did not show statistically significant associations.

Table 1. Characteristics of study participants.

Characteristic			
	n	**n**	
Study participants	**249**	**100 %**	
Sociodemographic and socio-economic factors			
Age (n=249)			
under 30 years	69	27.7 %	
30–39 years	77	30.9 %	
40–49 years	67	26.9 %	
50+ yearas	36	14.5 %	
Male	158	64.2 %	
Female	88	35.8 %	
Marital status (n=235)			
Single	178	75.7 %	
Married/cohabiting/Registered partnership	44	18.7 %	
Divorced	13	5.5 %	

Main activity (n=240)			
Unemployed	67	27.9 %	
Sick leave	17	7.1 %	
Disability pension	129	53.7 %	
Studying, employed, entrepreneur	22	9.2 %	
Other	5	2.1 %	
Basic education (n=247)			
Comprehensive school or less	148	59.9 %	
Upper secondary school	99	40.1 %	
Vocational education (n=245)			
No vocational or higher education	63	25.7 %	
Vocational education	135	55.1 %	
University education	47	19.2 %	
Work experience (n=240)			
No work experience	48	20.0 %	
1–4 years	78	32.5 %	
5–9 years	54	22.5 %	
10 years or more	60	25.0 %	
Time since last employment or education (n=239)			
Less than 1 year	89	35.7 %	
1–3 years	68	27.3 %	
More than 3 years	82	32.9 %	
Health and wellbeing related factors			
Cognitive functioning			
Memory (n=236)			
Very poor or poor	33	14.0 %	
Satisfactory	68	28.8 %	
Very well or well	135	57.2 %	
Learning (n=236)			
Very poor or poor	16	6.8 %	
Satisfactory	92	39.0 %	
Very well or well	128	54.2 %	

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Ability to concentrate (n=236)			
Very poor or poor	24	10.2 %	
Satisfactory	95	40.3 %	
Very well or well	117	49.6 %	
Primary psychiatric diagnosis (n= 232)			
F20-29	214	92.2 %	
F30-39	17	7.3 %	
Other	1	0.4 %	
Psychiatric comorbidity diagnosis (n=232)			
No	192	82.8 %	
Yes	40	17.2 %	
Somatic comorbidity diagnosis (n=232)			
No	182	78.4 %	
Yes	50	21.6 %	
	n	**mean**	**SD**
Self-assessed health	233	6.6	1.98
Self-assessed work ability	237	6.7	1.91
Return to work self-efficacy RTWSE	237	44.0	10.18
Social Inclusion	237	67.4	17.49
Psychological Distress K6	237	6.8	4.78
Rosenberg Self-Esteem RSE	236	28.4	6.79
Client-coach relationship related factors	**n**	**%**	
Contact between client and employment specialist (n=246)			
More often than monthly	168	68.3 %	
Monthly or less often	78	31.7 %	
Client's commitment to Individual placement and support (IPS) (n=244)			
No	142	58.2 %	
Yes	102	41.8 %	
Cooperation smooth between client and employment specialist (n=243)			
No	133	54.7 %	
Yes	110	45.3 %	

Effective interaction between client and employment specialist (n=244)			
No	142	58.2 %	
Yes	102	41.8 %	
Trustworthy relationship between client and employment specialist (n=243)			
No	131	53.9 %	
Yes	112	46.1 %	
Sufficient contact with client's mental healthcare team (n=244)			
No	50	20.5 %	
Yes	194	79.5 %	

Table 2. The association of gained employment with sociodemographic and socio-economic variables.

Characteristic	**Attained employment**		**Did not attain employment**		**Pearson's Chi-square test**		
	n	**%**	**n**	**%**	**χ2**	**df**	**p**
Programme participants	123	49.4 %	126	50.6 %			
Age					8.68	3	0.034*
under 30 years	33	47.8 %	36	52.2 %			
30–39 years	32	41.6 %	45	58.4 %			
40–49 years	43	64.2 %	24	35.8 %			
50+ years	15	41.7 %	21	58.3 %			
Gender					0.80	1	0.372
Male	75	47.5 %	83	52.5 %			
Female	47	53.4 %	41	46.6 %			
Marital status					2.06	2	0.358
Single	84	47.2 %	94	52.8 %			
Married/cohabiting/ Registered partnership	26	59.1 %	18	40.9 %			
Divorced	6	46.2 %	7	53.8 %			
Principal activity					0.41	3	0.938
Unemployed	34	50.7 %	33	49.3 %			
Sick leave	8	47.1 %	9	52.9 %			

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Disability pension	62	48.1 %	67	51.9 %			
Studying, employed, entrepreneur	12	54.5 %	10	45.5 %			
Other[1]	2	40.0 %	3	60.0 %			
Basic education					0.24	1	0.622
Comprehensive school or less	75	50.7 %	73	49.3 %			
Upper secondary school	47	47.5 %	52	52.5 %			
Vocational education					9.51	2	0.009**
No vocational or higher education	22	34.9 %	41	65.1 %			
Vocational education	70	51.9 %	65	48.1 %			
University education	30	63.8 %	17	36.2 %			
Work experience					4.77	3	0.190
No work experience	19	39.6 %	29	60.4 %			
1–4 years	38	48.7 %	40	51.3 %			
5–9 years	25	46.3 %	29	53.7 %			
10 years or more	36	60.0 %	24	40.0 %			
Time since last employment or education					1.04	2	0.594
Less than 1 year	40	44.9 %	49	55.1 %			
1–3 years	36	52.9 %	32	47.1 %			
More than 3 years	41	50.0	41	50.0			

* Statistical significance p<0.05
** Statistical significance p<0.010
*** Statistical significance p<0.001
[1] Category not included in $\chi 2$ testing

In terms of health and wellbeing of programme participants, none of the health and wellbeing related variables were found to be statistically significantly associated with employment *(Table 3)*.

In terms of the IPS client-coach relationship related variables, the client's commitment to the coaching process, effective interaction between the client and the employment specialist and a trustworthy coaching relationship were found to be positively associated with the employment outcomes (*Table 4*). In contrast, smooth collaboration between client and employment specialist and the sufficiency of collaboration with psychiatric services were not statistically significantly associated with employment. The p-value of the frequency of meetings between client and employment specialist (ES) was close to the threshold for statistical significance, and therefore the variable was included in the subsequent analyses.

Table 3. The association of gained employment with health and wellbeing related variables.

Characteristic	Attained employment		Did not attain employment		Pearson's Chi-square test		
	n	mean	n	mean	t	df	p
Self-assessed health	114	6.8	119	6.5	-1.131	231	0.259
Self-assessed work ability	115	6.8	122	6.6	-0.679	235	0.498
Return to work self-efficacy RTWSE	115	43.5	122	44.5	0.74	235	0.460
Social Inclusion	115	68.0	122	66.8	-0.508	235	0.612
Psychological Distress K6	116	7.0	121	6.6	-0.773	235	0.440
Rosenberg Self-Esteem RSE	115	28.2	121	28.5	0.351	234	0.726
	n	**mean**	**n**	**mean**	**t**	**df**	**p**
Cognitive functioning							
Memory					1.32	2	0.517
Very poor or poor	14	42.4 %	19	57.6 %			
Satisfactory	31	45.6 %	37	54.4 %			
Very well or well	70	51.9 %	65	48.1 %			
Learning					0.598	2	0.742
Very poor or poor	9	56.3 %	7	43.8 %			
Satisfactory	46	50.0 %	46	50.0 %			
Very well or well	60	46.9 %	68	53.1 %			
Ability to concentrate					0.277	2	0.742
Very poor or poor	12	50.0 %	12	50.0 %			
Satisfactory	48	50.5 %	47	49.5 %			
Very well or well	55	47.0 %	62	53.0 %			
Psychiatric comorbidity diagnosis					0.014	1	0.905
No	94	49.0 %	98	51.0 %			
Yes	20	50.0 %	20	50.0 %			
Somatic comorbidity diagnosis					0.209	1	0.648
No	88	48.4 %	94	51.6 %			
Yes	26	52.0 %	24	48.0 %			

Table 4. The association of gained employment with client-coach relationship related factors.

Characteristic	Attained employment		Did not attain employment		Pearson's Chi-square test		
	n	%	n	%	χ2	df	p
Contact between client and Employment specialist (ES)					3.733	1	0.053
More often than monthly	89	53.0 %	79	47.0 %			
Monthly or less often	31	39.7 %	47	60.3 %			
Client's commitment to Individual placement and support (IPS)					8.54	1	0.003**
No	58	40.8 %	84	59.2 %			
Yes	61	59.8 %	41	40.2 %			
Cooperation smooth between client and ES					3.381	1	0.066
No	58	43.6 %	75	56.4 %			
Yes	61	55.5 %	49	44.5 %			
Effective interaction between client and ES					4.594	1	0.032*
No	61	43.0 %	81	57.0 %			
Yes	58	56.9 %	44	43.1 %			
Trustworthy relationship between client and ES					6.831	1	0.009**
No	54	41.2 %	77	58.8 %			
Yes	65	58.0 %	47	42.0 %			
Sufficient contact with client's mental healthcare team					0.675	1	0.411
No	22	44.0 %	28	56.0 %			
Yes	98	50.5 %	96	49.5 %			

* Statistical significance p<0.05
** Statistical significance p<0.010
*** Statistical significance p<0.001

The logistic regression models are presented in *Table 5*. Regarding the sociodemographic and socio-economic factors, higher levels of education and longer work experience increased the likelihood of employment. Completing vocational education doubled the odds of employment, while holding a higher education degree increased the odds by 3.3 (CI 1.49-7.24) compared to individuals without any vocational qualifications. Age lost its statistical significance as an independent predictor of employment in the logistic regression analysis. After adjusting for age and gender, higher education remained a strong predictor (OR=3.1, CI 1.36-6.95), whereas the association with vocational education was no longer statistically significant. Regarding work experience, having more than ten years of experience increased the odds of employment by 2.3 (CI 1.05-4.97) compared to those with no experience; however, this association lost statistical significance after adjustment.

In terms of client-coach relationship related factors, clients who were rated as committed to the coaching process had 2.2 times higher odds (CI 1.28-3.61) of employment compared to those with lower commitment. Effective interaction between

the client and employment specialist increased the odds by 1.8 (CI 1.05-2.93), and a trustworthy coaching relationship by 2.0 (CI 1.18-3.29). The unadjusted association of the frequency of client-coach contact was not statistically significant. After adjusting for age and gender, client commitment remained a significant predictor (OR=2.1, CI 1.23-3.61), as did a trustworthy relationship (OR=2.0, CI 1.17-3.43), as well as more frequent contact between client and employment specialist (OR=1.8, CI 1.00-3.08), while the effect of interaction quality was no longer statistically significant.

Table 5. The unadjusted, and for age and gender, adjusted logistic regression models of sociodemographic, socio-economic and client-coach relationship related factors explaining paid employment.

Model 1[1]					**Model 2[2]**			
	b (SE)	**Sig.**	**OR**	**95 CI**	**b (SE)**	**Sig.**	**OR**	**95 CI**
Age								
under 30 y			1					
30–39 y	-0.254 (0.334)	0.447	0.776	0.403–1.493				
40–49 y	0.67 (0.351)	0.056	1.955	0.983–3.887				
50+ y	-0.249 (0.415)	0.548	0.779	0.345–1.758				
Vocational education								
No vocational or higher education			1				1	
Vocational	0.697 (0.315)	0.027*	2.007	1.081–3.724	0.608 (0.325)	0.061	1.837	0.972–3.473
University	1.191 (0.402)	0.003**	3.289	1.494–7.238	1.124 (0.416)	0.007**	3.078	1.363–6.952
Work experience								
No work experience			1				1	
1–4 years	0.372 (0.372)	0.318	1.45	0.699–3.007	0.373 (0.384)	0.331	1.452	0.684–3.084
5–9 years	0.274 (0.402)	0.495	1.316	0.598–2.893	0.322 (0.442)	0.466	1.38	0.580–3.280
10 years or more	0.828 (0.396)	0.036*	2.289	1.054–4.972	0.89 (0.485)	0.067	2.435	0.941–6.301
Client's commitment to Individual placement and support (IPS)								
No			1					
Yes	0.768 (0.264)	0.004**	2.155	1.283–3.618	0.746 (0.274)	0.007**	2.108	1.231–3.608

Effective interaction between client and Employment specialist (ES)								
No			1					
Yes	0.56 (0.262)	0.033*	1.75	1.047–2.926	0.528 (0.277)	0.057	1.696	0.985–2.922
Trustworthy relationship between client and Employment specialist (ES)								
No			1					
Yes	0.679 (0.261)	0.009**	1.972	1.182–3.290	0.694 (0.276)	0.012*	2.001	1.166–3.434
Contact between client and Employment specialist (ES)								
More than monthly monmomonthly			1					
Monthly or less	0.535 (0.278)	0.054	1.708	0.990–2.947	0.564 (0.287)	0.049*	1	
							1.757	1.001–3.083

* Statistical significance p<0.05
** Statistical significance p<0.010
*** Statistical significance p<0.001
[1] Model 1=unadjusted
[2] Model 2= adjusted for age and gender

INDIVIDUAL-LEVEL CHANGES IN HEALTH AND WELLBEING DURING THE IPS PROGRAMME

Several health and wellbeing indicators showed statistically significant improvement between baseline and one-year follow-up among programme participants (*Table 6*). The score of self-rated health increased from 6.6 to 7.0 (p<.001), experiences of social inclusion from 66.3 to 70.0 (p=.004), self-esteem from 28.1 to 29.1 (p=.014) and mental health symptoms decreased from 7.0 to 6.0 (p=.015). When the analysis was stratified by employment status, all of the above indicators improved significantly among those who gained employment, with greater magnitude of change compared to the full sample. In addition, perceived return to work self-efficacy improved significantly in this group, increasing from 41.9 to 44.7 (p=.020). In contrast, among participants who did not gain employment, only self-rated health showed a statistically significant improvement (p=.038). Other indicators didn't show any statistically significant changes.

DISCUSSION

DETERMINANTS OF PAID EMPLOYMENT

In this study, above all, educational attainment and factors related to client-coach relationship emerged as the primary predictors of employment. In particular, the client's level of engagement, the presence of a trustworthy relationship within the vocational counselling process and frequent contact between client and employment specialist were associated with a higher likelihood of employment. The role of work experience as a predictor of employment was less significant and disappeared after adjusting for age and gender. Neither sociodemographic variables nor health and wellbeing related factors of programme participants significantly explained employment outcomes.

Previous research has demonstrated, and align with results in this study, that higher educational attainment is commonly seen as a predictor of successful employment outcomes among individuals diagnosed with severe mental illness (18,19,20,21), but not always (22). It is also known that individuals with severe mental illnesses are at an increased risk of not completing secondary or higher education, and this educational disadvantage contributes to substantial losses in earnings and overall lifetime

Table 6. The mean rates of health and wellbeing factors at baseline (BL) and at 1-year follow-up in the employed and non-employed study participants.

Characteristic	Research population						Attained employment						Did not attain employment					
		BL	1 year	Paired samples t-test				BL	1 year	Paired samples t-test				BL	1 year	Paired samples t-test		
	n	mean	mean	t	df	p	n	mean	mean	t	df	p	n	mean	mean	t	df	p
Self-assessed health	136	6.6	7.0	-3.571	135	<0.001***	72	6.6	7.1	-2.917	71	0.005**	64	6.5	6.9	-2.124	63	0.038*
Self-assessed work ability	141	6.7	6.8	-0.764	140	0.223	74	6.8	7.1	-1.437	73	0.155	67	6.5	6.4	0.443	66	0.659
Return to work self-efficacy RTWSE	140	42.8	43.6	-0.014	139	0.362	75	41.9	44.7	-2.377	74	0.020 *	65	43.9	42.4	1.171	64	0.246
Social Inclusion	143	66.3	70.0	-2.947	142	0.004**	77	66.0	70.2	-2.456	76	0.016*	66	66.7	69.7	-1.666	65	0.101
Psychological Distress K6	143	7.0	6.0	2.466	142	0.015 *	77	7.2	5.8	2.555	76	0.013*	66	6.7	6.3	0.760	65	0.450
Rosenberg Self-Esteem RSE	143	28.1	29.1	-2.490	142	0.014 *	77	27.7	29.0	-2.461	76	0.016*	66	28.7	29.2	-0.960	65	0.340

* Statistical significance p<0.05
** Statistical significance p<0.010
*** Statistical significance p<0.001

income (2). Previous studies have also consistently identified prior work experience as a key factor in supporting entry into employment (39,26,40,23), although its role in predicting job retention remains less clear (41). In contrast, the present study found only moderate support for this association. The possible explanation may be the assumption that the IPS programme may mitigate the disadvantages of limited work history, offering effective support even for individuals without recent employment experience (22).

The findings of the present study highlight the importance of supporting access to post-compulsory education, particularly for young individuals diagnosed with severe mental health disorders. Alongside education, gaining work experience is also essential, even in the presence of illness. Therefore, it is important that both educational and employment opportunities are considered as integral components of early treatment planning for individuals with psychotic disorders, whenever feasible.

This study found no statistically significant associations between health or wellbeing related factors and employment, which is contrary to previous studies that have identified lower level of cognitive functioning, negative symptoms, psychiatric hospitalizations, and to some extent skills deficits and physical health problems as predictors of negative employment outcomes among individuals with severe mental illness (e.g. 18,23,24,22,19,25,42). Earlier research has suggested that participation in supported employment may at least partially compensate for the impact of cognitive impairment and symptoms on employment (24), which can also explain findings of this study. Our findings support the perception that IPS programme can be effective regardless of an individual's initial status of cognitive functioning, work ability or level of health and wellbeing. IPS is based on the "place-and-train" approach, which assumes that a person's motivation to work is a sufficient criterion for entering the programme. This approach challenges the assumption that work readiness can reliably be assessed in advance. Furthermore, pre-employment training or assessment periods may not accurately reflect the demands of competitive employment (9,43). In this context, timing and the individual's willingness to engage in IPS should be prioritized over clinical or functional assessments when determining readiness for vocational support.

This study identified the client's level of engagement, the presence of a trustworthy relationship and frequent contact with the employment specialist as key factors associated with successful employment outcomes. Although this area has received less attention, previous research has shown that a stronger relationship with the employment specialist (26) and a well-established working alliance, defined as a mutual agreement on goals, tasks and the emotional bond between the client and vocational worker, are positively associated with employment (27). Additionally, both directive emotional support and non-directive instrumental support provided during IPS programme have been linked to improved employment outcomes (44). The number of coping strategies used by employment specialists

has also been found to correlate positively with employment success (45). These findings highlight the central role of the employment specialist, who provides not only personal support, such as encouragement, honesty and flexibility, but also practical assistance with job search activities, including informal contacts and negotiation support (46).

CHANGES IN HEALTH AND WELLBEING AMONG IPS PARTICIPANTS DURING ONE-YEAR FOLLOW-UP

The findings showed that several indicators of health and wellbeing improved statistically significantly between baseline and one-year follow-up, including self-rated health, perceived social inclusion, self-esteem and mental health symptoms. Stratified analysis revealed that these improvements were more pronounced among participants who gained employment. Among those, a statistically significant increase in perceived return to work self-efficacy could also be observed. In contrast, among those who remained unemployed, only self-rated health improved statistically significantly, while other indicators showed no statistically significant changes. Although the changes are relatively small, the findings suggest that employment may play a crucial role in enhancing psychosocial outcomes among individuals with severe mental illness.

Previous research on the non-vocational outcomes of IPS programme has mostly yielded limited or inconsistent findings (47,48,49,50,30,51,52). Some studies have indicated potential benefits among IPS participants, particularly in quality of life (53,28,54,51), as well as in empowerment (53), work motivation (53), mental health (28), social functioning (54) and reduced hospitalizations (31). Among individuals vulnerable to social exclusion and work disability, but not necessarily diagnosed with a severe mental health disorder, previous studies have shown that participating in the IPS is associated with decreased disability, fewer subjective health complaints, lower substance use and reduced feelings of helplessness and hopelessness, along with a more optimistic outlook on future wellbeing (55). However, many of the positive non-vocational effects appear to be mediated by employment itself rather than the IPS programme per se (31,47,50,30,29,56,54), a finding that is also supported by the results of the present study. Further, more robust and coherent associations have been observed in service-related domains, particularly in the long term, which implies that employment is also linked to reduced psychiatric service use (31).

Previous qualitative studies have also reported a range of perceived non-vocational benefits among IPS participants, including improved and activated social lives and networks and social inclusion (57,58,59), increased self-esteem (57,58,60), increased confidence, wellbeing and positivity (59) and alleviation of depressive (60) and other symptoms (58), but not necessarily psychotic symptoms (57). However, qualitative findings often also reflect the broader context of employment rather than the specific effects of the IPS intervention. These findings are consistent with the results of this study, showing full alignment in terms of self-esteem, social inclusion and symptom reduction, and indirect support regarding self-assessed health and return to work self-efficacy among the employed IPS programme participants.

The findings of this study suggest that the primary goal of the IPS programme, employment, may serve as a key mechanism for personal recovery among participants. Those who successfully gain employment through the IPS programme demonstrated improvements in psychosocial health and wellbeing, indicating that employment itself may act as a therapeutic or rehabilitative outcome. However, for participants who did not achieve employment, no significant deterioration in health or wellbeing was observed, suggesting that the intervention was not harmful even when its primary goal was not met.

STRENGTHS AND LIMITATIONS

There are strengths but also some limitations of the study that should be taken into consideration when interpreting the findings. The use of multiple validated measures examining psychosocial wellbeing can be seen as a strength of the study. The participation rate was quite high, considering that the target group consisted of individuals with vulnerabilities. According to the missing data analysis, those who responded to the follow-up survey differed from those who did not respond only in terms of age, not, for example, in terms of gender or self-rated health or work ability. Compared to the non-respondents, respondents were on average slightly older (mean age 38 vs. 35 years), but as the age difference was quite small it is difficult to assess whether this has influenced the results in any particular direction. Further, the amount of missing data across variables was quite small, and therefore it is not expected to bias the results.

Due to lack of a control group, no direct conclusions can be drawn from the study findings about whether the changes observed during the follow-up period were due to IPS programme or some other factor. Therefore, the study does not permit causal inferences, which can be seen as a limitation of the study. In terms of constructing logistic regression models to investigate factors explaining the positive outcome in terms of employment, potential interactions between the observed variables may have influenced statistical significance.

CONCLUSION

The findings of the present study suggest that, besides the crucial role of educational attainment, individuals who are motivated and able to engage in a collaborative relationship with their employment specialist are most likely to benefit from IPS programme, regardless of their initial health status or functional capacity. This challenges traditional assumptions about who is "ready" for employment and highlights the inclusive potential of IPS, which emphasizes motivation and relational support over clinical or diagnostic thresholds. Further, the quality of the client–coach relationship emerges as a central mechanism of getting employed. Employment specialists play a multifaceted role, offering not only practical assistance with job search and negotiations, but also personal support. Their ability to adapt, build trust and use a range of supportive strategies is essential in facilitating clients' pathways to work.

This study also indicated that positive changes in the health and wellbeing of IPS participants seem to be related to employment, supporting the assumption that work can support recovery from mental illness and promote social inclusion. Given that the IPS programme does not negatively impact non-employed participants and may significantly benefit those who do gain employment, it can be justified as a potential service for a wide range of clients with severe mental health problems. The rehabilitative value of employment should be more explicitly recognized in mental health services. Employment should not only be seen as a socio-economic goal but also as a meaningful contributor to personal recovery.

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RETHINKING MENTAL HEALTH THROUGH EMERGING RELATIONAL FRAMEWORKS: A REVIEW OF MULTI-PERSON APPROACHES

ABSTRACT

Mental health research, psychiatric practice and neuroscience have long oscillated between individual-centred and socially embedded paradigms. After the rise of social psychiatry in the mid-20th century, the field largely turned toward individualized, biological approaches. However, growing calls across neuroscience, psychiatry and psychotherapy now signal a renewed focus on relational processes. Recent theoretical and empirical developments suggest that psychiatric disorders may be better understood as disorders of social interaction rather than isolated deficits. Concepts such as interpersonal misattunement, interaction-based phenotyping, and second-person neuropsychiatry offer promising alternatives to traditional observer-based models. Alongside these ideas, the emerging field of relational neuroscience, using methods such as hyperscanning, provides tools to explore the dynamics of reciprocal human interaction. Multi-person approaches also offer potential for advancing our understanding of psychotherapy and other relational settings by moving beyond isolated individuals to the dynamics of shared experience. By capturing meaningful interpersonal moments as they unfold, these approaches may offer insights into the neurobiology of relational change. We propose that a more comprehensive understanding of moments of genuine connection holds promise for advancing mental health research and supports new forms of relationally attuned mental health systems.

KEYWORDS: HYPERSCANNING, INTERACTION-BASED PHENOTYPING, INTERPERSONAL MISATTUNEMENT, INTERPRESENCE, MENTAL HEALTH, PSYCHOTHERAPY, RELATIONAL NEUROSCIENCE, SECOND-PERSON NEUROPSYCHIATRY

In this review, we describe and integrate scientific developments and perspectives highlighting the importance of adding a social lens to psychiatry and mental health, emphasizing the central role of social interaction and intersubjectivity, and the need to rigorously measure real-life, dynamic exchanges, moving beyond single-person approaches. In Section 1, we provide an overview of historical shifts between individual-centred and relational paradigms in psychiatry and neuroscience. In Sections 2 and 3, we introduce multi-person approaches to psychiatry and psychotherapy, respectively. Finally, in Section 4, we synthesize these developments into a relational framework for advancing mental health research and fostering new forms of relationally attuned mental health systems. A brief overview of key concepts and definitions discussed in this review is presented in *Table 1*.

Notably, research in psychiatry draws on a wide range of knowledge domains, including sociology, genetics, psychology, philosophy, neuroscience and medicine. No single domain can fully account for the complexity of mental disorders. We do not propose that relational approaches represent "the" path forward. Rather, we argue that they enrich the field as part of a broader, convergent research strategy and encourage deeper dialogue across disciplinary boundaries.

Table 1. Key concepts and definitions.

Concept	Definition
Interpersonal misattunement hypothesis (1)	Proposes that psychiatric disorders may arise not only from individual dysfunctions, but also from dynamic mismatches between individuals during social interaction (i.e. disruptions in the dynamic and reciprocal unfolding of social interaction).
Interaction-based phenotyping (2)	Measuring relational and reciprocal elements of behaviour and physiology between individuals in real time and naturalistic settings, to create observer-independent markers of how people relate to one another.
Hyperscanning (3)	Simultaneous recording of brain activity from two or more individuals.
Interpresence (4)	The condition of being in a shared psychological "here and now".

THE INDIVIDUAL–RELATIONAL PENDULUM IN MENTAL HEALTH, PSYCHIATRY AND NEUROSCIENCE

The history of psychiatry has been marked by ongoing tension between individual-centred and socially embedded paradigms. The mid-20th century witnessed the rise of social psychiatry. From the 1950s onward, various reform movements emphasized deinstitutionalization, community-based care and the resocialization of individuals with psychiatric diagnoses. This period envisioned an understanding of mental illness as shaped not only by individual factors but also by interpersonal relationships, structural inequalities and cultural context. Social psychiatry reframed mental health as a societal concern and public responsibility, with education, social conditions and institutional reform playing central roles, rather than viewing it exclusively as an individual matter (5).

Two main developments contributed to a significant shift in psychiatry toward the currently dominant biological paradigm, which prioritizes neurobiological explanations and treatment of mental disorders. First, the observed benefits of chlorpromazine in treating psychotic episodes, starting in 1948, along with the mood-stabilizing effects of lithium carbonate in manic-depressive disorders, constituted landmark breakthroughs. These treatments fuelled optimism about biological interventions and explanations for psychiatric conditions, giving rise to the field of psychopharmacology (6). In addition, the growing availability of neuroimaging technologies—such as EEG, CT, PET and fMRI—promised objective insights into brain function. As a result, the field increasingly narrowed its focus to brain-based explanations of mental illness. Neuroimaging became widely adopted in psychiatric research, with the expectation that these methods would offer meaningful insights into the understanding and prediction of mental health conditions (7).

Recent critics argue that the biological paradigm has not fulfilled its promise of translating neuroscientific findings into improved psychiatric practice, diagnosis or treatment (7–9). In response, emerging proposals advocate for approaches that emphasize the study of individuals in relation to the complex interplay of genetic, molecular, cellular, and macroscale brain dynamics and behaviour (10). Or precision psychiatry, which aims to understand within-person mechanisms through individualized neurobiological/behavioural longitudinal studies (11). In parallel, there are renewed calls to prioritize social dimensions and social determinants of mental health and for the adoption of a more social paradigm in psychiatry (9,12).

Meanwhile, the development of neuroscience and psychological science has been characterized by similar oscillations between individual and socially-centred paradigms. In the mid-20th century, the work of McCulloch and Pitts (13), along with the rise of cybernetics (14), introduced the idea that the brain could be formalized as a digital computer. That is, processing inputs, applying logical operations and generating outputs. This computational metaphor shaped classical cognitive science, which sought to model mental functions like attention, perception, memory and language as modular, internal operations (15). In that framework, cognition is treated as a self-contained process occurring "in the head", detached from the body, environment or social context.

More recent perspectives have challenged this view. The Embodied, Embedded, Enacted and Extended accounts of cognition, now commonly grouped within the 4E cognition framework (16), emphasize that cognitive processes depend on the person's body, are influenced by the environment, arise through active engagement with the world, and often extend beyond the brain and body to include tools and other people. Moreover, the social brain hypothesis posits that primates, including humans, evolved larger brains to meet the cognitive demands of managing complex social relationships and group structures (17). In some recent perspectives, social interaction is not treated as a higher-order process enabled by cognitive modules, but rather as the default mode through which minds develop and operate (18–21). Mental processes, in these views, are intrinsically social.

Following these paradigm shifts, social cognitive neuroscience research work has increasingly moved beyond the study of isolated individuals in tightly controlled experimental settings, embracing the complexity of naturalistic environments and real-time social interaction (20,22–24). This transition has been influenced by growing calls to study two or more interacting individuals simultaneously (20,25,26), with the aim of uncovering insights into the social underpinnings of brain function that may not be accessible through single-person studies.

These oscillations between individual and social perspectives in psychiatry and neuroscience set the stage for emerging scientific proposals that treat relational processes not as mere context, but as highly relevant to psychopathology and mental health. In the next section, we explore how such multi-person approaches open new avenues with promising implications for psychiatry and mental health research.

MULTI-PERSON APPROACHES IN PSYCHIATRY AND MENTAL HEALTH

Following this shift towards the social, we now focus on literature that frames psychiatric disorders as disorders of social interaction, and examine the implications of this perspective for the field. Here, we do not aim to define what psychiatry as a discipline is, but rather focus on perspectives emphasizing the importance of closely examining interactional dynamics, measuring both brain, body and behaviour in interaction as a potential way to move psychiatry forward.

PSYCHIATRIC DISORDERS AS DISORDERS OF SOCIAL INTERACTION

Psychiatric disorders have been approached largely through a neurobiological lens, prioritizing brain-based explanations and treatments (9). At the same time, finding brain correlates of psychiatric conditions has turned out to be challenging (9,27). It has been argued that an over-reliance on this neurobiological perspective may have limited psychiatry's ability to address the complexity of mental disorders and to deliver effective solutions, and incorporating a social angle might prove beneficial (9,27). Mental disorders are social constructs, and there is no objective assessment of psychiatric conditions (9). Diagnostic criteria are socially agreed upon through medical consensus, and these consensuses change over time without necessarily aligning with scientific evidence (9).

Moreover, social interactions play a significant role in mental disorders. Psychiatric conditions can strongly affect the experience of interacting with others, and difficulties in social interaction can also increase the risk of developing these disorders (28). Having meaningful interpersonal connections is vital for mental health, and social isolation constitutes both a risk factor and a consequence of psychiatric conditions (9,29). This bidirectional and interdependent relationship, where challenges in social interaction can both stem from and contribute to mental illness, has led to the proposal that psychiatric disorders can be approached as disorders of social interaction (28,30). In this light, placing greater focus on what happens between people (i.e. relational processes) rather than solely within individuals, may offer valuable insights into the understanding and treatment of mental health conditions (9,28).

INTERPERSONAL MISSATTUNEMENT HYPOTHESIS

> *"Impaired social interaction is bidirectional, but we never say that a neurotypical person has a deficit in social cognition when they have a hard time understanding a person with autism" (31)*

Focusing on relational processes, the interpersonal misattunement hypothesis proposes that psychiatric disorders should not be viewed solely as dysfunctional processes within individuals, but also as the result of dynamic mismatches between individuals during social interaction (1,32). Misattunement is defined here as a disruption in the dynamic and reciprocal unfolding of social interaction. These disturbances emerge and evolve across multiple timescales, from moments to years, and across multiple levels, from physiological responses to social expectations (32). Such mismatches are shaped by each individual's prediction and interaction styles and are typically

influenced by sociocultural and technological environments, as well as by dominant social norms (1,32). Importantly, this misattunement is not related exclusively to the traits of one individual and it is not the responsibility of the "atypical" person. Instead, it arises from the interaction itself and constitutes a collective phenomenon (32).

In autism spectrum conditions (ASC), this perspective highlights that social difficulties often emerge in heterogeneous dyads, such as those pairing neurotypical and autistic individuals, while homogeneous dyads (e.g. two autistic individuals), tend to report smoother and more fulfilling interactions (1,32–34). Similarity in autistic traits has been shown to predict higher friendship quality, suggesting that interaction success depends not only on individual traits but also on trait similarity and mutual attunement (35). These findings imply that difficulties in ASC may not arise only from isolated deficits but from mismatches in interactional expectations and predictive styles. We refer the reader to Bolis et al. (1) for a thorough account of how the interpersonal misattunement hypothesis applies to ASC.

A similar relational approach has recently been proposed in the study of paranoia. Although paranoia is defined as a social phenomenon, characterized by an unfounded belief that others intend harm, it is often conceptualized and studied as an isolated cognitive bias within the individual (36). The interpersonal misattunement hypothesis would reframe paranoia as emerging from, and being maintained by, cumulative interactional disruptions (36). For instance, repeated experiences of social disconnection may shape suspicious interaction styles, alter social expectations, and reinforce a cycle of mistrust. In this line, what drives paranoia may not only be the individual's tendencies but also the behaviour and responses of their social partners, which can either escalate or ease paranoid thought during and across interactions. These dynamics can vary across contexts and relationships, suggesting that social difficulties in paranoia are contingent upon relational fit rather than fixed traits (36).

Together, these research lines suggest that social impairments in psychiatric conditions may be more accurately understood as emergent properties of dyadic or group-level interactions, properties that are not present in the individuals themselves. They also point toward a shift to inter-personalized psychiatry that considers and measures not only individual symptoms but also interactional dynamics (32).

INTERACTION-BASED PHENOTYPING

Given the growing views of psychiatric disorders as disorders of social interaction, there is increasing interest in developing tools that move beyond the isolated assessment of individuals and toward capturing the dynamics of real-world interactions. One promising direction is interaction-based phenotyping (2,27,37), which seeks to measure how behaviour unfolds between people in real time and in ecologically valid settings (2). Traditional psychiatric assessments rely heavily on clinical judgment or static self-report questionnaires, yet behavioural markers such as interpersonal synchrony, gaze, posture and turn-taking may reveal critical features of psychiatric conditions that only emerge during actual interaction (27). By measuring these aspects of social interaction, interaction-based phenotyping may facilitate the creation of observer-independent markers that reflect how individuals relate to others, rather than simply how they behave in isolation (2,37).

This approach extends traditional digital phenotyping, which uses smartphones and wearable devices to track individual behaviour in daily life and extract clinically meaningful patterns to inform mental health (38). While digital phenotyping captures general patterns of activity and communication, it lacks the granularity needed to understand real-time social dynamics. Interaction-based phenotyping goes beyond this, measuring the relational and reciprocal elements of behaviour central to many psychiatric disorders (27,39). This approach is proposed to support earlier detection of psychopathology, more personalized interventions, and a shift toward an inter-personalized psychiatry rooted in real-life relational processes (27,30).

RELATIONAL NEUROSCIENCE AND SECOND-PERSON NEUROPSYCHIATRY

Building on the need to measure natural social interactions, a logical additional step is to examine the neural dynamics of such interactions by measuring the brain activity of multiple individuals simultaneously. To elucidate the brain basis of social interaction and social cognition, neuroscience has traditionally focused on studying how individual brains process social stimuli, often relying on paradigms where participants passively observe others or infer mental states in well-controlled tasks/scenarios (20,25,40). While this work has shed light on neural correlates of key components of social cognition, such as empathy, mentalizing and action perception, it has mostly examined the social brain from a third-person, observer-based perspective. In the last two decades, a conceptual and methodological shift has taken place, giving rise to frameworks such as two-person neuroscience (20,25), second-person neuroscience (26) and relational neuroscience (41), which aim to understand the brain not only as it processes social information, but as it participates in dynamic, reciprocal, real-time interactions (20,25,26,42).

One of the key methodological developments supporting this shift is hyperscanning, which refers to the simultaneous recording of neural activity from two or more individuals. After Montague (3) demonstrated for the first time the feasibility of measuring brain activity from two individuals using synchronized magnetic resonance imaging (MRI) scanners, hyperscanning setups have become increasingly available in other non-invasive neuroimaging modalities, including electroencephalography (EEG), functional near-infrared spectroscopy (fNIRS) and magnetoencephalography (MEG) (43,44). To date, the hyperscanning literature is predominantly composed of studies using fNIRS and EEG, likely due to their affordability and portability (44).

The availability of two-brain data has opened up new possibilities for research questions, experimental paradigms and data analysis methods aiming at exploiting the richness and complexity of these datasets (20). Hyperscanning has been employed across various domains, including interpersonal coordination, verbal and non-verbal communication, developmental research, social learning and education and teamwork, emotion and affect, as well as mental health and psychopathology. To date, most studies in the field have focused on examining interdependencies or similarities between the brain activity of interacting individuals and how these relate to social interaction, often emphasizing inter-brain synchronization as a central element. The underlying premise is that meaningful aspects of social interaction may be reflected in, or mediated by, varying levels of synchrony between the brain activity of individuals engaged in interaction. We refer the reader to several sources for overviews of hyperscanning research in multiple domains (20,23,42–44), a comprehensive review on brain-to-brain synchrony (23), and recent guidelines providing practical recommendations for conducting hyperscanning studies (45).

Second-person neuropsychiatry emphasizes the importance of studying the interplay between social cognition and mental disorders not solely through traditional single-person observation-based paradigms, but by investigating individuals in interaction with others. Second-person neuropsychiatry extends interaction-based phenotyping from behaviour towards addressing relevant neural correlates. As previously described, both neuroscience and psychiatry have historically overlooked social interaction, and this is precisely where they now converge (46). Second-person neuropsychiatry is, in essence, a multi-person/relational neuroscience approach applied to the study of psychiatric disorders, which are here understood as disorders of interaction, relationally constituted and context-dependent (26,28,47). This approach focuses on investigating real-time dynamic exchanges, capturing the processes that underlie natural social behaviour (26,42). We refer the reader to various comprehensive overviews of studies applying second-person approaches to psychiatric research, including methodological and conceptual challenges (23,28,29,47). These reviews include applications and early findings related to ASC, personality disorders, depression, schizophrenia, substance use disorder and social anxiety disorder.

As a relevant example, Bilek et al. (48) investigated alterations in interpersonal brain dynamics in individuals with borderline personality disorder (BPD), a condition characterized by significant emotionally driven difficulties in social interaction. Employing a hyperscanning approach, the researchers recorded brain activity from dyads consisting either of two healthy participants or of one healthy participant and one individual fulfilling the criteria for BPD. The aim was to examine whether brain-to-brain connectivity during social interaction differed in BPD and how such differences varied as a function of the clinical state. Their findings revealed that dyads involving participants with active BPD exhibited reduced inter-brain connectivity relative to control dyads. Notably, this disruption appeared to be state-dependent: during remission, BPD participants showed restored cross-brain connectivity with their interaction partners, with connectivity patterns approximating those of the control–control group. These results suggest that interpersonal misalignment in BPD may be dynamic and modulated by symptom severity. The authors propose that cross-brain connectivity metrics may serve as state-sensitive biomarkers, offering novel opportunities for monitoring treatment efficacy and informing relationally focused interventions. More broadly, the study underscores the potential of multi-person approaches to shed light on the neurobiological substrates of relational dysfunction in psychiatric disorders, aligning neuroscientific and clinical knowledge. Moreover, these findings open avenues for the further development of interaction-based diagnostic and therapeutic frameworks.

As a cautionary note, the growing number of hyperscanning studies has also drawn attention and raised criticisms, particularly regarding outcomes related to inter-brain synchronization in social interaction. Concerns include the lack of a unified theoretical framework (49), the proliferation of analytic techniques combined with limited consensus on best practices and standardization in the field (44,49–51), questions on the interpretation of inter-brain coupling results and their relationship to social interaction (49,51–53). We have also questioned whether the current approaches can capture meaningful relational dynamics and proposed relevant solutions (4). We will return to this issue in Section 3, where we introduce some remediations we consider relevant in the context of psychotherapy.

In addition, given that real-time natural interactions are inherently variable and unique, it remains challenging to rely solely on brain or brain-to-brain measures in these studies. Combining behavioural/physiological measures and interaction-based phenotyping is essential for obtaining a more comprehensive understanding of the neural basis of social interaction and its disruptions in psychopathology (20,27,42). In the longer term, once reliable social markers of psychopathology are identified, neurofeedback tools based on these markers could potentially be implemented for the diagnosis and treatment of certain conditions (47). For example, real-time feedback on brain-to-brain connectivity, shared physiological states or behavioural patterns could be used to help individuals with social difficulties, such as those seen in autism or mood disorders, learn to recognize and regulate interpersonal dynamics in various contexts. We refer the reader to Morrissey et al. (54) for a review of neurofeedback applications in clinical settings and to Cheng et al. (55) for an example of multi-person neurofeedback tools to promote social connectedness.

While research endeavours involving multi-person neuroscience in psychiatry are still in their early stages, they hold promise for generating new ideas, hypotheses and empirical findings that may advance the field of psychiatry and its clinical relevance. As Schilbach eloquently put it:

> *"Moving towards a second-person neuropsychiatry, therefore, could be seen as an effort that tries to incorporate both biological and psychosocial aspects of mental disease while considering the brain as the interface at which genetic and environmental influences interact to produce those thoughts, perceptions, beliefs and feelings that are relevant for the joys and sorrows that characterize our everyday life". (23, p. 8)*

MULTI-PERSON APPROACHES AND MEANINGFUL INTERPERSONAL MOMENTS IN PSYCHOTHERAPY

Multi-person approaches also hold potential to advance our understanding of change processes in psychotherapy, by moving beyond isolated individuals to the dynamics of meaningful moments and shared experiences. Many established psychotherapeutic approaches are grounded in individual-level models of therapeutic change (56). According to these models, the patient communicates symptoms, the therapist interprets them through theoretical knowledge, and together they identify potential pathways for relief and other positive outcomes. The therapist may suggest a conceptualization of how the patient's suffering is related to behaviour, thoughts, defence mechanisms and other dimensions, from which a proposal for change may emerge. These approaches typically emphasize individual insight and cognitive restructuring, with relational dynamics playing a supporting but not central role. However, alternative models of change highlight the therapeutic relationship itself as a key driver of transformation, suggesting that something about the authentic meeting between two individuals has a therapeutic effect for the patient (57,58). Rooted in, for example, attachment theory and affect theory, these models emphasize implicit, co-regulated emotional processes and moments of shared presence between therapist and patient. They suggest that healing can emerge not only through reflection and interpretation but also through moments of meeting as new relational experiences (59).

The integration of neuroscience, physiology and psychotherapy research has long been a topic of interest in the mental health field, but it remains methodologically and conceptually challenging, and empirical multi-person studies investigating fine-grained, real-time therapeutic interactions are still scarce (60,61). An extensive body of research exists on interpersonal autonomic physiology in therapeutic settings (62–64), and slightly more than ten studies to date have applied a relational/multi-person neuroscience approach in clinical psychotherapeutic contexts (60). These studies have typically attempted to summarize the complexity and dynamics of therapeutic encounters using indices of inter-brain synchronization or interpersonal autonomic linkage at the group level. Yet, the relationship between such inter-brain dependencies and therapeutic processes remains underexplored and poorly understood (60).

One explanation for this situation may be that psychotherapeutic interactions, like all real-world conversations, are inherently complex and shaped by multiple interacting factors, including gestures, language, mentalization and environmental context. Studying the dynamics of these factors in naturalistic settings is inherently challenging, and it is even more difficult to draw conclusions about individual experiences or link them directly to therapeutic outcomes. However, promising approaches have been proposed to better capture interactional dynamics in ways that could inform and enhance psychotherapeutic practice.

One relevant proposal is the integration of the 4E/MoBI framework with Scalable Experimental Designs (SED) (22). In cognitive science, as introduced in Section 1, the term 4E refers to cognition as embodied, enacted, extended and embedded. These concepts emphasize how mental processes are fundamentally interrelated with bodily, environmental, and social contexts, similar to the complex relational dynamics explored in relational

neuroscience and psychotherapy. The authors propose applying a 4E perspective in psychotherapeutic research, operationalized through MoBI (Mobile Brain/Body Imaging), which integrates multiple brain and body measurements adapted for use outside traditional laboratory settings. The second element, Scalable Experimental Design (SED), refers to a research strategy that spans a continuum from highly controlled experiments to more naturalistic settings. Specific microprocesses may initially be studied under controlled laboratory conditions and then explored in less structured environments, such as emotionally intense conversations that resemble formal therapy sessions. Ultimately, this continuum leads to studying these processes within the context of real-world psychotherapy. This approach seeks to balance internal and ecological validity, thereby bridging the long-recognized gap between lab-based paradigms and real-world therapeutic encounters (22).

From a psychotherapy-informed perspective, we argue that relational, multi-person approaches have often fallen short of producing meaningful and lasting results, particularly in the context of therapeutic change. We have previously identified at least three contributing factors (4). First, many studies rely exclusively on overly simplified concepts such as synchronicity, and continue to use analytic tools originally designed for single-brain studies, which may fail to capture the complexity of interpersonal dynamics. Second, the experiential and subjective dimensions of psychotherapeutic processes are frequently overlooked, highlighting the need to incorporate phenomenological perspectives and methods more systematically. Third, limited dialogue and methodological exchange across disciplines such as psychotherapy, social neuroscience, and philosophy of mind have hindered both theoretical and empirical progress. Together, these factors contribute to a persistent gap between relational multi-person approaches and the fine-grained processes that characterize real-world psychotherapeutic interactions.

To address the identified methodological and conceptual limitations in studying relational dynamics in psychotherapy, we have introduced the ConNECT approach (Convergence research including Neuroscience and Experiences, Capturing meaningful dynamics with Therapists' knowledge) (4) as an extension of the 4E/MoBI framework. ConNECT offers a convergence-based research strategy that integrates neuroscientific, phenomenological and psychotherapeutic expertise. It emphasizes the inclusion of subjective and experiential dimensions as central to understanding therapeutic processes and leverages clinicians' knowledge to identify and interpret meaningful patterns in multi-person brain and body data. This approach encourages the development of experimental designs that are both ecologically valid and informed by real-world therapeutic practice. These elements are centred around the concept of interpresence, which refers to a shared psychological "here and now" that enables mutual engagement and connection. We believe this integrated methodology opens new possibilities for capturing meaningful interpersonal dynamics as they unfold in therapy. It holds promise for advancing our understanding of the neurobiological underpinnings of therapeutic change and offers valuable insights into both mental healthcare and everyday relational experiences.

Taken together, we call for approaches to psychiatry and mental health that treat relational dynamics not only as targets of inquiry but also as tools for investigation. As multi-person approaches continue to evolve, psychotherapy offers a uniquely rich context for examining how reciprocal interactions shape human experience and behaviour. While notable challenges remain, these integrative frameworks may ultimately deepen our understanding of what makes interpersonal moments meaningful and how they can contribute to the advancement of mental health.

SUMMARY

In this review, we argued that psychiatry and mental health research would benefit from embracing a relational paradigm, one that considers social interaction as a fundamental, though often underappreciated, dimension of brain, behaviour and experience (4,9,20,28). We traced how oscillations between individual and social paradigms have shaped psychiatry and neuroscience, and highlighted growing calls to reframe psychiatric disorders as disorders of social interaction and interpersonal attunement. This shift has opened the door to interaction-based phenotyping and second-person neuroscience approaches to psychiatry as promising frameworks for capturing and deepening the understanding of the dynamic, reciprocal, and relational nature of mental health and psychopathology.

We showed that psychotherapy offers a promising ground for multi-person approaches, as it centres on complex, emotionally meaningful relational change processes that are difficult to reduce to individual-level mechanisms. As a promising path to address these meaningful experiences, we previously introduced the concept of interpresence, a shared psychological 'here and now,' and the ConNECT approach, which advocates for convergence research that integrates subjective experience, therapist expertise, and multi-person neural and behavioural data (4).

Taken together, we call for approaches to psychiatry and mental health that focus on relational dynamics as both a

target and a tool of investigation. By combining insights from neuroscience, psychotherapy and psychiatry, we can move toward more attuned, socially grounded models of human suffering and change. We propose that a more comprehensive understanding of unique moments of genuine connection holds promise for advancing mental health research and fostering new forms of relationally attuned mental health systems.

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SOCIAL RELATIONSHIPS AND LEISURE TIME ACTIVITIES IN ADOLESCENCE AND THE RECURRENCE OF DEPRESSION AMONG FORMER ADOLESCENT PSYCHIATRIC INPATIENTS IN NORTHERN FINLAND

ABSTRACT

Background: *The recurrence of depression among adolescents is a common phenomenon, for which the risk factors are not fully understood. The role of social environment and depressive symptoms has been studied previously. More research is needed to explore the underlying mechanisms of recurrent depression in adolescents.* ***Objective:*** *The aim of this study was to identify whether social relationships and leisure time activities are associated with a recurrent course of depression among former adolescent psychiatric inpatients.* ***Method:*** *We examined interview data of former adolescent psychiatric inpatients (n=508) in Northern Finland hospitalized between 2001 and 2006, and analysed the course of depression with national Finnish Care Register for Health Care data on psychiatric diagnoses until year 2016, when the age of study participants ranged from 23 to 33 years. We compared the features of social relationships and leisure time activities between those study participants with a single episode of depression and those with a recurrent course of depression.* ***Results:****Among 508 study participants, 235 (46.2%) were diagnosed with depression, and of those 35.7% had a recurrent course of depression. Adolescent female patients who reported spending leisure time mostly alone had a higher likelihood of recurrent depression (OR 4.07, 95% CI 1.23-13.45) compared to non-recurrent depression. The likelihood was also higher among those adolescent female patients who reported dissatisfaction with leisure time (OR 3.02; 95% CI 1.38-6.58). Surprisingly, adolescent male patients who reported spending time mostly with friends had a higher likelihood of recurrent depression (OR 9.36; 95% CI 1.23-71.34).* ***Conclusions:*** *Dissatisfaction with leisure time and loneliness were associated with a higher likelihood of recurrent depression among adolescent female patients. This finding highlights the importance of considering adolescents' social environment and potential loneliness when treating depression in this group.*

KEYWORDS: ADOLESCENCE, RECURRENT DEPRESSION, SOCIAL RELATIONSHIPS, REGISTER-BASED INFORMATION

INTRODUCTION

Depression is a highly prevalent affective disorder among adolescents and has a complex impact on various aspects of individuals' lives. A recent systematic review concluded that there has been a rise of self-reported depressive symptoms among adolescents during the first two decades of the 21st century (1). The prescription of psychotropic drugs for adolescents has also continued to increase in recent years, which signals that psychiatric morbidity is increasing in this age group (2). The course of major depressive disorder (MDD) often includes recurrent episodes, which augments the burden for an individual as well as the wider society. Younger age at diagnosis of MDD has been associated with higher risk of recurrent episodes of MDD among adolescents (3).

There is growing evidence that low social support and its determinants, such as small social networks and low frequency of contacts, are associated with depression. In particular, the substantial role of the presence or absence of friends has been recognized in previous studies (4,5). The influence of close

relationships is not only limited to adolescence but can also impact on the development of MDD several years later (5).

The contribution of social environment and interpersonal relationships as potential risk factors for recurrence of MDD has been identified in numerous studies (6,9). It has been observed that challenges in interpersonal relationships, such as perceived chronic stress in close and romantic relationships, are independently associated with MDD recurrence (6). Low level of perceived social support in the adult population seems to predispose an individual to the progression of subthreshold depression into MDD (7), while higher levels of social support in adolescence prevents recurrent episodes (8). Among adolescent girls, poor peer relationships and introversion appear to be risk factors for a recurrent course of MDD (9).

The current study enables a comprehensive assessment of the social relationships and leisure time activities in adolescence and their association with a recurrent course of MDD. The primary aim of this study is to identify whether the social relationships and leisure time activities are associated with the recurrence of MDD, diagnosed by young adulthood, among the former adolescent psychiatric inpatients. To find these associations, this study examines the number of close friendships in adolescence, whether those friendships feel close and lasting, the most typical companion for leisure time in adolescence, satisfaction with leisure time in adolescence and the types of leisure time activities in adolescence, taking into account study participants' age at the index hospitalization period, social engagement in early childhood, repeated school years, special services at school, truancy, involvement in bullying, previous childhood psychiatric care and psychiatric disorders at index hospitalization period. The second aim is to explore whether the associations between social relationships and leisure time activities in adolescence and the recurrence of MDD in young adulthood differ between male and female study participants.

METHODS

STUDY POPULATION

The present study utilizes the patient data from a clinical follow-up project which aims to analyse associations of diverse adolescent psychosocial factors with long-term psychiatric outcomes. The data consists of 508 former adolescent inpatients, who received acute psychiatric treatment at Oulu University Hospital's Department of Adolescent Psychiatry between April 2001 and May 2006, from here onwards referred to as index hospitalization. All adolescent patients were aged between 13 and 17 years old during the index hospitalization period. The mean age at index hospitalization was 15.8 years among male and 15.6 years among female study participants. This study population covers the hospital districts of Northern Ostrobothnia and Lapland, which account for 43% of Finland's geographical area.

Consent for participation in the study was obtained from the adolescent patient and their guardians, with all providing signed written informed consent. Exclusion criteria included an adolescent patient's refusal to participate in the study, age under 13 or over 18, incomplete interviews due to short admittance in hospital, intellectual disability and organic brain disorders. After considering these criteria the participation rate was 83.7 %, including 508 adolescent patients from the original 637 eligible adolescent patients. The ethical aspects of the study protocol were discussed with the Ethical Committee of University of Oulu and their approval was given for the study.

RESEARCH INSTRUMENTS

The diagnostic interviews were conducted by the treating physicians and trained medical students, under the guidance of the treating physicians. The interviews were based on the Finnish version of the semi-structured Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime (K-SADS-PL) (10). Trained nurses also conducted interviews during the index hospitalization period, based on the Finnish version of the European Addiction Severity Index (EuropASI) (11). EuropASI gathers information on physical and mental health, family socio-economic status, substance abuse, criminal activity and social relationships.

VARIABLES GATHERED IN ADOLESCENCE

Information on background factors in adolescence was gathered primarily from the K-SADS-PL interviews. These background factors include adolescent patient's age at the index hospitalization period, previous psychiatric hospitalization during childhood, the diagnosed psychiatric disorders by the time of index hospitalization, social engagement in early childhood, involvement in bullying, truancy, repeating a year of school and use of special education services at school. Information on previous childhood psychiatric hospitalization was obtained from the Finnish Care Register for Health Care (CRHC). If single or multiple treatment periods in childhood psychiatric care were registered in the CRHC, a study participant's previous psychiatric hospitalization during childhood was defined as present.

All DSM-IV-based psychiatric disorders (12) for the adolescent patients in our study were based on the K-SADS-PL interview. Psychiatric disorders were categorized into internalizing disorders including anxiety disorders (300.00–300.02, 300.21–300.23, 300.29, 300.3, 308.3, 309.81), affective disorders (296.2–296.3, 300.4, 311) and psychotic disorders (295, 296.0, 296.4–299.0, 297.1–299.0, 301.13, 301.22), and externalizing disorders including substance-related disorders (DSM-IV 303.9, 304.0–304.6, 304.8–304.9, 305.0, 305.2–305.7, 305.9) and conduct or oppositional defiant disorders or ADHD (312.8–312.9, 313.81, 314.00–314.01, 314.9, 299.80).

The information on social engagement in early childhood was obtained from K-SADS-PL interview during the index hospitalization period. The guardian was asked whether the adolescent patient's social relatedness during infancy and early childhood was normal, on a dichotomous yes or no scale. Social engagement in early childhood was classified as normal if guardian gave a positive response.

The data for involvement in bullying was gathered from non-structured and structured sections of the K-SADS-PL interview. The study participants were divided into bullies, victims and bully-victims. In the non-structured section, participants were asked whether they had ever been the victim of bullying. Those study participants who reported that they had been a victim of bullying were classified as victims. The information on bullying others was gathered from the structured section of conduct disorder criteria in the K-SADS-PL interview. Study participants were asked the following questions: "What is the worst you ever laid into someone? Have you ever beat someone up real bad for no real reason, or just because they are a nerd?" The criterion of having bullied others was defined as three or more occasions of intimidating other people. However, K-SADS-PL questionnaire did not define involvement in bullying according to the established definition of bullying (13).

The data on truancy was obtained from the screening section of behavioural disorders within K-SADS-PL interview. The adolescent patients were asked whether they had ever been out of school for the entire school day without permission ("none": no absences, "sub-threshold": one absence, "threshold": two absences or more). The study participant was defined as having a history of truancy if there had been two absences or more. The data for repeating a year(s) at school was obtained from the K-SADS-PL interview and it was classified as present if an adolescent patient had repeated one or more school years. Information on special education services at school was gathered in K-SADS-PL interview during the index hospitalization period. Special services at school was defined as present if adolescent patient had history of receiving individual special support in a special class or in student's own class.

The related social relationship and leisure time activity factors in adolescence were gathered from the EuropASI interviews. Information was assessed on the total number of perceived close friendships and the most typical companion in leisure time (alone, friends or parents) reported by adolescent patient. Study participants reported the exact number of friends in EuropASI interview. Study participants were asked in EuropASI interview whether they spent leisure time mostly with family, friends or alone. The qualitative features, such as the sense of close and lasting friendships and the perceived satisfaction with leisure time, were assessed on a dichotomous yes or no scale in EuropASI interview. Sense of close and lasting friendships was defined to be present if adolescent patient gave a positive response to question in EuropASI interview. Perceived satisfaction with leisure time was defined to be present if adolescent patient gave a positive response to question in EuropASI interview.

The leisure time variables were gathered by utilizing data on hobbies previously collected from the non-structured part of K-SADS-PL (14). Hobby data was reclassified into subgroups based on the level of social activity of each hobby (14). The first subgroup includes the hobbies which are typically practiced inside the home and do not require social interaction. The following hobbies were classified into the first subgroup: listening to music, playing an instrument, singing, arts, reading, television and movies. The second subgroup consists of hobbies which are typically practiced outside the home and require only a limited amount of social interaction. The following hobbies were classified into the second subgroup: riding, animals, shooting, fishing, hunting, vehicles and individual sports. The third subgroup is composed of hobbies that contain complex interpersonal activities. The following hobbies were classified into the third subgroup: team sports, clubs, scouting, church and friends. The fourth subgroup is composed of those who reported drinking alcohol or using drugs as hobbies. The fifth subgroup is composed of those who reported having no hobbies at all.

Register-based information on recurrent depression

In this study, the main interest was in those 235 study participants who were diagnosed with depression before, after or during their index hospitalization. Of these study participants, 71 (30.2%) were male and 164 (69.8%) were female. The information on whether the study participants had a non-recurrent or recurrent course of depression was obtained utilizing data previously collected in this clinical

follow-up project (15). Recurrent depression was classified as present if a study participant had had two or more inpatient treatment periods for diagnosed depression in specialized medical care, separated by 8 weeks without any inpatient treatment periods for diagnosed depression in specialized medical care (16,15). The information on diagnosed depression (ICD-10: F32.0–F32.9, F33.0–F33.9, F34.1) was gathered from the national Finnish Care Register for Health Care (CRHC) register provided by the Finnish National Institute of Health and Welfare. Study participants diagnosed with schizophrenia spectrum disorder (ICD-10: F20, F21, F25) or bipolar disorder (ICD-10: F30.0-F30.9, F31.0-F31.9, F34.0) were excluded from the study. Information on inpatient and outpatient treatment periods of the study participants was collected until the year 2016. Since the hospitalization period during the research project occurred between 2001 and 2006, 10 to 15 years of register-based follow-up data was accumulated.

Those study participants with a single diagnosed episode of depression were classified as non-recurrent depression patients, irrespective of whether the depression was diagnosed prior to, during, or after the index hospitalization period until the end of year 2016. Those with two or more diagnosed episodes of depression were classified as recurrent depression patients. Childhood psychiatric inpatient care prior to adolescent psychiatric admission was defined as being present if a treatment episode in specialized child psychiatric care was registered in the CRHC.

STATISTICAL METHODS

The statistical significance of group differences in categorical variables was analysed with Pearson Chi-square or Fisher's Exact text and in continuous variables with Student's t-test or Mann-Whitney U-test. A binary logistic regression analysis (method=enter) was used to examine the association of background (adolescent patient's age at the index hospitalization period, previous psychiatric hospitalization during childhood, the diagnosed psychiatric disorders by the time of index hospitalization, social engagement in early childhood, involvement in bullying, truancy, repeating a year of school and use of special education services at school), social and leisure time variables (the total number of perceived close friendships, the sense of close and lasting friendships, the most typical companion in leisure time, the perceived satisfaction with leisure time and participation in different types of hobbies) in adolescence to the outcome variable of recurrent depression (yes vs. non-recurrent depression). The limit for statistical significance was set at $p \leq 0.05$ and all significance tests were two-tailed. The statistical analyses were performed with IBM SPSS Statistics, version 29.

RESULTS

Among our 508 study participants, 235 (46.2%) were diagnosed with depression before, during or after their index hospitalization. Based on the register-based follow-up information, 84 (35.7%) study participants had a recurrent course of depression diagnosed by young adulthood: 22 (31.0%) among male and 62 (37.8%) among female study participants.

Table 1 shows the distribution of psychiatric characteristics, school-related factors and psychiatric diagnoses measured in adolescence among study participants with non-recurrent and recurrent courses of depression. Those with recurrent and non-recurrent depression did not have any significant differences in background factors in adolescence in either sex.

Table 1. Psychiatric characteristics, school-related factors and psychiatric diagnoses at the time of the index hospitalization for study participants with recurrent and non-recurrent depression, categorized by sex.

	Males (n=71)			Females (n=164)		
	Non-recurrent depression (n=49)	Recurrent depression (n=22)	p-value	Non-recurrent depression (n=102)	Recurrent depression (n=62)	p-value
Age at index hospitalization, mean (sd)	15.2 (1.5)	15.8 (1.2)	0.113	15.4 (1.3)	15.6 (1.3)	0.375
Social engagement in early childhood reported by parent or guardian, n (%)						
Normal social engagement	36 (73.5%)	16 (72.7%)	0.948	71 (69.6%)	48 (77.4%)	0.277
School-related factors, n (%)						
Repeated a year at school	10 (20.4%)	6 (27.3%)	0.550	11 (10.8%)	3 (4.8%)	0.186
Special services at school	28 (57.1%)	16 (72.7%)	0.211	38 (37.3%)	31 (50.0%)	0.109
Truancy	21 (42.9%)	8 (36.4%)	0.607	30 (29.4%)	20 (32.3%)	0.701
Involvement in bullying, n (%)			0.542			0.830
No bullying	27 (55.1%)	9 (40.9%)		51 (50.0%)	28 (45.2%)	
Victim	12 (24.5%)	7 (31.8%)		38 (37.3%)	25 (40.3%)	
Bully or bully-victim	10 (20.4%)	6 (27.3%)		13 (12.7%)	9 (14.5%)	
Childhood psychiatric care, n (%)						
Before admission to index hospitalization	14 (28.6%)	9 (40.9%)	0.304	9 (8.8%)	9 (14.5%)	0.258
Psychiatric disorders at index hospitalization, n (%)						
Internalizing disorders	39 (79.6%)	17 (77.3%)	0.527	90 (88.2%)	59 (95.2%)	0.136
Externalizing disorders	33 (67.3%)	15 (68.2%)	0.945	50 (49.0%)	29 (46.8%)	0.780

Note: The answers indicate positive response (yes), if not otherwise stated.

Table 2 shows the characteristics of adolescent-related social relationships and leisure time activities among the male and female study participants with recurrent and non-recurrent depression diagnosed by young adulthood. Among adolescent female patients, the most typical companion in leisure time and the perceived satisfaction with leisure time are associated with a recurrent course of depression. Adolescent female patients with a recurrent course of depression were more likely to spend their leisure time alone rather than with family or friends compared to those with non-recurrent depression (25.8% vs. 9.8%, p=0.024). Adolescent female patients with a recurrent course of depression were more likely to report dissatisfaction with leisure time than those with non-recurrent depression (59.7% vs. 34.3%, p=0.002). Among the adolescent male patients, there were no statistically significant differences in association between leisure time variables and recurrence of depression.

Table 2. Characteristics of adolescent-related social and leisure time activities of the male and female study participants with recurrent and non-recurrent courses of depression diagnosed by young adulthood.

	Males (n=71)			Females (n=164)		
	Non-recurrent depression (n=49)	Recurrent depression (n=22)	p-value	Non-recurrent depression (n=102)	Recurrent depression (n=62)	p-value
How many close friendships, n (%)			0.837			0.216
None / Not known	6 (12.2%)	3 (13.6%)	0.948	10 (9.8%)	8 (12.9%)	0.277
1-3	17 (34.7%)	9 (40.9%)		45 (44.1%)	34 (54.8%)	
4 or more	26 (53.1%	10 (45.5%)		47(46.1%)	20 (32.3%)	
Whether the friendships feel close and lasting, n (%)						
No / Not known	6 (12.2%)	6 (27.3%)	0.170	16 (15.7%)	9 (14.5%)	0.840
The most typical companion in leisure time, n (%)			0.116			0.024
Family	14 (28.6%)	2 (9.1%)		21 (20.6%)	11 (17.7%)	
Friends	28 (57.1%)	18 (81.8%)		71 (69.6%)	35 (56.5%)	
Alone / Not known	7 (14.3%)	2 (9.1%)		10 (9.8%)	16 (25.8%)	
Hobbies, n (%)						
a. Individual hobbies practised at home	23 (46.9%)	11 (50.0%)	0.811	64 (62.7%)	37 (59.7%)	0.695
b. Individual hobbies practised outside home	26 (53.1%)	12 (54.5%)	0.908	55 (53.9%)	38 (61.3%)	0.356
c. Group activities	24 (49.0%)	10 (45.5%)	0.783	43 (42.2%)	24 (38.7%)	0.663
d. Drugs or alcohol	1 (2.0%)	1 (4.5%)	0.527	1 (1.0%)	4 (6.5%)	0.068
e. Staying alone	1 (2.0%)	0 (0.0%)	1.000	0 (0.0%)	1 (1.6%)	0.378

Note: The answers indicate positive response (yes), if not otherwise stated.

Table 3 shows associations of background factors in adolescence to the likelihood of having a follow-up diagnosis of recurrent depression by young adulthood, separately, among male and female study participants. No significant associations were found between background factors in adolescence, such as psychiatric morbidity, school-related factors or involvement in bullying, for a recurrent course of depression either in adolescent male or female patients.

Table 4 shows the association of adolescent-related social and leisure time activities to the likelihood of having a follow-up diagnosis for recurrent depression by young adulthood, separately, among male and female study participants. Those adolescent male patients, who reported spending leisure time mostly with friends, were more likely to have a recurrent course of depression than those who spent time mostly with their family (OR 9.36; 95% CI 1.23-71.34). Adolescent female patients who spent leisure time mostly alone, were more likely to have a recurrent course of depression, compared to those adolescent female patients who spent leisure time mostly with their family (OR 4.07; 95% CI 1.23-13.45). The likelihood for recurrent depression was also higher among those adolescent female patients who did not experience satisfaction with their leisure time (OR 3.02; 95% CI 1.38-6.58).

Table 3. Association of background factors in adolescence to the likelihood of recurrent depression (yes vs. non-recurrent depression), diagnosed by young adulthood, among male and female study participants.

Background factors in adolescence	Recurrent depression (yes vs. non-recurrent depression as reference category) by young adulthood					
	Males (n=71)			Females (n=164)		
	OR	95% CI	p-value	OR	95% CI	p-value
Psychiatric morbidity (yes vs. no as reference category)						
History of childhood psychiatric care, yes	2.22	0.56-8.72	0.254	2.32	0.76-7.13	0.142
Normal social engagement in early childhood reported by parent or guardian, yes	1.25	0.35-4.46	0.730	1.56	0.72-3.38	0.256
Psychiatric disorders (yes vs. no as reference category)						
Internalizing disorders, yes	0.69	0.14-3.33	0.645	3.37	0.76-14.98	0.110
Externalizing disorders, yes	0.74	0.18-2.99	0.669	0.80	0.39-1.66	0.548
School-related factors (yes vs. no as reference category)						
Repeated a year at school, yes	1.05	0.25-4.32	0.950	0.33	0.08-1.39	0.132
Special services at school, yes	2.38	0.63-9.06	0.203	1.52	0.77-2.97	0.225
Truancy, yes	0.57	0.15-2.15	0.402	0.57	0.59-2.64	0.571
Involvement in bullying						
No-bullying involvement	ref.			ref.		
Victim	3.25	0.79-13.33	0.102	1.11	0.54-2.30	0.773
Bully or bully-victim	1.97	0.43-8.72	0.382	1.88	0.58-6.10	0.291

Note: Odds ratios (ORs) and 95% confidence intervals (95% Cis) for ORs are based on the results of a binary logistic regression model (method=enter) in which likelihood for outcome variable (recurrent depression vs. non-recurrent depression) diagnosed by young adulthood was predicted with background variables in adolescence.

Table 4. Association of social and leisure time activities in adolescence with the likelihood of recurrent depression (yes vs. non-recurrent depression) diagnosed by young adulthood, among male and female study participants.

	Recurrent depression (yes vs. non-recurrent depression as reference category) by young adulthood					
Social and leisure time activities in adolescence	**Males (n=71)**			**Females (n=164)**		
	OR	**95% CI**	**p-value**	**OR**	**95% CI**	**p-value**
The number of close friendships						
None	1.56	0.12-19.44	0.732	2.30	0.58-9.10	0.237
1 to 3	2.89	0.68-12.29	0.151	1.47	0.68-3.18	0.324
4 or more	ref.			ref.		
Whether the friendships feel close and lasting						
Yes	ref.					
No	5.35	0.74-38.93	0.098	0.55	0.16-1.86	0.337
The most typical companion in leisure time						
Own Family	ref.			ref.		
Friends	9.36	1.23-71.34	0.031	1.42	0.52-3.91	0.492
Alone	2.44	0.21-28.68	0.478	4.07	1.23-13.45	0.022
Satisfaction with leisure time						
Yes	ref.			ref.		
No	0.39	0.09-1.73	0.215	3.02	1.38-6.58	0.005
Hobbies (yes vs. no as reference category)						
Hobbies practised alone, yes	0.68	0.20-2.31	0.539	1.36	0.66-2.79	0.409
Hobbies practised outside home, yes	0.86	0.28-2.67	0.796	0.52	0.25-1.071	0.076
Hobbies requiring social interaction, yes	0.86	0.25-3.01	0.816	0.81	0.38-1.72	0.585
Drugs or alcohol, yes	1.88	0.08-42.15	0.690	6.03	0.53-68.76	0.148

Note: Odds ratios (ORs) and 95% confidence intervals (95% CIs) for ORs are based on the results of a binary logistic regression model (method=enter), in which likelihood for outcome variable (recurrent depression vs. non-recurrent depression) diagnosed by young adulthood was predicted with variables for social and leisure time activities in adolescence.

DISCUSSION

This study provides an important approach to understanding the factors that affect the course of depression. We analysed associations between social relationships and leisure time activities and the recurrent course of depression diagnosed by young adulthood among former adolescent psychiatric inpatients separately, among male and female study participants. Our findings revealed that the factors associated with recurrent depression differed between male and female study participants. For adolescent female patients, dissatisfaction with leisure time and loneliness during adolescence were linked to a higher likelihood of recurrent depression. In contrast, among adolescent male patients, spending leisure time mostly with friends during adolescence was associated with a higher likelihood of recurrent depression.

Adolescence is an important period for developing self-identity and acquiring vocational and social skills while transitioning into adulthood. This process largely occurs through social interaction with peers. Existing psychological theories underline the importance of a feeling of belonging and closeness to our family and friends, and it is widely thought that a lack of these experiences leads to an increased risk of depression (17).

However, the role of adults remains significant during adolescence. One systematic review (18) noted that social support from parents, teachers and family were significant protective factors against adolescent depression in over 80% of the studies reviewed, but social support from friends was a significant protective factor in only 56% of the studies. A meta-analysis on the subject also revealed that the effect size of peer social support was generally small to moderate and that classmate support (or other general support) was more impactful in younger adolescents, while support from close friends remained significant throughout adolescence (19).

Interestingly, among adolescent male patients the likelihood of a recurrent course of depression diagnosed by young adulthood was higher with those who reported spending time mostly with friends. Furthermore, 27% of adolescent male patients with recurrent depression in our study felt that their friendships were neither close nor lasting. This finding raises the question of whether the quality of friendship differs significantly between depressed adolescent male and female patients. There is evidence that boys tend to have larger groups of friends with less emotional intimacy and support-seeking behaviour than girls in the general population (20). While the growing emphasis on friendships is an important part of adolescent development, its effect may differ in the case of a depressed adolescent. In this study, it was not possible to specify whether the self-reported friendships were beneficial or harmful to the adolescents' psychological development.

Among adolescent female patients, isolation from family and peers and dissatisfaction with leisure time associated with a higher likelihood of a recurrent course of depression. The association between the absence of social support and depressive symptoms has previously been observed in adolescent girls (21), and social anxiety and a pronounced fear of rejection are predictors of recurrent depression (22). These pathways may lead to spending time mostly alone and this may later increase the risk of recurrent depression in the absence of social support. In our study, no statistically significant associations between background factors in adolescence and the recurrence of depression were found for male and female study participants.

In previous studies involvement in bullying among adolescents has been associated with higher rates of self-reported depressive symptoms (23,24). However, this study did not find a similar association between involvement in bullying and recurrent depression. Our study focused on a clinical sample of patients who received inpatient psychiatric care during adolescence, so the results may differ from those without a history of inpatient psychiatric care during adolescence. Future studies could examine the relationship between involvement in bullying and recurrent depression in a larger sample of adolescent psychiatric patients. However, the predictors of recurrent depression among adolescents are only partially understood, so more research is needed to identify these predictors and clarify the underlying mechanisms.

Increased physical activity has previously been recognized as a protective factor for depressive symptoms among adolescents (25). Interestingly, in our study, the type of leisure time activity in adolescence was not associated with a later recurrent course of depression for either male or female study participants. It is likely that these other risk factors for recurrent depression outweigh the influence of different leisure activities.

The strengths of this study include professional diagnostics of adolescent psychiatric disorders, face-to-face interviews with the study population conducted by trained interviewers and a long follow-up period of 10–15 years. This study also has some important limitations. The study population consists of former adolescent inpatients who have been admitted to inpatient psychiatric care during adolescence. Therefore, the results cannot be generalized to the general adolescent or adult population. This study did not measure the quality of self-reported friendships, and thus could not distinguish whether those friendships had a positive or negative effect on the adolescents' psychological development. In this study, we were unable to assess involvement in bullying according

to the established definition (13). Furthermore, at the time of the adolescents' index hospitalization, no data were collected on problematic smartphone usage, which is now known to be associated with an increased likelihood of adolescent depression (26).

CLINICAL SIGNIFICANCE

Early detection of adolescents who are at higher risk for developing recurrent depression can enable more targeted and effective preventive interventions and treatments. This study provides a thorough evaluation of social and leisure time factors in adolescence, establishing that feelings of dissatisfaction with leisure time and spending most of their time alone are linked to an increased likelihood of recurrent depression by young adulthood among female study participants. These findings highlight the importance of considering an adolescent's social environment when assessing their risk of recurrent depression later in life.

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Conflict of Interest

AHH has received travel fees for a Finnish symposium (Lundbeck). The remaining authors have no disclosures. No potential conflict of interest has been reported by the authors.

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OVERLAPPING CORRELATES OF BEING SUBJECTED TO AND PERPETRATION OF ADOLESCENT DATING VIOLENCE

ABSTRACT

Adolescent dating violence (ADV) refers to intimate partner violence (IPV) among adolescents. Research suggests that it may be even more common than among adults, correlates with numerous negative mental health and psychosocial indicators and is predictive of IPV in adulthood. This study set out to explore factors related to family background, mental health, peer relationships, sexual experiences and self-esteem as correlates of ADV victimization and perpetration among 1,386 9th graders who responded in the survey study, Adolescent Mental Health Cohort and Replication Study (AMHC) in 2018. While when studied one by one, variables from all these domains were associated with ADV victimization and perpetration, in final multivariate models independent associations were detected in advanced sexual experiences and experiences of being subjected to sexual harassment. Parental involvement in adolescents' lives was further inversely associated with ADV perpetration. Our findings suggst that to prevent ADV, sexuality education and promotion of parental involvement during adolescent years may be beneficial.

KEYWORDS: DATING VIOLENCE, ADOLESCENCE

INTRODUCTION

Adolescent dating violence (ADV) refers to intimate partner violence among adolescents (1). Evidence suggests that ADV has increased over time and is now considered a global issue, potentially even more prevalent than intimate partner violence among adults (2). A systematic review of 25 cross-sectional and nine cohort studies found that dating violence in adolescence also predicts intimate partner violence in adulthood (3).

ADV encompasses psychological, physical and sexual harm within a romantic relationship. Psychological violence includes manipulation, while physical violence may involve actions such as hitting, pushing and kicking. Sexual violence refers to forcing a partner into various non-consensual sexual acts, ranging from unwanted touching to rape (2,3).

Estimates of ADV prevalence, both in terms of being subjected to and perpetration, vary across studies. Dosil et al. (2) conducted a cross-sectional study on Spanish adolescents aged 12–17 and found that ADV is most common among those aged 15–17. Their findings indicated that dating violence included physical, verbal-emotional and relational abuse. The annual prevalence of victimization was 36.2%, while perpetration was reported at 29%. Similarly, Miller et al. (1) reviewed studies on ADV and concluded that while it occurs in early adolescence, its prevalence increases with age, peaking at 18–22 years. Based on Youth Risk Behavior Surveys from 2013 and 2015 in the USA, they estimated the annual prevalence of physical and sexual ADV victimization to be approximately 20% among females and 10% among males. A Canadian study that included psychological violence and threats found that 63% of girls and 50% of boys had experienced ADV in the past 12 months (4).

Studies indicate that girls are disproportionately subjected to ADV (1–4). Female victims also often endure more severe psychological, psychosocial and physical consequences. Research on sex differences in ADV perpetration remains inconclusive (2).

Several factors correlate with ADV victimization, including low self-esteem, social difficulties, substance use, unprotected sex, risky sexual behaviour, increased suicide risk, physical injury and low stress tolerance (2,3,5). Among mental health

concerns, ADV victimization has been linked to depression, anxiety, antisocial behaviour and other psychiatric disorders. The severity of violence tends to correlate with an increased likelihood of multiple psychiatric conditions. Moreover, the association between ADV victimization and mental health problems varies by age, typically decreasing over time (3). Additionally, cultural inequality correlates with higher rates of ADV victimization among girls (5). Factors such as family and neighbourhood violence, childhood abuse and insecurity at school are associated with both ADV victimization and perpetration (3).

ADV perpetration has been linked to sexist attitudes, low stress tolerance, low self-esteem, social stress and social anxiety (2). Among males, factors that increase the risk of ADV perpetration include experiences of being subjected to physical violence, involvement in bullying (both as a victim and perpetrator), childhood trauma (physical or mental), childhood sexual abuse, alcohol-related problems and poor conflict resolution skills (5).

Prior studies suggest that the correlates of ADV victimization and perpetration overlap to some extent, implying that individuals subjected to ADV may also engage in perpetration. Some individuals may enter relationships characterized by mutual ADV. Taquette & Monteiro (3) noted that reciprocal violence between both partners is the most common form of ADV, further supporting the idea of victimization and perpetration overlap. Research has also demonstrated that gender inequality influences ADV patterns, with girls more frequently experiencing victimization in unequal societies (5). Consequently, boys in these societies are more likely to perpetrate ADV. The dynamics of ADV may differ in gender-equal countries, such as the Nordic nations, where victimization and perpetration may more commonly affect the same individuals.

Given these considerations, we aim to explore the following research questions:

1. What family, peer relationship, sexual and mental health-related factors are associated with ADV victimization?
2. What family, peer relationship, sexual and mental health-related factors are associated with ADV perpetration?
3. To what extent do the correlates of ADV victimization and perpetration overlap?

MATERIALS AND METHODS

This study utilizes data from the 2018 Adolescent Mental Health Cohort and Replication Study (AMHC), a mental health survey conducted among 9th graders in comprehensive schools (15–16-year-olds). The person-identifiable questionnaires were completed in classrooms under the supervision of teachers who ensured a peaceful and private environment without interfering with responses. The survey has been conducted during the academic years 2002–03, 2012–13 and 2018–19 (6). In 2018–19, the questionnaire was conducted online. Participation in the study was voluntary, and both adolescents and their parents were informed about its voluntary nature verbally and in writing.

The study included 1,386 participants in Tampere in the academic year 2018–19, with 710 boys and 676 girls. The average age of respondents was 15.5 years (SD 0.39). Some adolescents skipped questions related to dating violence. The analysable sample regarding being subjected to dating violence consisted of 1,246 participants, while the sample for perpetration of dating violence included 1,238 participants.

The AMHC study explored common behavioural problems (e.g. drinking, bullying), subjective health and prevalent mental health issues (e.g. depression, social anxiety, eating disorders). Ethics approval was granted by Tampere University Hospital's ethics committee, and appropriate administrative permissions for data collection were obtained from the City of Tampere.

MEASURES

ADV victimization and perpetration. The respondents were asked "Have you ever been subjected to violent behaviour (such as hitting, punching, hair-pulling or similar) by a date or steady partner?" and "Have you ever acted violently (for example by hitting, punching, hair-pulling or similar) towards a date or a steady partner?" both with response alternatives "yes" and "no".

Family Variables. Sociodemographic factors and the relationship between adolescents and their parents were analysed. The sociodemographic variables included the following:

- Low maternal education (primary school only)
- Low paternal education (primary school only)
- Parental unemployment (one or both parents during the past year)
- Not living with both parents

A sum variable (Adverse SES) was created, scoring 1–4, with higher values indicating an accumulation of sociodemographic risk factors.

Parents' involvement in their adolescent's life was assessed using three questions, which formed a sum variable of protective factors (scoring 0–3):

- Parents knowing the adolescent's friends
- Parents knowing where the adolescent spends weekend evenings
- Adolescents being able to discuss important topics with their parents

Family social support was measured using the family-related items of the Perceived Social Support Scale–Revised (PSSS-R), a widely used tool for assessing family support (7,8). The PSSS-R includes 12 items covering support from family, friends and others, with responses scored on a 1–4 scale (1=almost never, 4=almost always). The four items of the family scale comprise a sum ranging from 4-12, with higher scores reflecting higher perceived support.

Peer Relationship Variables. Peer relationships were assessed through adolescents' perceived peer rejection and the friends-related items of the PSSS-R. The perceived peer rejection sum variable (scoring 0–3) included the following criteria:

- Lack of friends
- Being bullied during the current semester
- Being excluded from the circle of friends

The sum score of the peer support factor from PSSS-R ranges from 4-12, with higher scores reflecting higher perceived support.

Self-Esteem. Self-esteem was measured using the Rosenberg Self-Esteem Scale (RSES), a globally recognized tool consisting of 10 items scored on a scale of 1–4. While there is no universally defined cut-off for low self-esteem, earlier Finnish research has used a threshold of 25 for distinguishing low from normative self-esteem (9). This study treated RSES scores as a continuous variable, with higher scores reflecting better self-esteem.

Sexuality Variables. Sexuality-related variables included advanced sexual experiences and experiences of sexual harassment. Advanced sexual experiences were represented by a sum score (0–4) derived from endorsing the following experiences: kissing, caressing over clothes, caressing under clothes, sexual intercourse (10). Sexual harassment was measured using a sum variable (0–5), encompassing experiences such as sexual name-calling, unwanted sexual proposals, unwanted touching, coercion or pressure into sexual acts and offers of payment for sex (11).

Mental health variables. Mental health measures included depression, social anxiety, delinquency and aggressive behaviour, all used in the analyses as continuous measures.

- Depression was assessed using a Finnish modification of the short-form (13-item) Beck Depression Inventory (R-BDI). The tool is known for its reliability and includes response options ranging from positive/neutral (scored as 0) to severe (scored 1–3) (12)
- Social Anxiety was measured using the Mini-SPIN, a three-item abbreviated version of the Social Phobia Inventory (SPIN). Responses are scored 0–3, with total scores ranging 0–9 (13)
- Delinquency was defined using the Youth Self-Report (YSR) delinquency scale ((14), which consists of 11 statements scored 0–2 (never/sometimes/often), resulting in a sum score ranging 0–22
- Aggression was evaluated using the YSR aggression scale (14), comprising 17 statements scored 0–2 (never/sometimes/often), with a sum score ranging 0–34

Honesty of Responding. Prior research indicates that some adolescents exaggerate or provide untruthful responses about problem behaviours, symptoms and psychosocial issues (15–17). To mitigate this issue, participants were asked to indicate their sincerity in responding to the survey (yes/no/unsure).

STATISTICAL ANALYSES

Logistic regression analyses were performed to examine ADV victimization and perpetration as dependent variables. The independent variables included family, peer, self-esteem, sexuality and mental health factors, all treated as continuous variables.

First, the relationship of each independent variable with ADV victimization and perpetration was assessed individually. Next, relationships were analysed by grouping variables into the following blocks:

- Family variables: Sociodemographic factors, parental relationships and PSSS-R (parents)
- Peer variables: Exclusion from peer circles and PSSS-R (friends)
- Self-esteem: Measured using the Rosenberg Self-Esteem Scale
- Sexuality variables: Advanced sexual experiences and experiences of sexual harassment
- Mental health variables: Depression, social anxiety, delinquency and aggression

Finally, variables with statistically significant associations in each category were combined into a single model. Age, sex and honesty were controlled for in every model. Odds Ratios (OR) and their 95% confidence intervals (95% CI) are reported.

A p-value of less than 0.01 was considered the threshold for statistical significance.

RESULTS

Of the respondents, 3.9% reported experiences of being subjected to dating violence and 2.8% reported perpetration of dating violence. Being subjected to dating violence was reported by 2.9% of the girls and 4.8% of the boys (p=0.01), perpetration by 1.8% of the girls and 3.8% of the boys (p=0.02).

When each variable was entered individually in Model 1, a statistically significant positive association was observed between having been subjected to dating violence and adverse SES, advanced sexual experiences, experiences of sexual harassment, depression, delinquency and aggression. Inverse associations were identified between having been subjected to ADV and parental involvement, PSSS-R (family), PSSS-R (friends) and self-esteem. No associations were found between having been subjected to ADV and peer rejection or social anxiety (*Table 1*, Model 1). Perpetration of dating violence was positively associated with adverse SES, advanced sexual experiences, experiences of sexual harassment, depression, delinquency, social anxiety and aggression. Inverse associations were observed between perpetration of ADV and parental involvement, PSSS-R (family), PSSS-R (friends) and self-esteem. Peer rejection was not associated with perpetration of dating violence (*Table 2*, Model 1). Thus, common variables statistically significantly associated with both being subjected to and perpetration of dating violence included adverse SES, parental involvement, PSSS-R (family), PSSS-R (friends), self-esteem, sexual experiences, sexual harassment, depression, delinquency and aggression.

In Model 2, variables in each block were entered simultaneously. Statistically significant associations were found between having been subjected to dating violence and adverse SES, both sexuality variables, depression and delinquency, while other associations identified in Model 1 were diminished (*Table 1*, Model 2). Perpetration of dating violence was statistically significantly inversely related to parental involvement and positively associated with sexuality variables, with other associations from Model 1 levelled out (*Table 2*, Model 2). Variables statistically significantly associated with both being subjected to and perpetration of dating violence in Model 2 were advanced sexual experiences and experiences of sexual harassment.

In the final models (Model 3), variables identified as statistically significant in Model 2 were entered all simultaneously as explaining variables. Having been subjected to dating violence was statistically significantly related to advanced sexual experiences and experiences of sexual harassment (*Table 1*, Model 3). Perpetration of dating violence was borderline significantly inversely associated with parental involvement and positively associated with experiences of sexual harassment; additionally, a positive association with advanced sexual experiences approached statistical significance (*Table 2*, Model 3). Thus, variables associated with both being subjected to and perpetration of dating violence were advanced sexual experiences and experiences of sexual harassment. Additionally, parental involvement was statistically significantly inversely associated with perpetration of ADV, but not with having been subjected to it.

Table 1. Associations between being subjected to dating violence and family, peer, self-esteem, sexuality and mental health variables (OR, 95% CI). All analyses are controlled for age, sex and honesty of responding. Associations statistically significant at level p<0.01 are highlighted in bold.

	Model 1. Variables in each block entered one by one			Model 2. Variables in a block entered simultaneously			Model 3. Variables statistically significant in Model 2 entered simultaneously		
	OR	**95% CI**	**p-value**	**OR**	**95% CI**	**p-value**	**OR**	**95% CI**	**p-value**
Block 1. Family variables									
Adverse SES	**1,90**	**1,4-2,58**	**<0.001**	**1,70**	**1,23-2,35**	**0,001**	1,43	0,95-2,14	0,086
Parental involvement	**0,71**	**0,61-0,83**	**<0,001**	0,82	0,67-1,01	0,06			
PSSS-R family	**0,87**	**0,82-0,93**	**<0,001**	0,93	0,86-1,01	0,086			
Block 2. Peer relationships									
Peer rejection	1,76	1,13-2,73	0,013	1,63	0,95-2,8	0,077			
PSSS-R friends	**0,92**	**0,86-0,98**	**0,007**	0,95	0,88-1,02	0,14			
Block 3. Self-esteem									
Rosenberg self-esteem scale	**0,92**	**0,88-0,96**	**<0,001**				0,98	0,92-1,05	0,61
Block 4. Sexuality									
Advanced sexual experiences	**2,10**	**1,69-2,61**	**<0,001**	**1,85**	**1,47-2,32**	**<0,001**	**1,64**	**1,28-2,10**	**<0,001**
Sexual harassment experiences	**2,66**	**2,13-3,33**	**<0,001**	**2,45**	**1,93-3,12**	**<0,001**	**2,16**	**1,66-2,82**	**<0,001**
Block 5. Mental health									
Depression	**1,12**	**1,08-1,16**	**<0,001**	**1,07**	**1,02-1,13**	**0,005**	1,02	0,96-1,09	0,50
Social anxiety	1,12	1,02-1,23	0,018	0,99	0,88-1,11	0,80			
Delinquency	**1,36**	**1,24-1,49**	**<0,001**	1,21	1,10-1,39	**0,006**	1,08	0,96-1,22	0,20
Aggression	**1,15**	**1,10-1,21**	**<0,001**	1,04	0,97-1,12	0,30			

Note: SES = socioeconomic risk factors sum variable, PSSS-R = percieved social support scale - revised

Table 2. Associations between perpetration of dating violence and family, peer, self-esteem, sexuality and mental health variables (OR, 95% CI). All analyses are controlled for age, sex and honesty of responding. Associations statistically significant at level p<0.01 are highlighted in bold.

	Model 1. Variables in each block entered one by one			**Model 2. Variables in a block entered simultaneously**			**Model 3. Variables statistically significant in Model 2 entered simultaneously**		
	OR	**95% CI**	**p-value**	**OR**	**95% CI**	**p-value**	**OR**	**95% CI**	**p-value**
Block 1. Family variables									
Adverse SES	**1,91**	**1,33-2,73**	**<0,001**	1,65	1,12-2,43	0,012	1,40	0,9-2,19	0,14
Parental involvement	**0,65**	**0,54-0,77**	**<0,001**	**0,72**	**0,57-0,91**	**0,006**	0,77	0,62-0,96	0,018
PSSS-R family	**0,86**	**0,8-0,92**	**<0,001**	0,95	0,86-1,04	0,23			
Block 2. Peer relationships									
Peer rejection	1,34	0,75-2,38	0,33	1,05	0,51-2,14	0,89			
PSSS-R friends	**0,91**	**0,84-0,97**	**0,007**	0,91	0,84-0,99	0,026	0,97	0,89-1,06	0,53
Block 3. Self-esteem									
Rosenberg self-esteem scale	**0,93**	**0,88-0,98**	**0,006**				1,01	0,93-1,09	0,90
Block 4. Sexuality									
Advanced sexual experiences	**1,68**	**1,35-2,1**	**<0,001**	**1,49**	**1,19-1,88**	**0,001**	1,30	1,02-1,67	0,038
Sexual harassment experiences	**2,29**	**1,80-2,92**	**<0,001**	**2,14**	**1,66-2,77**	**<0,001**	**1,90**	**1,42-2,55**	**<0,001**
Block 5. Mental health									
Depression	**1,12**	**1,08-1,17**	**<0,001**	1,06	1,0-1,13	0,049	1,04	0,97-1,12	0,27
Social anxiety	**1,19**	**1,07-1,32**	**0,002**	1,08	0,95-1,23	0,24			
Delinquency	**1,30**	**1,17-1,43**	**<0,001**	1,13	0,97-1,32	0,12			
Aggression	**1,14**	**1,07-1,20**	**<0,001**	1,05	0,97-1,15	0,22			

Note: SES = socioeconomic risk factors sum variable, PSSS-R = percieved social support scale - revised

DISCUSSION

In this study exploring correlates of ADV victimization and perpetration, prevalence of ADV was small compared to what has been reported internationally. This is likely due to our focusing only on physical aspects of ADV. When associations with family, peer, sexuality and mental health variables were examined individually, having been subjected to adolescent dating violence (ADV) was linked to adverse sociodemographic factors, increased sexual experiences, experiences of sexual harassment, depression, delinquency and aggression. Conversely, it was negatively associated with parental involvement in an adolescent's life, social support from parents and peers and good self-esteem. These findings largely align with previous research in the field (2,3,5) but introduce a novel insight—delinquency and aggression were also associated with being subjected to sexual harassment. Adolescents prone to delinquency and aggression may engage in social circles where violent behaviour is more common, potentially leading them into relationships that involve ADV.

However, when these variables were analysed simultaneously in the final model, being subjected to ADV was only associated with increased sexual experiences and sexual harassment experiences. While previous research has linked being subjected to dating violence with risk-taking sexual behaviour (2,3,5), our study makes a unique contribution by considering both risk and protective factors across different domains relevant to adolescent life simultaneously. While these factors may influence adolescents' sexual behaviour and even their risk of experiencing sexual harassment, they were ultimately not independently associated with having been subjected to dating violence.

The same patterns apply to the perpetration of dating violence. When examined individually, ADV perpetration was associated with lower socio-economic status, increased sexual experiences, experiences of sexual harassment, depression, social anxiety, delinquency and aggression. It was negatively associated with parental involvement in an adolescent's life, social support from parents and peers and good self-esteem. These associations are generally in agreement with previous research (2,3,5); however, to our knowledge, earlier studies have not explored the roles of parental involvement, depression and delinquency in ADV perpetration.

In the final multivariate model, ADV perpetration was only inversely associated with parental involvement in an adolescent's life and positively associated with experiences of sexual harassment and increased sexual experiences. Previous research supports our findings regarding sexual experiences (2,5), but no prior studies have examined the relationship between ADV perpetration and parental involvement in an adolescent's life. Parental involvement may play a crucial role in the development of emotional regulation (18), which could explain why it serves as a protective factor against ADV perpetration.

The common correlates of both being subjected to and perpetration of ADV remained largely the same when risk and protective factors were considered individually and in the final models. Among all the examined family, peer, mental health and sexuality-related variables, increased sexual experiences and experiences of sexual harassment consistently remained associated with both being subjected to and perpetration of ADV in the fully adjusted models. Previous studies have also linked both being subjected to and perpetration of ADV with sexual experiences (2,3,5).

Prior research has shown that in countries with greater gender inequality, girls are more frequently victims of ADV (5). However, our findings suggest that in more gender-equal societies, such as Nordic countries, both being subjected to and perpetration of ADV tend to accumulate in the same individuals. This supports the idea that ADV occurs within relationships where both partners are actively involved.

While most family, peer, mental health and self-esteem variables initially appeared to be associated with both being subjected to and perpetration of adolescent dating violence (ADV), these associations were levelled out in the final models. During adolescence, challenges related to family, peers and mental health tend to accumulate and interact in complex ways. Ultimately, independent associations with ADV persisted only in sexuality-related variables, suggesting that the effects of other domains are mediated through sexual behaviour and experiences.

In their systematic review of the causes and consequences of ADV, Taquette and Monteiro (3) emphasized the urgency of recognizing and addressing ADV early. Their review primarily called for efforts to dismantle cultural patterns of gender-based violence within families, schools and communities. Our findings highlight sexuality education as an essential avenue for preventing ADV.

METHODOLOGICAL CONSIDERATIONS

A strength of the collected data is the relatively large sample of homogeneous middle adolescents regarding age. This age group is particularly relevant for studying adolescent dating violence, as it represents a developmental phase in which initial dating experiences emerge, shaping future romantic and sexual encounters. Our study only focused on physical

aspects of dating violence. This can be seen both as strength and as limitation. A strength is that we focused on the most severe aspects of ADV. On the other hand, including verbal and emotional abuse would have given a more comprehensive picture.

Mental health problems, social support and self-esteem were measured using internationally recognized rating scales, while other variables have been widely used in Finnish adolescent health surveys and have been shown to associate with problem behaviours and emotional symptoms (10,11,19–21). The classroom survey method allows for comprehensive reach within this age group, and the supervised survey setting ensures respondent privacy. Additionally, the inclusion of a sincerity check helped control for mischievous responses. However, a limitation of the study is the lack of more detailed information about dating violence. A limitation is also that the data were cross-sectional and therefore not able to advise about causal relationships. In the future, longitudinal studies are needed. Finally, phenomena such as adolescent dating violence may both decrease and increase over time; education, societal attitudes and sensitivity may change. However, while these might impact reported prevalence, they might impact less on the correlations detected.

CONCLUSION

Both being subjected to and perpetration of ADV are associated with advanced sexual experiences and experiences of sexual harassment. Additionally, ADV perpetration is linked to a lower likelihood of parental involvement in an adolescent's life. Investing in sexuality education in schools and healthcare settings is crucial for preventing such issues in later adolescence. Furthermore, fostering positive parent-child relationships across adolescent years may play a protective role in reducing behavioural problems, including ADV perpetration.

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TUULA TANSKANEN, KATINKA TUISKU, VERA VIITANEN, TIINA HÄRKÖNEN, TIINA PAUNIO

DYSFUNCTIONAL BELIEFS AND ATTITUDES ABOUT SLEEP (DBAS -16) SCALE IN PATIENTS REFERRED TO PSYCHIATRIC OUTPATIENT CLINIC FOR SLEEP CONSULTATION IN FINLAND – A REGISTRY-BASED STUDY

ABSTRACT

Background: *Dysfunctional assumptions about sleep are characteristic of chronic insomnia and an important target of treatment. The Dysfunctional Beliefs and Attitudes about Sleep (DBAS-16) scale identifies clinically significant levels of unhelpful beliefs related to sleep and differentiates insomnia patients from "non-insomnia" patients. More information is needed about DBAS measurement properties in psychiatric patients with sleep complaints. The aim of this study was to find a DBAS-16 cut-off value to identifying clinical insomnia among patients with psychiatric comorbidity to recognize patients who would benefit from Cognitive Behavioural Therapy for Insomnia (CBT-I), which is the primary evidence-based treatment for insomnia.* ***Methods:*** *The register-based sample comprised 115 psychiatric outpatients referred to the University Hospital Psychiatric Outpatient Clinic for Sleep Consultation, where their sleep complaints were evaluated comprehensively for symptoms and diagnosis. The DBAS scores of cases with insomnia disorder were compared with those without comorbid insomnia disorder by analysis of variance, and the optimal cut-off point was calculated using the Youden index.* ***Results****: Mean age of patients was 40.1 years (SD 12.5). DBAS of patients with insomnia disorder (mean 6.26) was significantly higher than that of non-insomnia patients (mean 5.35). Organic sleep disorders, such as sleep apnoea, restless legs syndrome and delayed sleep phase, had no independent effect on DBAS. The optimal cut-off point for discriminating insomnia in psychiatric patients was 6.3, with sensitivity of 0.64 and specificity of 0.67.* ***Conclusions:*** *In a psychiatric outpatient sample, the DBAS cut-off value should be set higher than in a population sample to recognize patients who would benefit from Cognitive Behavioural Therapy for Insomnia (CBT-I).*

KEYWORDS: DBAS, INSOMNIA, SLEEP COGNITION, SLEEP DISORDER, PSYCHIATRIC DISORDER, VALIDATION

HIGHLIGHTS

- Dysfunctional sleep-related cognition plays an important role in the development, maintenance and exacerbation of insomnia.
- Dysfunctional Beliefs and Attitudes about Sleep Scale (DBAS-16) is a 16-item self-report measure designed to evaluate a subset of sleep-related cognitions. It is a well-established instrument in studies of populations of "good sleepers" as well as in populations of patients with insomnia without a comorbid psychiatric disorder.
- In a psychiatric outpatient sample, the DBAS cut-off value should be higher than in a population sample.

INTRODUCTION

Insomnia is highly prevalent among patients with psychiatric disorders and it is a common symptom of major depressive disorder, dysthymia, generalized anxiety disorder and post-traumatic stress disorder (1,2).

Clinical assessment of insomnia emphasizes the patient's subjective experience of difficulty falling or staying asleep, which is associated with significant distress or impairment in daytime functioning (1), leading to maladaptive sleep habits and dysfunctional cognitions or beliefs about sleep (3).

Depression and sleep complaints, particularly insomnia, have a well-established bidirectional relationship (4-6). Dysfunctional, inaccurate thoughts and beliefs are common

in depression and are often targeted as a point of treatment for depression during cognitive therapy (7,8).

Maladaptive negative thought patterns in depression and anxiety disorders extend to sleep-related content that contributes to development of chronic insomnia together with circadian dysregulation (e.g. selective negative perceptions and interpretations about sleep, exaggerated pessimistic beliefs concerning the daytime consequences of disturbed sleep, and worry, fear and helplessness related to sleep) (9,10).

Cognitive models of insomnia stress the relevance of worry and rumination in the development and maintenance of insomnia (3). Dysfunctional beliefs about sleep belong to the major pathophysiological mechanisms of insomnia (11) and have been shown to be correlated with the treatment effects of CBT-I, so that the clinical treatment response is in parallel with decrease of DBAS scores (12-14).

The tool most widely used for assessing the maladaptive beliefs in insomnia is a 16-item self-report measurement, the Dysfunctional Beliefs and Attitudes about Sleep (DBAS-16) scale (10). The DBAS is a frequently used and well-established instrument in studies of populations of "good sleepers" as well as in populations of patients with insomnia without a comorbid psychiatric disorder (15). Carney et al. (16) examined the properties of DBAS-16 in various insomnia sufferers and healthy controls ("good sleepers") (n=1384). A validity analysis suggested that in healthy control group a DBAS-16 index score of >3.8 is associated with clinically significant insomnia.

DBAS score correlates well with subjective methods of assessing insomnia, anxiety and depression symptoms but poorly with objective polysomnography findings (10,14). DBAS scores are also increased in sleep disorders other than primary insomnia that cause sleep-related dysfunctional attitudes and beliefs about sleep (14). The DBAS is the primary instrument for detecting sleep-related cognitions in clinical insomnia studies and to determine treatment response for CBT-I, which is the primary evidence-based treatment for insomnia. CBT-I has been shown to have moderate to large effects on dysfunctional beliefs about sleep (12-14).

A few previous studies have investigated beliefs about sleep in a sample of patients with a range of psychiatric illnesses using the DBAS-16 scale (17) (18), but more information is needed to determine the DBAS threshold score discriminating chronic insomnia among psychiatric outpatients with sleep complaints.

We hypothesize that the DBAS cut-off value distinguishing insomnia from non-insomnia is higher in psychiatric outpatients than in the rest of the population on average (>3.8, (16)).

The aim of this study was as follows: 1) to assess the discriminative capacity of DBAS for chronic insomnia diagnosis in a psychiatric sample with sleep complaints, and 2) to determine an insomnia-specific cut-off value in the psychiatric population to identify patients with chronic insomnia who would benefit from cognitive behavioural therapy for insomnia (CBT-I).

MATERIALS AND METHODS

PARTICIPANTS

Our naturalistic clinical registry sample (n=115) consists of patients referred to the Psychiatry Outpatient Clinic for sleep consultation at Helsinki University Hospital (HUS) between February 2016 and December 2017, who were assessed by a sleep nurse and a psychiatrist under somnologist supervision, according to standard three-step protocol: 1. Laboratory screening and summary of earlier patient files, 2. Sleep nurse interview, Structured symptom assessment and Sleep diary, and 3. The medical diagnostic assessment of sleep disorders by a clinician with sleep recordings when needed.

MEASUREMENTS

The main outcome was DBAS-16 (10). In DBAS-16, each item is rated by the patient on a scale from 0 (strongly disagree) to 10 (strongly agree), and the average is reported.

The register of patient consultations also included the Insomnia Severity Index (ISI) scale (19), which is a 7-item self-report questionnaire assessing the nature, severity and impact of insomnia symptoms (19), which has been identified as the best sleep measure to screen clinical insomnia in a psychiatric population (20).

Psychiatric symptom scales included the Beck Depression Inventory (BDI) (21) and the Overall Anxiety Severity and Impairment Scale (OASIS) (22).

STATISTICAL ANALYSIS

Data analysis was performed using the Statistical Package for Social Sciences (SPSS), version 22. We used parametric statistical methods because the DBAS data was normally distributed (23). We used the Student's t-test for comparing DBAS scores between two groups (insomnia vs. no insomnia; psychiatric comorbidity vs. no comorbidity). Student's t-test was also used for testing the generalizability of patients who filled in DBAS by comparing them to those with missing DBAS data. For this purpose, chi-square test was used for comparing categorical variables between those who had DBAS sores to those without DBAS scores. Pearson correlation test was used

to test the intercorrelations between psychometric symptom scores. Univariate analysis of covariance (ANCOVA) was used to analyse the effect of other diagnoses on DBAS variance. To estimate cut-off values, the OptimalCutpoints function from R package OptimalCutpoints (24) was used. Youden index was chosen as a criterion to maximize both sensitivity and specificity. R version 4.1.2 was used for this analysis.

RESULTS

SAMPLE CHARACTERISTICS

The sample consisted of 115 patients, aged 19-70 (mean 40, SD 12.5) years. There were 63 females (55%) and 52 (45%) males. Most of the patients (n=95, 83%) were referred from primary care, the rest from somatic specialized care (n=11, 10%), psychiatric care (n=5, 4%) and occupational healthcare (n=4, 3%).

The most common indication for referral was persistent insomnia (n=84, 73%). Of the patients, 37 (32%) were employed and working; the remainder were either unemployed (n=61, 51%) or receiving disability compensation (n=17, 15%). Most of the patients in the whole sample, 88 (77%), had comorbid psychiatric disorders, and 17 (15%) had no current psychiatric diagnosis other than a sleep disorder diagnosis. The most common current psychiatric diagnosis was mood disorder (n=69, 60%), followed by anxiety disorder (n=45, 39%).

After assessment, 78 patients (68%) had a diagnosis of chronic insomnia, whereas the rest had other sleep disorder diagnoses. Other common sleep disorder diagnoses were sleep apnoea in 40 (35%), delayed sleep phase in 30 (26%), restless legs syndrome (RLS) in 30 (26%), nightmare disorder in 11 (10%) and sleep terror in 7 (6%) of the patients. The most commonly occurring psychiatric diagnosis with insomnia was mood disorder (n=35, 66%), followed by anxiety disorder (n=18, 34%). The most frequently comorbid sleep disorders with insomnia were sleep apnoea (n=25, 22%) and RLS (n=25, 22%).

Comparison between the patients who reported DBAS scores and those who did not, are presented in *Table 1*. The patients with insomnia diagnoses had more systematically filled in DBAS questionnaires.

Table 1. Sample characteristics and comparison between the patients with DBAS scores and those without (* significant difference). The patients with missing DBAS scores were significantly different from others only with regard to insomnia diagnoses.

Characteristics of the patient sample	DBAS scores available n=105	DBAS scores missing n=10	Significance p value	Method
Age, mean (SD)	40.7 (12.6)	34.3 (10.3)	0.124	t-test
ISI, mean (SD)	18.3 (5.60)	15.1 (7.77)	0.120	t-test
BDI, mean (SD)	19.7 (11.8)	21.1 (12.8)	0.770	t-test
OASIS, mean (SD)	9.34 (5.61)	7.64 (5.06)	0.442	t-test
Gender			0.312	Chi-Square
Male (n)	49	3		
Female (n)	56	7		
Referring organization			0.480	Chi-Square
Primary care (n)	100	10		
Other (n)	0	5		

→

Characteristics of the patient sample	DBAS scores available n=105	DBAS scores missing n=10	Significance p value	Method
Indication of Referral			0.331	Chi-Square
Treatment-resistant insomnia (n)	78	6		
Diagnostics and comorbidity (n)	27	4		
Vocational status			0.840	Chi-Square
Outside of work and education	56	5		
Employed or student	49	5		
Disability			0.696	Chi-Square
No disability	67	7		
Disability	38	3		
Organic sleep disorder (ICD-10 group G-diagnosis)				
Sleep apnoea	37	3	0.740	Chi-Square
Restless legs syndrome	27	3	0.768	Chi-Square
Circadian sleep disorder	27	3	0.768	Chi-Square
Functional sleep disorder (ICD-10 group F-diagnosis)				
Insomnia	74	4	0.049*	Chi-Square
Parasomnias	16	1	0.656	Chi-Square
Psychiatric diagnoses				
Mood disorders	105	10	0.499	Chi-Square
Anxiety disorders	43	2	0.187	Chi-Square
Psychosis	5	1	0.477	Chi-Square

Note: DBAS = Dysfunctional Beliefs and Attitudes about Sleep, ISI = Insomnia Severity Index, BDI = Beck Depression Inventory, OASIS = Overall Anxiety Severity and Impairment Scale

DBAS OUTCOMES

The mean DBAS score of the whole sample was 6.26 (SD 1.70). The all-symptom scores for different groups are presented in *Table 2*.

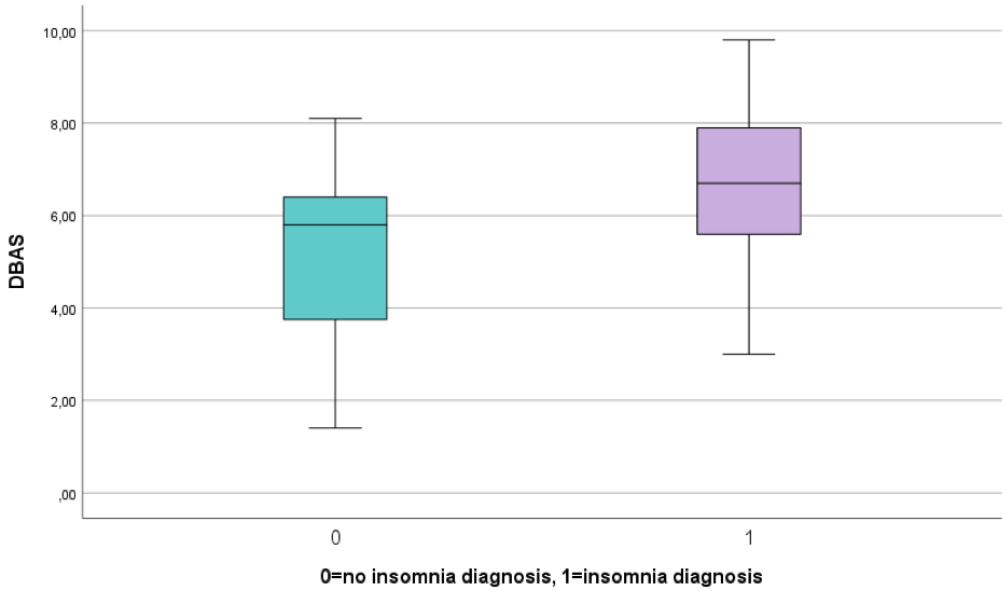
Patients diagnosed with an insomnia disorder scored significantly (t=-3.694, p=0.001) higher in DBAS (mean 6.67) than patients without insomnia diagnosis (mean 5.35)(*Figure 1*). DBAS scores of patients with psychiatric diagnoses (n=88) were slightly, but significantly (t=2.024, p=0.046) higher than the DBAS scores of patients without psychiatric diagnoses (n=17). The results are presented in *Table 2* and *Figure 2*.

Table 2. The scores of symptom scales DBAS, ISI, OASIS and BDI compared between insomnia versus no insomnia, and psychiatric diagnosis versus no psychiatric diagnosis groups. Only patients that filled in DBAS (n=105) are included.

	Insomnia diagnosis (n=74)	No insomnia diagnosis (n=31)	Significance of difference	Psychiatric diagnosis[1] (n=88)	No psychiatric diagnosis[1] (n=17)	Significance of difference
DBAS Mean (SD)	6.674 (1.54)	5.350 (1.73)	difference	6.429 (1.66)	5.530 (1.77)	t=2.024, p=0.046
DBAS Range	3.0-9.8	1.4-8.1		1.4-9.8	2.6-8.2	
ISI Mean (SD)	19.74 (5.05)	15.68 (6.13)	t=4.663, p<0.001	18.74 (5.36)	15.68 (6.13)	t=2.106, p=0.038
ISI Range	5-28	1-22		2-28	1-25	
OASIS Mean (SD)	9.270 (5.91)	9.633 (4.25)	t=-0.224, p=0.823	10.48 (5.26)	4.567 (4.52)	t=4.010, p<0.001
OASIS Range	0-19	2-15		0-19	0-17	
BDI Mean (SD)	19.88 (12.2)	19.03 (10.8)	t=0.269, p=0.789	22.46 (11.3)	7.969 (5.27)	t=5.004, p<0.001
BDI Range	0-51	1-36		1-51	0-20	

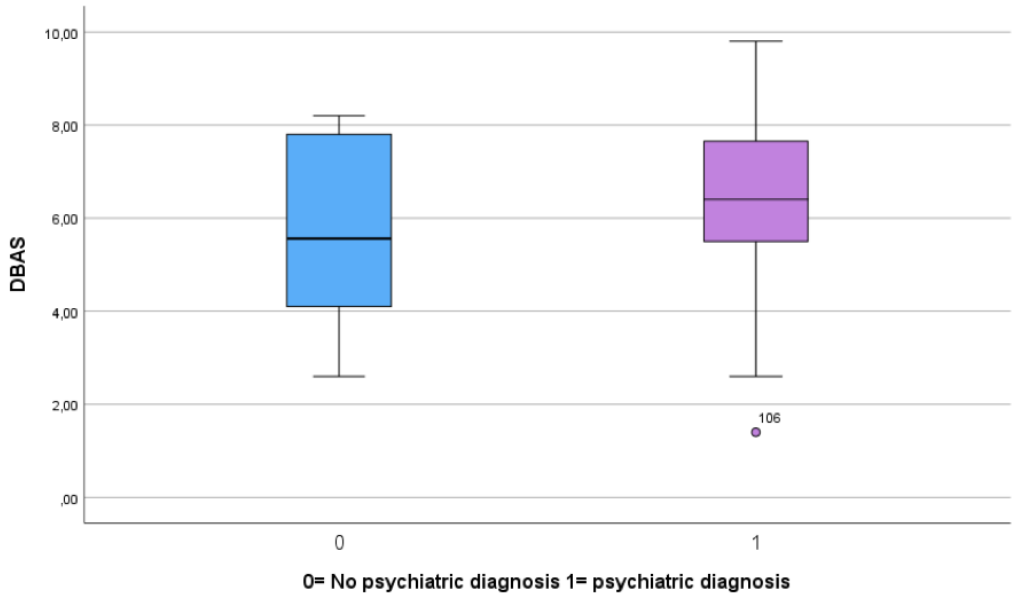
Note: DBAS = Dysfunctional Beliefs and Attitudes about Sleep, ISI = Insomnia Severity Index. OASIS = Overall Anxiety Severity and Impairment Scale, BDI = Beck Depression Inventory
[1]Psychiatric diagnoses here indicate ICD-10 group F diagnoses other than F-coded sleep disorders.

Figure 1. DBAS scores of patients with insomnia diagnoses (n=74) versus patients without insomnia diagnoses (n=31).



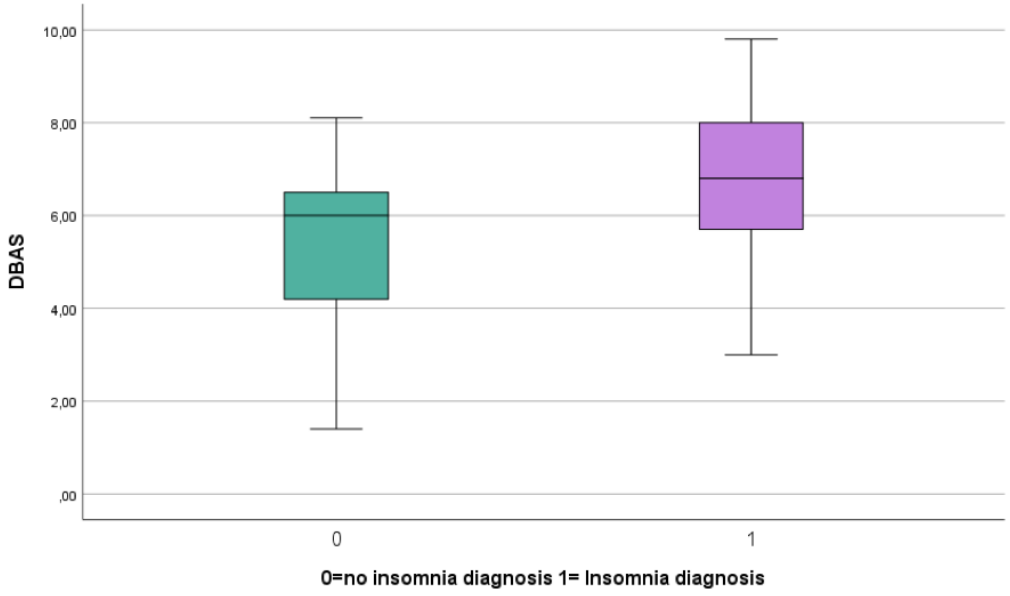
DBAS=Dysfunctional Beliefs About Sleep Scale

Figure 2. DBAS scores of patients with psychiatric diagnoses (n=88) versus patients without psychiatric diagnoses (n=17). Psychiatric diagnoses here indicate group F-diagnoses other than F-coded sleep disorders.



DBAS= Dysfunctional Beliefs and Attitudes about Sleep Scale

Figure 3. DBAS scores of patients with insomnia diagnoses (n=61) versus patients without insomnia diagnoses (n=27) among patients with psychiatric comorbidity.



DBAS= Dysfunctional Beliefs and Attitudes about Sleep Scale

Insomnia diagnosis had the greatest effect on the variance of DBAS scores (p=<00.1, F=16.172), Sleep apnoea diagnosis had a weaker, but still significant effect, (p=0.036, F=4.533) and RLS had no effect (p=0.949, F=0.004) on the variance of DBAS.

The mean DBAS scores (6.71) of sleep apnoea patients (n=37), however, were not significantly different (t=-0.127, p=0.900) from the mean DBAS scores (6.05) of those without sleep apnoea (n=68). After excluding comorbid insomnia in the subgroup analysis, the patients with sleep apnoea and without insomnia (n=12) scored even slightly less in DBAS (5.30 vs. 5.38) than those without sleep apnoea (n=19), but the difference was insignificant (t=-0.127, p=0.900).

In the subgroup analysis of the patients with other current psychiatric diagnoses, insomnia patients still scored significantly (t=3.550, p<0.001) higher (mean 6.821, SD 1.48) in DBAS than non-insomnia patients (mean 5.543, SD 1.73) (*Figure 3*).

Among patients with psychiatric comorbidity (n=95), the DBAS cut-off value was 6.3, with sensitivity of 0.64 and specificity of 0.67 (Area under curve, AUC 0.696 with confidence interval from 0.582 to 0.811).

DBAS scores were significantly correlated with ISI (r=0.625, p<0.0005), BDI (r=0.473, p<0.0005) and OASIS (r=0.440, p<0.0005) scores.

DISCUSSION

This naturalistic clinical registered-based study aimed to identify the DBAS threshold score that discriminates chronic insomnia among psychiatric patients with sleep complaints.

Results confirm our hypothesis that patients with psychiatric disorders and sleep complaints worry significantly about their sleep and hold more dysfunctional beliefs about sleep than people without psychiatric comorbidity. The average DBAS scores were markedly higher in our comorbid sample than reported in the general population (<3.8) (16). In our sample, both insomnia-diagnosed and non-insomnia patients scored higher on average (>5) than the general population.

The mean DBAS-16 total score of insomnia patients in our psychiatric sample (6.67) is in line with previous studies among insomnia patients with psychiatric comorbidity. In Carney et al. (16), patients with a variety of comorbid medical or psychiatric conditions had higher DBAS-16 total scores (6.16) than good sleepers (<3.8). Huthwaite et al. (17) assessed beliefs about sleep in adults with acute psychiatric disorders (schizophrenia and other non-affective psychoses, affective disorders, n=100) recruited from inpatient and outpatient clinics; the average total DBAS-16 score in their study was 5.54. Chang et al. (18) examined maladaptive sleep cognition among psychiatric patients and assessed its association with insomnia. Participants were outpatients (either mood disorder, anxiety disorder or schizophrenia spectrum disorder, n=400) recruited from a tertiary psychiatric hospital in Singapore. DBAS-16 total score among the psychiatric outpatient sample was 6.26.

This study is limited by its small sample size, retrospective nature and the highly selected sample of referred patients in specialized care. No data were reported on other medical conditions which may influence sleep. The subgroup analyses should be interpreted with special caution. These results are not directly generalizable to primary healthcare population because this sample consisted of patients selected by their persistent sleep complaints. Compared to other specialized psychiatric care units, this patient sample had more pronounced sleep problems. Strengths include the naturalistic sample and profound diagnostic procedures.

Several questionnaires that measure sleep-related cognitions have been developed which measure highly overlapping but not identical constructs. The Pre-Sleep Arousal Scale (PSAS) (25) captures manifestations of cognitive (as a "racing mind" and consisting of worry, rumination and an inability to relax your mind) and somatic (such as rapid breathing, a racing heart and muscle tension) arousal at the time before falling asleep. While PSAS assesses current experiences of arousal, DBAS assesses underlying negative thought patterns about sleep that can negatively affect emotions and behaviour during the day, not just before sleep.

Chronic insomnia and common mental disorders are characterized by dysfunctional thought patterns. Sleep-related dysfunctional thoughts are more prevalent in insomnia patients with psychiatric comorbidity than in insomnia patients without psychiatric comorbidity. Despite psychiatric and sleep disorder comorbidity in our sample, DBAS moderately differentiated chronic insomnia patients from those without insomnia diagnosis. However, a higher cut-off value should be applied for patients with psychiatric comorbidity to recognize those who would possibly benefit from CBT-I.

CONCLUSION

Our results revealed that psychiatric comorbidity increases sleep-related dysfunctional beliefs and attitudes. For outpatients with psychiatric disorders and sleep complaints, we tentatively suggest that the DBAS-16 cut-off value to identifying clinically significant levels of unhelpful beliefs related to sleep should be set ≥6 until stronger evidence is obtained from further studies.

Ethics and dissemination

The Coordinating Ethics Committee of the Hospital District of Helsinki and Uusimaa, Finland, approved the study protocol.

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IMPLEMENTATION OF PHYSICAL ACTIVITY AS A COMPLEMENTARY INTERVENTION FOR PATIENTS WITH PERSISTENT INSOMNIA - A NATURALISTIC PILOT STUDY

ABSTRACT

Physical exercise has favourable effects on sleep, and poor sleep may reduce daytime functioning. Current evidence-based guidelines recommend regular weekly aerobic exercise of moderate intensity for at least 150 minutes and muscle strengthening training twice a week. For insomnia patients, moderate activity is optimal. Evidence-based cognitive behavioural treatment is increasingly available, but experiences about applicability of guided physical activity as an add-on treatment in standard care are scarce. In this naturalistic pilot study, we screened for insufficient physical activity among treatment-resistant insomnia patients and conducted an intervention of exercise training with them. Despite pandemic- and resource-related barriers to implementation, those patients who carried out the exercise programme guided by a physiotherapist reported relief in their insomnia symptoms.

KEYWORDS: EXERCISE, GUIDELINES, IMPLEMENTATION, INSOMNIA, PHYSICAL ACTIVITY, SLEEP

INTRODUCTION

Chronic insomnia is a highly prevalent disorder with a prevalence of 12% in Finnish population. It is accompanied by an increased risk of depression, diabetes and cardiovascular morbidity. Cognitive behavioural therapy for insomnia (CBT-I) is the evidence-based treatment of choice, but the treatment response remains deficient among 20-30% of the patients and subclinical among 50% [1].

There is evidence of positive effects of physical activity and exercise training on several aspects of mental health [2] and sleep [3]. The advantages of physical activity as a complementary approach, or "add-on" treatment for insomnia, include availability and low costs [3]. Somewhat inconsistent subjective and objective results concerning the effects of exercise training on sleep may be related to variations in exercise prescription, and the interval between the exercise bout and bedtime [3].

The sleep-related benefits depend on the amount and quality of physical activity, in addition to the personal characteristics and health state of an individual [4]. The effects of physical activity on sleep are mediated by multiple mechanisms including endocrine, metabolic, anti-inflammatory, circadian and mood factors (4). Regular exercise seems to lower the nocturnal autonomic nervous system sympathetic tone and to decrease body temperature consequently contributing to sleep [4].

Conclusions based on meta-analyses refer to some positive subjective [5,6] and objective effects [7] of physical activity on sleep. It seems to reduce sleep-onset latency and to increase total sleep time and the amount of slow-wave sleep (SWS) [7]. A clinical treatment response has been measured with clinical symptom scales (Pittsburg Sleep Quality Index, PSQI, and Insomnia Severity Index, ISI), but there may have been selection bias [3].

Physical activity and exercise training is recommended as a self-care approach in the most prevalent sleep disorders, such as insomnia [1], restless legs syndrome [8] and obstructive sleep apnoea [9]. In general population, an educational health behaviour programme of 40 hours seemed to have positive effects on subjective sleep quality and insomnia symptoms, possibly explained by increasing exercise [10].

According to evidence-based guidelines concerning physical activity and health, adults are recommended to perform aerobic exercise at least 150-300 minutes a week with moderate intensity, or 75-150 minutes a week with vigorous intensity, in addition to muscle strengthening activities at least 2 days a week [11,12]. The guidelines and research data address the

gradual increase of exercise, special caution with cardiac risks and insomnia patients with objectively short sleep [4,11,12].

Small, progressive changes to increase physical activity are needed for the adaptation of the body to the additional stresses while minimizing the risk of injury. Exercise counselling by a healthcare professional or consultation with a physical activity specialist is needed especially with those patients who have a chronic health condition or disability, such as mental health illness, to tailor the physical activity programme to meet the individual health-related needs and goals [11].

MATERIALS AND METHODS

The Outpatient clinic for sleep disorders of Helsinki University hospital offers public consultation services, clinical assessments and further treatment trials for sleep disorders with diagnostic and treatment challenges and typically poor response to the usual evidence-based treatments.

The naturalistic clinical sample of this study consisted of patients with treatment-resistant insomnia referred to the Outpatient Clinic for sleep disorders between 9th November 2020 and 5th March 2021. During the recruitment phase, among 112 referrals there were 68 referrals of patients with treatment-resistant insomnia symptoms.

Inclusion criteria were a referral based on treatment-resistant insomnia symptoms, chronic insomnia as the main clinical problem, age between 18 and 65 years, subjectively reported insufficient weekly amount of physical activity (<150 min a week), motivation to participate in the study (informed consent), and adherence to outpatient (face-to-face) appointments, laboratory screens and other clinical assessments.

Medical exclusion criteria were clinical cardiovascular disease, signs of it, or remarkable risk factors, collapse, unresolved decrease of function, active inflammatory diseases, cancer, acute psychotic disorder or suicidality, eating disorders, underweight and current substance abuse. Other exclusion criteria were a sufficient baseline physical activity level (at least 150 min a week) or refusing to participate. Due to the pandemic, an additional exclusion criterion was added: living outside the capital region.

In the naturalistic setting, all the patients filled in sleep logs for 1-2 weeks, sleep questionnaires and symptom scales, and they went through clinical assessments with laboratory tests and clinical neurophysiology investigations when needed, following the usual clinical protocol. Updated treatment plans were designed for them by a doctor, and their medications were adjusted. They were referred to further interventions according to clinical follow-up data, new findings and comorbidities.

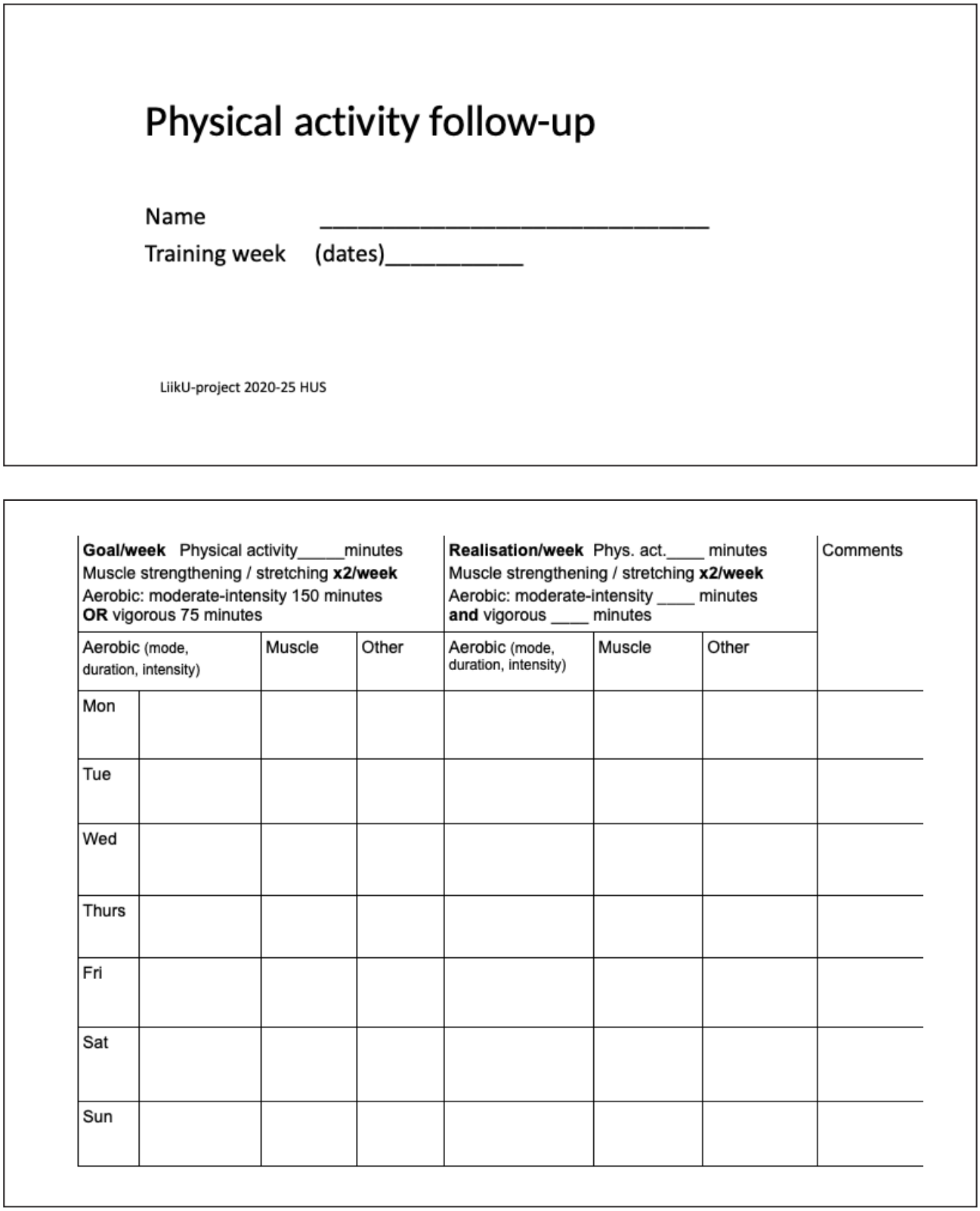
The patients included in the study were referred to a physiotherapist for exercise counselling and guided exercise intervention immediately, from the first contact. The aim was to carry out an individually tailored exercise programme as an add-on treatment while already waiting for the further assessments, consultations and other treatments. Due to the pandemic, however, there were delays in starting physical activity interventions, leading to some overlap with other interventions, like CBT-I boost for residual insomnia, and other interventions targeted to comorbid sleep disorders.

The 2-month guided exercise intervention by the physiotherapist included initial assessment of the amount and quality of physical activity routines of the participants, and an assessment of physical performance by squat test [13] and 6-minute walk test [14]. In addition, exploration of barriers to exercise, finding solutions to them were discussed, and an individually designed exercise programme with gradual increase of activity was planned with the participant, with encouragement to follow up using an exercise diary (*Figure 1*). After initial assessment, the physiotherapist had 3 follow-up visits and the final assessment visit with instructions for continued self-care. The fitness tests were repeated after 2 months.

The quantitative outcomes were recorded by sleep diaries, symptom scales and reports about physical activity. The amount of physical activity per week was based on self-report and follow-up diary (Fig. 1). Brisk walking, or other aerobic exercise, and muscle strength training were counted as physical activity. The physical activity was reported by minutes per week and its intensity was defined by Borg scale [15]. The primary outcome measure, severity of insomnia symptoms, was measured by ISI [16]. Other clinical scales included daytime sleepiness measured by Epworth Sleepiness Scale (ESS) [17], depression symptoms measured by Beck Depression Inventory (BDI) [18] and anxiety symptoms by measured by Overall Anxiety Severity and Impairment Scale (OASIS) [19]. ESS was reported only at baseline, being a screening method rather than an outcome measure in our clinical process for insomnia patients.

Statistical significance of the difference between baseline and follow-up after intervention and statistical power were analysed using Wilcoxon paired sample test by statistical program SPSS-29, and the effect size calculations were completed manually. The study was approved by the Ethics committee of the Helsinki and Uusimaa hospital according to the Helsinki declaration (approval number HUS/1809/2020).

Figure 1 Physical exercise goal setting and follow up diary.



Physical activity follow-up

Name _____

Training week (dates)_____

LiikU-project 2020-25 HUS

Goal/week Physical activity_____minutes Muscle strengthening / stretching **x2/week** Aerobic: moderate-intensity 150 minutes **OR** vigorous 75 minutes				**Realisation/week** Phys. act.____ minutes Muscle strengthening / stretching **x2/week** Aerobic: moderate-intensity ____ minutes **and** vigorous ____ minutes			Comments
Aerobic (mode, duration, intensity)		Muscle	Other	Aerobic (mode, duration, intensity)		Muscle	Other	
Mon								
Tue								
Wed								
Thurs								
Fri								
Sat								
Sun								

Ratings of perceived exertion (Borg scale) -RPE
The Borg RPE scale rates exertion from a scale of 6 (no exertion) to 20 (maximum effort).
A rating between 12 to 14 typically reflects a moderate or somewhat hard level of intensity.

Borg scale

Score	Level of exertion
6	No exertion
7	
7.5	Extremely light
8	
9	Very light
10	
11	Light
12	
13	Somewhat hard
14	
15	Hard (heavy)
16	
17	Very hard
18	
19	Extremely hard
20	Maximum exertion

RESULTS

SAMPLE SELECTION

Finally, among the 68 patients with treatment-resistant insomnia, 16 participants were included and 52 were excluded from the study; 22 patients were excluded because their baseline physical activity had already reached the goal (at least 150 min a week), 12 patients were excluded due to medical reasons, 11 due to age or location (living outside of the capital region) and 7 due to refusal.

SAMPLE CHARACTERISTICS

The study participants (n=16) consisted of 12 females and 4 males. There were no non-binary, nor transgender individuals in the sample. Their average age was 40.5 years and the age ranged from 18 to 63 years. Their median Body mass index BMI was 26.4 (range 20-37).

In addition to chronic insomnia, the participants were diagnosed with sleep disorder comorbidities during the clinical assessment: Obstructive sleep apnoea (n=6), Delayed sleep phase (n=6), Restless legs syndrome (n=3) and parasomnias (n=2).

The reported baseline physical activity of the participants was 75 minutes a week (median). Their median weekly alcohol intake was 0 doses (range 0-8 doses), none of them were currently smoking and their median daily caffeine intake was 2 doses (range 0-5 doses).

The participants' baseline characteristics are presented in *Table 1*.

Table 1. Participants' characteristics at baseline n=16.

	Mean	Median	Minimum	Maximum
Sleep log				
Duration of sleep (min)	383.2	375.0	245.0	650.0
Sleep onset latency (min)	51.0	27.5	2.0	200.0
Sleep efficiency (%)	70.6	67.0	50.0	87.5
Sleep quality (1-10)	4.9	5.2	2.4	6.4
Daytime alertness (1-10)	5.5	5.7	2.4	8.1
Symptom scales				
ISI	20.3	20.0	14	28
ESS	6.3	7.5	0	14
BDI	17.8	15.0	5	46
OASIS	6.6	5.5	0	20

Note
ISI = Insomnia Severity Index
ESS = Epworth Sleepiness Scale
BDI = Beck Depression Inventory
OASIS = Overall Anxiety Severity and Impairment Scale

CLINICAL NEUROPHYSIOLOGICAL BASELINE DATA

Before the intervention, 14 study patients had diurnal activity monitoring with actigraphy as a screening assessment. In actigraphy, 6 of the patients showed delayed sleep phase, and one showed irregularity of sleep-wake rhythm. Ambulatory polysomnography recording was performed on 14 study patients based on clinical indications. Six patients were diagnosed with mild to moderate obstructive sleep apnoea.

Comparison of actigraphy findings with polysomnographic data is presented in *Table 2*, showing consistency between the two different types of measurements. Major polysomnography findings are presented in *Table 3*.

Table 2. Comparison of sleep parameters between 2-week actigraphy and one-night ambulatory polysomnography n=14. Medians.

	Actigraphy	Polysomnography
Total sleep time in minutes	403	404
Sleep efficiency %	79.3	78.2

Table 3. Polysomnography data, median values of participants (baseline) n=14.

Total sleep time, TST	404 minutes
Sleep efficiency, SE	78,2%
Sleep onset latency, SOL	12 minutes
Arousal index, AI	16,2/hour
Apnoea-hypopnoea index, AHI	2.6/hour
Periodic limb movements during sleep, PLMSI	1.4/hour

IMPLEMENTATION OF THE PHYSICAL EXERCISE INTERVENTION

Among the 16 study participants, there were 7 dropouts. Five patients could not be reached after a marked delay due to pandemic- and resource-related gaps in services. Two patients withdrew at the initial assessment by physiotherapist; one due to burdening life situation and lack of mental resources, the other due to deteriorated health status, and both of them because of other ongoing, more urgent treatments. They reported that the intervention protocol seemed too heavy for them. Finally, only 9 entered the physical exercise programme and carried it out to the end.

Due to the Covid pandemic, the amount of exercise was limited due to several reasons, such as closing of gyms and public swimming pools. Here, some examples are given about the treatment plan.

If, for example, a participant reported taking walks 2-3 times a week of 30-60 min duration in the beginning of the intervention, the plan was to maintain the endurance exercise and add muscle strength exercise and mobility exercise 1-2 times a week. For more physically passive participants, with less than weekly exercise, the goal was to have exercise 1-3 times a week, starting with 1-2 walks of 15-30 min and weekly exercise of muscle strength and mobility.

The more active participants succeeded in reaching their individual goals well. Those who were less active, the goal was only partially reached. With them, the aim was primarily to maintain the minimum of 1-3 exercise sessions per week.

The participant (n=9) experiences reported by open feedback were all positive. They realized and reported positive changes in their sleep, self-appraisal, coping with pain, physical performance, motivation to exercise and awareness of the role of exercise for their wellbeing. They found the initial face-to-face contact and the careful planning of the exercise programme with physiotherapist to be important, but not all of them found the initial fitness test useful for them. For adherence to the programme, they reported the follow-up contact and exercise diary to be essential. Please see Box 1 for citations.

The amount of self-reported weekly median physical activity increased from 75 minutes a week to 183 minutes a week, the mean increase being 108 minutes, but the difference did not reach statistical significance (p=0.063).

SYMPTOM FOLLOW-UP

Insomnia symptoms measured by ISI decreased significantly (p=0.018) during the physical exercise intervention, from 20 (moderate) to 12 (mild). The median change was 8 points on ISI scale.

There were no significant changes in depressive and anxiety symptoms during the intervention. The symptom scale follow-up data are presented in *Table 4*. Effect sizes (r) in power analysis were 0.79 for ISI, 0.24 for BDI and 0.48 for OASIS.

Table 4. The symptom scales at baseline and at follow-up (2 months) n=9. Medians.

	ISI	BDI	OASIS
Baseline	20	15	6
Follow-up after intervention	12	10	7
Statistical significance	P= 0.018	p=0.480	p=0.147

Note
ISI = Insomnia Severity Index
BDI = Beck Depression Inventory
OASIS = Overall Anxiety Severity and Impairment Scale

DISCUSSION

Physical exercise has favourable effects on health and sleep, in general [2,3,11]. Chronic insomnia, by diagnostic definition, has daytime consequences [1]. Daytime distress, worries, tiredness or lowering of function may lead to reduced physical activity and reduced drive to move. There is a bilateral interaction between daytime inactivity and poor sleep [4]. The vicious cycle of poor sleep and sedentary daytime behaviour leads to flattening of diurnal activity amplitude, detected in insomnia [20].

Medical approaches to insomnia usually include medication. As the primary treatment for insomnia, CBT-I is increasingly implemented in Finnish healthcare [21,22,23]. Physical exercise is recommended as complementary self-treatment for insomnia, based on earlier studies [1,4,10]. The key to obtaining the advantages is consistency and regularity of exercising [24]. Based on clinical experience and studies [20,25] there are psychological, social and health-related barriers for adherence to regular exercise. To overcome these, the physically inactive patient often needs the help of a specialist in exercise counselling.

The major question in healthcare is how to implement physical exercise as an add-on treatment and how to integrate it in the clinical process. Considering the established benefits of health behaviour interventions in mental healthcare, there is a need to shift the focus of studies from efficacy towards implementation and how to integrate them in clinical practice [27]. People with common mental disorders often do not meet the standards of physical activity recommended by guidelines. Among patients with major depression, only 20% seem to achieve enough activity per week [28].

In this naturalistic pilot study, we tried to integrate an individually tailored, physiotherapist-guided physical exercise intervention of 2 months into clinical assessment of treatment-resistant insomnia patients. We failed, however, to recruit an adequate number of patients to allow any other than very preliminary conclusions. The paired comparisons of the study were too underpowered to detect significant changes in depression and anxiety symptoms, but there was enough statistical power to test the change in insomnia symptoms measured by ISI, which was the primary outcome measure. Other limitations of the study were considerable delays and the high drop-out rate, mainly related to pandemic situation. Besides, as a naturalistic clinical study, there were no controls.

In this pilot study, we followed the existing guidelines on insomnia and exercise prescription [1,11,12], carefully considering health risks and aiming at individually fitted, moderate intensity physical activity, especially aerobic, that has been shown to decrease sleep latency and increase total sleep time, whereas high-intensity physical activities, especially in the evening or close to bedtime, may lead to opposite effects [24].

Those participants, who carried out the exercise programme guided by a physiotherapist, reported relief in their insomnia symptoms and they were able to increase their physical activity. An earlier, randomized controlled trial [26] found that increasing physical activity of inactive individuals up to level recommended by guidelines (≥150 min of moderate to vigorous intensity physical activity per week) during 6 months reduced insomnia significantly, with an average reduction of four points on ISI. The median decrease in insomnia symptoms in our study was higher, 8 points, which can be explained by higher baseline scores among our treatment-resistant insomnia patients compared to non-clinical insomnia patients. Furthermore, our pilot study did not exclude placebo effects.

In this study, only the decrease in insomnia symptoms was significant, whereas there was no significant change in depression, nor in anxiety symptoms. The statistical power of the small naturalistic sample was not sufficient to test the possible response in depression and anxiety symptoms. Besides, the

expected relief of depression symptoms mediated by sleep [29] would probably have needed more time to develop. Mediating mechanisms between sleep and mood involve neuroplasticity and emotion regulation [29]. From earlier studies we know that an effective treatment of insomnia additionally provides a treatment response in comorbid depression, explained by sleep acting as a mediator in the recovery from depression [30].

Our preliminary findings were promising, but they show that successful implementation should not be dependent on changes in healthcare resources and public transportation that were vulnerable during the pandemic. Consequently, digital materials demanding less specific employee investment and video-visits are to be studied in the future. A simple, low-cost, standardized model is needed, that could be implemented within a clinical setting, still considering adequately the individual risks, barriers, motivations, needs and goals.

According to feedback by patients and the consulting physiotherapist (S.M) who designed and carried out the intervention, the initial face-to-face appointment is one of the core elements to be preserved, as well as structured follow-up tool (*Figure 1*) and a few follow-up contacts, that could be conducted as teleconsultations with the support of digital materials in the future. A physiotherapist or other healthcare professional with complementary training in exercise science, working in cooperation with the doctor responsible for the care package is recommended to design the exercise plan for patients with multiple health issues.

Despite the challenges and limitations of the study, guided physical activity seems to be acceptable and beneficial for our selected sample of treatment-resistant insomnia patients, who were highly motivated and committed to the intervention. Clinically, they were representative of treatment-resistant insomnia patients referred to centralized sleep disorder outpatient clinic.

A surprising positive finding, leading to a high rate of exclusions in our study, was that a considerable amount of treatment-resistant insomnia patients (32%) already had more than 150 minutes of physical exercise in their weekly routines. It seemed that quite many of them were well-informed and had already adopted many useful health behaviour routines earlier by themselves, or with the support of primary, secondary and occupational healthcare.

CONCLUSIONS

In this pilot study, almost a third of the treatment-resistant insomnia patients followed the baseline physical activity guidelines despite the daytime effects of chronic insomnia. For those who did not reach the goal (150 minutes weekly), an add-on intervention of guided physical exercise seemed to be helpful in reducing insomnia symptoms. Implementation of guided physical activity successfully would require a less vulnerable setting with availability of personnel resources specialized in exercise counselling, standard tools adoptable to various settings and some degree of automatization, while still preserving patient safety and enough individual flexibility according to patient needs.

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MATILDA MELA, ANNA KESKI-RAHKONEN

EATING DISORDERS, BODY IMAGE CONCERNS AND EXERCISE IN YOUNG FINNISH WOMEN

ABSTRACT

Purpose: *Body image concerns are common among women with eating disorders. Our aim was to compare body image concerns and exercise in women with and without eating disorders.* ***Methods:*** *Women diagnosed with lifetime eating disorders (n=159) and randomly selected women without eating disorders (n=163), from the 1975–1979 birth cohort of Finnish twins, completed self-report surveys that assessed body image concerns and exercise and the impact on their private, social and professional lives.* ***Results:*** *Compared to women from the general population, women with eating disorders were more likely to express excessive body image concerns, exercise nearly every day, set goals for exercise and use exercise as a form of self-punishment. They also reported spending significantly more time and money on worrying about and managing their appearance, and body image concerns had a more negative impact on their private, social and professional lives.* ***Conclusions:*** *Body image concerns and driven exercise are common among women, but women with a history of eating disorders invest more time in them and report more negative consequences.*

KEYWORDS: EATING DISORDERS, BODY IMAGE CONCERNS, DRIVEN EXERCISE, TWIN STUDIES

INTRODUCTION AND AIMS

Eating disorders (EDs) are common and persistent mental disorders among young women: 6–18% of Finnish women suffer from EDs at some point in their life (1). Previous studies have found that body image concerns play a significant role in the development and maintenance of EDs (2-4).

Body image is a multidimensional construct that consists of perceptual, evaluative and behavioural components (5,6). Negative body image, particularly body dissatisfaction, is a common risk factor of eating disorders (7). On the other hand, positive body image appears to be a protective factor from disordered eating (8).

Physical activity has emerged as a powerful potential mediator of positive body image (9). However, an intense focus on exercise and appearance can also have negative consequences (10).

A more recent turn in body image research has been to study appearance investment (11). Appearance investment can boost quality of life (8) but can also turn dysfunctional if it results in social anxiety and lower quality of life, or causes excessive self-consciousness, such as intense body surveillance (5).

Physical appearance can also be seen as a form of capital that can be accumulated and exchanged socially and economically (12). Recent studies have also shown that physical appearance as capital involves double standards for women: accumulating it is generally endorsed but exploiting it is generally frowned upon (12). In general, younger women are more likely than men to place importance on their appearance and invest time to achieve their ideal appearance (13).

Although appearance investment can be measured using various approaches (11,14,15), we feel that body image-related behaviours and cognitions are not yet fully described. Body image concerns affect everyone to some degree, yet relatively few studies have sought to study appearance-oriented cognitions and behaviours in the community.

Using a community-based setting, the aim of our study was to compare body image concerns and exercise in women with and without a diagnosis of lifetime eating disorder. We also sought to quantify time and money invested in appearance-

related activities and their impact on the women's private, social and professional lives. Our hypothesis was that women with eating disorders (EDs) would have a higher need to alter their appearance, spend more time and money in appearance management activities and experience feelings of worry more often than women without EDs.

METHOD

STUDY PARTICIPANTS

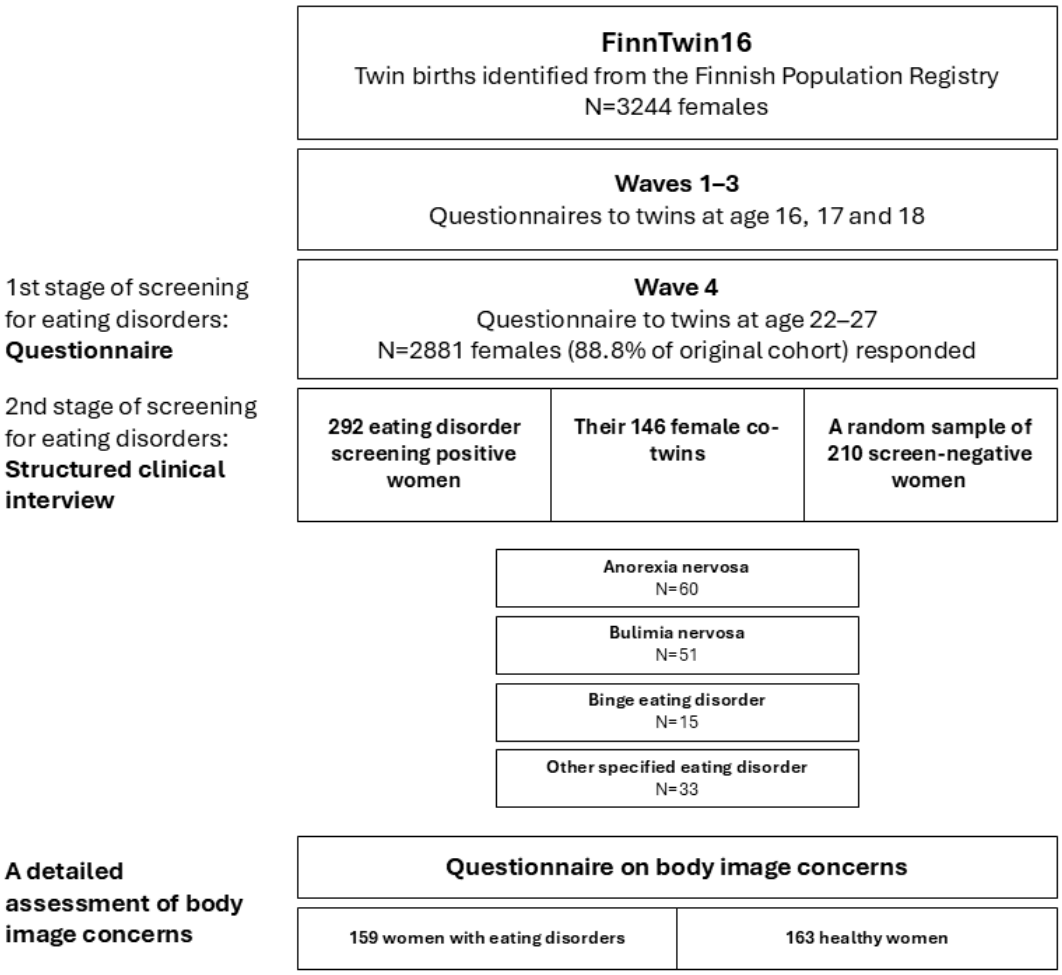
This study is a cross-sectional case-control study involving women with eating disorders (n=159) and randomly selected women without eating disorders (n=163) from a community-based cohort. The participants are from FinnTwin16 (16), a nationwide cohort study of Finnish twins born between 1974 and 1979 (n=5563).

The flowchart of the study design is presented in *Figure 1.* The data collection took place in 2000–2003 when the participants were 22–28 years old (mean 24.4, standard deviation (SD) 0.94), their eating disorder symptoms were assessed using three subscales of Eating Disorder Inventory-2 (EDI) (17), including Body Dissatisfaction (BD), Drive for Thinness (DT) and Bulimia, along with several other questions (self-reported weight and height, self-reported anorexia nervosa, self-reported bulimia nervosa, purging, eating disorder suspected by others). Based on low body mass index (BMI), self-reported or suspected ED or high EDI scores, a subset of female participants were invited to take part in detailed diagnostic interviews using the Structured Clinical Interview for DSM-IV (SCID) (18) that included diagnostic modules for anorexia nervosa (AN), bulimia nervosa (BN), binge eating disorder (BED) and other specified feeding and eating disorder (OSFED) (19). All diagnoses were recoded following DSM-5 diagnostic descriptions (20).

After the interview, the participants were given a self-report questionnaire that assessed body image concerns in greater detail. The participants of the present study completed the ED screening questionnaire, participated in the diagnostic telephone interview and returned the body image concern assessment questionnaire. Of these respondents, 163 women did not have an eating disorder and 159 women (Women with EDs) had a lifetime diagnosis of an eating disorder. Of women with EDs, 37.7% had AN (n=60), 32.1% had BN (n=51), 9.4% had BED (n=15) and 20.8% had OSFED (n=33). The inclusion of men in this study was also considered. However, because very few men screened positive for eating disorders, their inclusion in more detailed statistical analyses of body image concerns was not feasible because of low numbers. The key characteristics of male participation have been described in previous studies (21).

Participation in the present study was voluntary; all participants gave their informed consent prior to their inclusion in the study. The study followed principles expressed in the Declaration of Helsinki.

Figure 1: Flowchart of study waves and participants about here.



BODY IMAGE CONCERNS

Body image concerns (appearance-oriented cognitions and behaviours) were measured by a survey designed specifically for this study. The complete list of items is available in the supplement (Appendix A). The assessment included 66 questions regarding appearance, lifestyle, eating habits and mood. In this brief report, we focus on 20 items that measured appearance-oriented cognitions and behaviours, including exercise, and their impact on the participants' personal and social life, studies or work. Of these items, one was worded ambiguously, thus we left it out from data analysis.

These items assessed, for example, time spent on body image concerns, the time and money spent on appearance management, the frequency of exercise and the use of diet supplements and slimming beauty products (Appendix A). The impact of body image concerns on various aspects of life was assessed by evaluating how often these concerns caused sadness, diminished sex life and impacted on social relationships, studies or work (Appendix A). The participants also reported how frequently they exercised, how often they exercised when ill or injured and whether they used exercise as self-punishment (Appendix A).

STATISTICAL ANALYSIS

We computed descriptive statistics from survey responses and analysed how women with EDs and the comparison group differed in terms of appearance-oriented behaviours and cognitions using cross-tabulation with Pearson's chi-squared test. We collapsed the last two categories of the 4-level items into one, because the frequency rates in the fourth option were rather rare, especially among the comparison group. Categorical variables measuring time were recoded into binary

variables: less than 30 minutes and at least 30 minutes. We also accounted for clustered sampling within twin pairs and adjusted P-values by design-based F (22). We performed all statistical analysis using Stata 16.0.

RESULTS

DEMOGRAPHICS

Both the women with and without EDs were similar in terms of age, education and self-rated income (*Table 1*). However, women with EDs differed significantly from the comparison group in their BMI and Eating Disorder Inventory-2 (EDI) subscale scores (*Table 1*). Women with EDs were also more likely to be currently enrolled at university than the women in the comparison group (*Table 1*).

Table 1. Demographic and social characteristics of study participants.

Variables	Women with EDs †			Women without EDs †			P-value ‡
	N	mean	SD	*N*	mean	SD	
Age, years	159	24.32	0.85	163	24.38	0.80	0.536
Body mass index	159	22.47	3.84	162	21.04	3.13	<0.001
EDI-bulimia	158	17.83	7.36	159	11.27	4.16	<0.001
EDI-Body dissatisfaction	159	32.27	10.38	163	23.96	9.81	<0.001
EDI-Drive for thinness	158	26.61	9.20	161	17.73	7.89	<0.001
	N (%)			*N (%)*			
Completed education							0.659
12-year education	123 (77.36)			131 (80.86)			
Non-university higher education	25 (15.72)			22 (13.58)			
University degree	11 (6.92)			9 (5.56)			
Ongoing studies							0.094
No ongoing studies at university level	116 (72.96)			132 (81.48)			
Ongoing studies at university level	43 (27.04)			30 (18.52)			
Self-rated income							0.106
Very good	7 (4.43)			7 (4.32)			
Quite good	31 (19.62)			51 (31.48)			
Average	67 (42.41)			64 (39.51)			
Quite poor	41 (25.95)			35 (21.60)			
Very poor	12 (7.59)			5 (3.09)			

† Totals may vary because of missing value
‡ P-value from linear regression analysis for continuous variables $\chi 2$/design-based F for categorical variables. Adjusted for clustered sampling within the twin pair
Note: SD=Standard deviation, EDI=Eating Disorder Inventory

BODY IMAGE CONCERNS IN THE COMMUNITY

Table 2. Appearance-oriented cognitions and behaviours in the community.

Variables	ED+ (%)	ED–(%)	P-value †	OR	95% CI
Q10: Thinking about appearance at least 30 mins daily	35.9	16.0	<0.001	2.94	1.64–5.28
Q11: Worrying about appearance at least 30 mins daily	26.4	10.4	<0.001	3.08	1.59–5.97
Q12: Feeling anxious, sad or low because of appearance-related worries	81.8	44.8	<0.001	5.53	3.25–9.40
Q14: Enhancing appearance for at least 30 mins daily	45.9	33.1	0.021	1.71	1.08–2.71
Q15: Appearance-oriented spending (at least 50 € monthly)	27.7	16.0	0.012	2.02	1.16–3.50
Q16: Neglecting social life because of appearance-related matters	40.9	14.7	<0.001	4.00	2.29–6.99
Q17: Appearance-related worries have negatively impacted sex life	67.9	35.0	<0.001	3.94	2.45–6.32
Q18: Appearance-oriented cognitions have interfered with studies or work	39.0	12.9	<0.001	4.32	2.41–7.74
Q19: Appearance-oriented cognitions have impacted education or career choices	22.0	14.1	0.084	1.72	0.93–3.19
Q20: Avoiding other people because of appearance-related doubts, worries or shame	45.3	17.8	<0.001	3.82	2.24–6.53
Q21: Denying oneself things that one likes because of own appearance, dieting or exercising	78.0	46.6	<0.001	4.06	2.48–6.62
Q22: Using weight-loss products or devices	28.9	14.7	0.003	2.36	1.32–4.21
Q23: Appearance-oriented consuming of dietary supplements or high-protein foods	28.3	15.4	0.011	2.16	1.19–3.95
Q24: Having considered or sought cosmetic surgery	49.1	40.5	0.155	1.42	0.88–2.29
Q26: Exercising almost daily	15.7	7.4	0.025	2.35	1.10–5.02
Q27: Exercising at least 1–2 hours at a time	35.0	27.8	0.174	1.40	0.86–2.29
Q28: Exercising while injured	37.1	27.2	0.068	1.58	0.97–2.59
Q29: Exercise used as a form of self-punishment	59.1	15.5	<0.001	7.87	4.56–13.57
Q30: Setting goals for physical activity	49.7	28.4	<0.001	2.49	1.57–3.95

† P-value from design-based F for categorical variables. Adjusted for clustered sampling within the twin pair
Note: OR=Odds Ratio, CI=Confidence Interval

As described in *Table 1*, body image concerns were frequently reported by all participants. However, women with EDs reported engaging in these significantly more often and spending more time on worrying and managing their appearance. Body image concerns were more time consuming for women with EDs: 35.9% reported thinking about and 26.4% worrying about their appearance for at least half an hour every day, compared to 16.0% ($p<0.001$) and 10.4% ($p<0.001$) of women in the comparison group, respectively. On daily basis, 45.9% of women with EDs spent at least half an hour on appearance management activities (vs. 33.1% of the comparison group, $p=0.021$).

The use of appearance management products was also more common among women with EDs than in the comparison group: almost a third of them used nutritional supplements or high-protein products (28.3% vs. 15.4%, $p=0.011$), diet supplements or toning beauty products (28.9% vs. 14.7%, $p=0.003$) and spent at least 50€ (in early 2000 would equal approximately 74 € in 2025) on their appearance monthly (27.7% vs. 16.0%, $p=0.012$). Their intention to engage in cosmetic procedures, however, did not differ significantly ($p=0.063$).

PHYSICAL EXERCISE AND SELF-PUNISHING BEHAVIOURS

We also investigated the relationship between physical exercise and appearance concerns. Time devoted to workout sessions, or exercising when injured, did not significantly differ between women with and without EDs, but women with EDs were more likely to exercise almost daily (15.7% vs. 7.4%, $p=0.025$) and set goals for exercise (49.7% vs. 28.4%, $p<0.001$).

Women with EDs also engaged in self-punishing activities significantly more often than the comparison group: 78.0% (vs. 46.6% of the comparison group, $p<0.001$) denied themselves things they liked because of their appearance, dieting or exercising, and 59.1% (vs. 15.5% of the comparison group, $p<0.001$) used physical exercise as a form of self-punishment.

IMPACT ON PRIVATE, SEXUAL, SOCIAL AND PROFESSIONAL LIFE

Body image concerns were not only more common among women with EDs, but they also had more of a negative impact on their private, sexual, social and professional life. Compared to the women in the comparison group, women with EDs were almost two times more likely to report that body image concerns had caused appearance-related worries (81.8% vs. 44.8%, $p<0.001$) or impacted on their sex life (67.9% vs. 35.0%, $p<0.001$).

Withdrawing from social life because of insecurities regarding one's appearance was significantly more common among women with EDs than the women in the comparison group. Doubts, worry or shame caused 45.3% of women with EDs to avoid other people, and 40.9% neglected their social relationships because of appearance-related issues. Of the comparison group, 17.8% ($p<0.001$) and 14.7% ($p<0.001$) reported these issues, respectively.

Women with EDs were significantly more likely to report that body image concerns had interfered with their studies or work than the women in the comparison group (39.0% vs. 12.9%, $p<0.001$). However, body image concerns had not significantly impacted on most women's career choices.

Despite these findings, a relatively prominent proportion of women with EDs did not report a negative impact on the different aspects of their lives, as shown in *Table 1*. Most women of the comparison group were not affected by body image concerns.

DISCUSSION

In this case-control study nested in a population-based cohort, we examined body image concerns, exercise and their consequences on various aspects of life in women with and without eating disorders (EDs). We also sought to quantify time and money spent on appearance management activities. Overall, body image concerns, self-punishing behaviours and ensuing impairments in life were reported significantly more often by women with EDs than by the comparison group. Women with EDs were also more likely to express features of driven exercise.

SPENDING ON APPEARANCE

In our setting, body image concerns were more common and more time consuming among women with EDs compared to women without EDs. We were able to find three previous studies that documented time spent on appearance concerns. In the first of these two studies, Rudd and Lennon (23) examined the lived experiences of 95 college women in a qualitative setting: 11.6% of them had indicated anorexia-related and 7.4% bulimia-related behaviours. Their study participants reported spending 20 to 120 minutes to "get ready" on a daily basis, but the average time was not mentioned. Almost half of the women were satisfied with their body, whereas 15% were dissatisfied (23). It was not reported, however, if women who were dissatisfied with their appearances spent less, same or more time "getting ready" than women who were satisfied with their looks.

In the second study, Singlehurst et al. (24) studied the time-use patterns of 10 participants with binge eating disorder and the impact that the disorder had on their everyday activities. The average time spent on washing and dressing as personal care was 53 minutes. Other appearance management activities were not included in the time-use patterns. The third study we found, by St-Pierre et al. (25), compared the time-use patterns between anorexia nervosa, bulimia nervosa and binge eating disorder for a period of 24 hours. These patterns were categorized as personal care, productivity and leisure. Similar to Singlehurst et al. (24), the only appearance management activity recorded was washing and dressing. On average, participants with anorexia nervosa spent most time (39min), followed by participants with bulimia nervosa (31min) and binge eating disorder (26min), on washing and dressing (25).

Our results cannot be directly compared to these studies for three reasons. One, our questionnaire had fixed options to choose from, and no possibility to indicate the actual time. Two, we also measured attempts to enhance appearance, that goes beyond daily hygiene. Third, we didn't perform between-group analysis due to our modest sample size. Future studies should consider collecting detailed and consistent information about appearance management activities and other time-use patterns in EDs.

PHYSICAL ACTIVITY

To our surprise, we found no significant difference in the amount of exercising between women with and without EDs. After all, this is a common stereotype associated with EDs. There are many possibilities that could explain this, starting from our study setting, but we discuss the two that we find most likely.

On one hand, patients with anorexia nervosa significantly under-reported light physical activity, compared to moderate and vigorous physical activity, on self-reporting questionnaires when compared to accelerometer data (26). Bezzina et al. (26) suggest that patients with anorexia nervosa might define "light activity" differently than other groups in their study.

On the other hand, physical activity as a symptom in EDs can be defined either in terms of quantitative dimension (excessive) or qualitative dimension (compulsive). Instead of looking at the quantity of exercise, the qualitative dimension has been found to be more fitting to describe the exercise in eating disorders (27). Rigid routine, neglecting other activities for physical activity and feeling guilty when skipping a workout session attribute to compulsivity (28).

These two could explain, at least partially, why our finding about the amount of physical activity was different from previous studies. Firstly, patients with anorexia nervosa underestimate light physical activity, and since almost 2/5 of the women with EDs in our setting had anorexia nervosa, this could affect the results for the whole group. Because of the modest sample size, we are not able to do between-group analysis without losing power. Secondly, compulsivity also speaks for our findings. After all, in our setting, women with EDs reported setting goals for exercise and using it for self-punishment more often than the comparison group. We would speculate that women with a history of restrictive anorexia nervosa would engage more often in driven exercise than, for example, women with a history of binge eating disorder.

IMPAIRMENTS IN LIFE

Body image concerns were associated with impairment in several important areas of life, including social and occupational life and sexual and romantic relationships. These results are in line with previous research. Women with EDs reported relatively ascetic lifestyles and engaged in behaviours such as self-denial and self-punishment. These kinds of behaviours are seen in ascetic personality trait that is part of overcontrol in EDs, affecting both adults and adolescents (see, for example, 29,30). Previous studies have found that ascetic trait in EDs might negatively affect treatment outcomes (31) and make it harder to receive care (30). The ascetic lifestyle may have an impact on overall quality of life. In our study, negative body image and impairment in different aspects of life were more common among women with EDs than in the comparison group.

In general, negative body image is associated with lower quality of life (32) and poorer social functioning (33). Disordered eating is associated with lower psychological quality of life, whereas positive aspects of body image are associated with enhanced quality of life (8). In past studies, severity of ED symptoms, along with anxiety and depression, has predicted impairment in social and occupational functioning (34,35). Stigmatization related to EDs may increase feelings of alienation and social withdrawal, which, in turn, may further increase ED symptom severity (36). Even after recovery, individuals with EDs report more difficulties in social and occupational functioning compared to individuals without an eating disorder (35). Previous studies also suggest that both body size and body image impact on romantic relationships (33). Moreover, women with negative body image experience greater dissatisfaction with their sex lives, relationships and dating situation (33).

Studies about social comparison and body image have found that women are more prone to be concerned about how other people evaluate their bodies than men, and that these concerns

can lead to avoiding social encounters and spending more time alone (33). Rudd and Lennon (23) suggest that social comparison is at the core of endless appearance management behaviour. These theories could also help explain why the women with EDs in our study were more likely to experience more negative impact on various aspects of their lives, and of spending more time on their appearance-oriented cognitions and behaviours than women in the comparison group. From 1998 to 2018 there has been a decreased trend in body dissatisfaction and dieting in Finland (37). Despite these positive developments in body image over the past two decades, body image concerns are still associated with a considerable burden, particularly in women (37).

Our findings reflect the Sarpila et al. (12) theory about "aesthetic capital": Moderate investment on accumulating aesthetic capital was common and widely endorsed by women in our study. In our study, both women with and without eating disorders generally engaged in appearance management, but women with EDs were more involved and less likely to report benefits or positive consequences.

STRENGTHS AND LIMITATIONS

The unique strength of this nested case-control study was the inclusion of women without EDs. The population-based control group of women provides some insight into the distribution of body image concerns in participants' lives. Women without EDs also frequently engaged in these behaviours. Although body image concerns impact on most women, women with EDs were far more likely to be involved in excessive appearance management behaviour, overcontrol and self-punishment.

Our study has limitations that should be considered when interpreting the results. First, our sample included only women and our sample size was modest, which is reflected in the precision of estimates. Because of low number of participants, this study was not designed to address the impact of eating disorder treatment on appearance-oriented cognitions and behaviours. Women with eating disorders in our study included women at different stages of recovery. For this reason, differences in clinical populations could be even more extreme. Second, we used an ad hoc questionnaire to measure body image concerns (appearance-oriented cognitions and behaviours). At the time of design of this study, widely used measures of appearance investment, like Appearance Schemas Inventory (ASI-R) (5), were not yet available in our context. For this reason, our results cannot be directly compared with other studies. Third, our questions on appearance investment were based on just one wave of a longitudinal study, and therefore the study was cross-sectional. For this reason, our data cannot be used to resolve causal questions.

CONCLUSION

Many women with eating disorders examine, monitor and evaluate their bodies trying to change how they look and feel. However, as appearance-related pressure impacts on all women, these thoughts and behaviours are not limited to people with eating disorders. Women with and without eating disorders reported frequent body image concerns (appearance-oriented cognitions and behaviours). However, women with eating disorders were far more likely to engage in these thoughts and behaviours and spend more time and money on them. Women with eating disorders were also more likely to report that these behaviours had a negative impact on their private, sexual, social and professional lives, and to engage in driven exercise and self-punishing behaviour.

Supplementary Material

Supplementary data are available at Psychiatria Fennica online.

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ANNA KESKI-RAHKONEN, EMMA SAURE

NEURODIVERSITY-AFFIRMING AUTISM ASSESSMENT AND SUPPORT: A SCOPING REVIEW

ABSTRACT

Purpose: *The neurodiversity movement has challenged longstanding medical conceptualizations of autism. This scoping review aims to examine recent literature on neurodiversity-affirming autism research, assessment and support.* ***Study Design:*** *A systematic PubMed search using the term "neurodiversity-affirm*" was conducted in May 2025. The findings were thematically organized to illustrate how neurodiversity-affirming views are currently shaping medical practice.* ***Findings****: The neurodiversity movement is a human rights movement that advocates for the rights and inclusion of neurodivergent individuals. It emphasizes the importance of involving autistic people in research, decision making and service planning. Some of the most prominent advocates of the neurodiversity movement are scientists and health professionals with lived experience of autism. They are uniquely positioned to bridge autistic experience, scientific research and healthcare practices. Recently, many health professionals have embraced the ideas of the neurodiversity movement and integrated them into the concept of neurodiversity-affirming practice. To date, these principles have inspired various health professionals and members of the autistic community to collaborate in improving autism assessment and support. This new approach has led to the development of promising assessment tools and innovative ways of supporting autistic children, youth and adults.* ***Conclusion:*** *For autistic individuals, whose ways of being have historically been framed in terms of deficits, it is essential to create spaces where they can authentically express themselves and be recognized and valued. Such environments are fundamental to enhancing their wellbeing. Healthcare providers are therefore encouraged to rethink autism services and to co-design them with the autistic community to promote true inclusion.*

KEYWORDS: AUTISM SPECTRUM DISORDER, NEURODIVERSITY, NEURODIVERSITY AFFIRMING PRACTICE, INTERVENTIONS

Autism is an umbrella concept for highly heterogeneous individual neurodevelopmental differences in social communication, interaction and behaviour (1). Although these differences are often detected in early childhood, sometimes they become more obvious later in life as social demands increase. Diagnostic criteria for autism have evolved over time, and their evolution will continue with the adoption of the 11th Edition of the International Classification of Diseases (ICD-11) (Supplement 1). There is considerable overlap in features of autism and several other communicational, neurodevelopmental and mental health conditions.

In Finland, the increasing demand for autism assessments has created tensions in mental health services (2). An increase in autism diagnoses has occurred in recent years in many other Western countries (3). In Britain, a similar situation has been addressed by creating a strategic action plan for improving access to autism services (4).

Many of the underlying reasons for the surge in need for autism assessments and services are medically motivated and related to progress in medical research and practice (1). However, the concept of autism has also undergone an evolution because of decades of autistic self-advocacy (5,6).

The neurodiversity movement is a social justice movement that has challenged traditional medical conceptualizations of autism, such as viewing autism as a disorder (5,6). Evolving public understanding and increased representation have changed the public image of autism and fostered greater acceptance and inclusivity (1,7). For this reason, understanding and

actively engaging with the views and goals of the neurodiversity movement is essential for all researchers and clinical practitioners working with autistic people.

PURPOSE OF THIS REVIEW

The purpose of this scoping review is to introduce some key concepts and theories in neurodiversity that underpin the concept of neurodiversity-affirming care. We provide a literature review to discuss how the neurodiversity movement is currently discussed in medical research.

METHODS

This scoping review is based on a systematic PubMed search on the search term neurodiversity-affirm*. The search was conducted in May 2025 and it yielded 41 articles. These were complemented by hand searches. We used thematic analysis to organize the search contents to illustrate how the ideas of the neurodiversity-affirming movement are shaping the present and future of autism assessment and support.

LITERATURE REVIEW

WHAT IS THE NEURODIVERSITY MOVEMENT?

The neurodiversity movement is a human rights movement that is based on decades of autistic activism. The movement advocates for the rights, acceptance and inclusion of autistic and neurodivergent individuals (5,6,8). The central idea of the neurodiversity movement is that all people, regardless of neurocognitive abilities, have inherent value (9). The neurodiversity movement embraces a social model of disability (Table 1). It has had an impact on how the general population and media view autism (10).

Adherents of the neurodiversity movement view autism as a naturally occurring form of human diversity and as a unique and valid way of relating to the world (8). They reject the idea that autistic individuals should conform to the neuronormative ideals of mainstream society and become "less autistic". The ability of people to thrive is not defined by their diagnosis but depends on the match between the individual and their social context (11).

Rather than viewing autism as a cluster of deficits that need to be addressed or changed, the neurodiversity movement views autism as an inherent and integral part of the autistic person's identity (12,13). According to this view, autism shares social dynamics and stressors with other marginalized identities (13).

WHAT IS NEURODIVERSITY-AFFIRMING PRACTICE?

Neurodiversity-affirming practice is a reform movement that aims to shift how autistic experience is viewed in clinical, research and educational settings (6,8,13). Some of the main ideas of neurodiversity-affirming practice are presented in *Figure 1*.

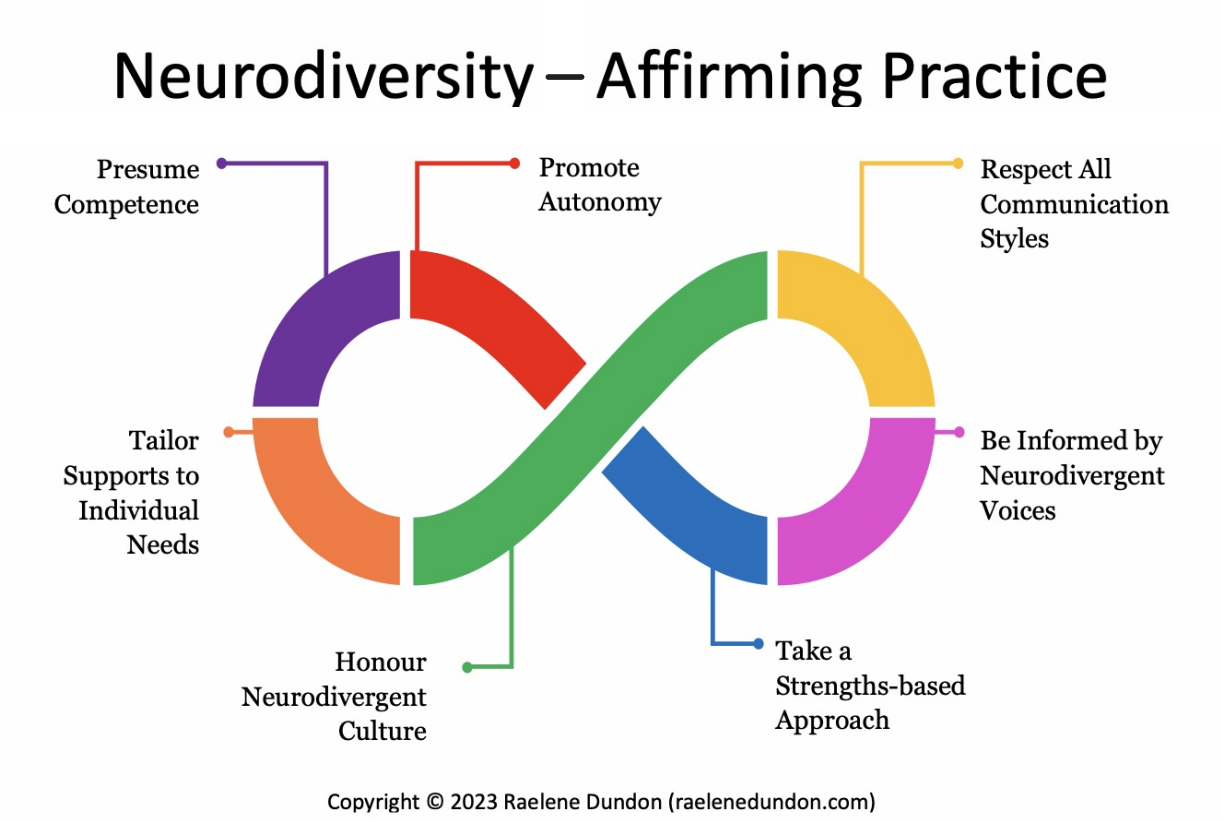
The neurodiversity movement has highlighted that treatment approaches focused on reducing autistic "symptoms"' or "cure" for autism are unlikely to be useful (14). Ideally, autism support is theoretically sound, evidence-based, neurodiversity-affirming and tailored to individual support needs (6,15). The inclusion of autistic people's goals, strengths, interests and perspectives in discussing support needs is crucial (16).

INCLUDING AUTISTIC EXPERIENCE IN RESEARCH AND TREATMENT PLANNING

Traditionally, autistic individuals have not had much chance to influence which kind of support they receive and what kind of goals they will pursue (17). The neurodiversity movement has questioned this approach and emphasized that it is important to seek input from autistic individuals and the autistic community. Neurodiversity-affirming practice encourages participatory research and involving neurodivergent individuals and communities in research and service design, decision making and priority setting (18).

Although many of the activists of the neurodiversity movement are cognitively able individuals who are capable of independent living, they highlight the importance of also addressing the needs of autistic people with high support needs (7). Some autistic individuals, as well as parents of autistic children, have expressed that they feel the neurodiversity movement overlooks their struggles and needs (1). The movement has also been criticized for being predominantly supported by individuals who are relatively well-functioning in their daily lives and are often described as having "high-functioning autism." In particular, parents of severely disabled children, as well as some autistic people themselves, report that they tend to favour a more traditional, pathologized view of autism, as they feel they are not "high-functioning" enough to benefit from a depathologizing perspective (1). However, recently, a group of non-speaking autistic individuals and autistic people with intellectual disabilities have expressed support for the goals of the neurodiversity movement (19).

Figure 1. Principles of neurodiversity-affirming practice. Raelene Dundon has kindly permitted the use of this figure in this publication.



MANY PROFESSIONALS ARE EMBRACING NEURODIVERSITY-AFFIRMING PRACTICE

Some of the most prominent advocates of the neurodiversity movement are scientists and health professionals with lived experience of autism (20-22). They are uniquely positioned in their ability to bridge autistic experience, scientific research and healthcare practices. As a result, many health professionals have reconsidered their autism-related attitudes. Doctors (23), psychologists (21), occupational therapists (24,25) and speech and language professionals (26) describe how neurodiversity-affirming principles have influenced their views of autism and impacted their professional practice. They call for a more balanced model of evidence-based practice that is informed by neurodivergent values (21,23,27).

NEURODIVERSITY-RELATED ATTITUDES CAN BE RELIABLY MEASURED

Psychologists have developed and validated the 17-item Autism and Neurodiversity Attitudes Scale to measure how much a person agrees with the neurodiversity view of autism (28). This instrument also addresses autism-related stigma. Researchers found that autistic individuals were more likely to endorse the neurodiversity view of autism compared to non-autistic individuals. Individuals who embraced the neurodiversity view were also less likely to have negative feelings against people with other disabilities and more likely to engage in various forms of activism (28).

A similar instrument has also been developed and validated for parents of autistic children (29). Its goal is to increase the parents' understanding and acceptance of unique characteristics of their child (29).

NEURODIVERSITY-AFFIRMING THEORIES CHALLENGE IDEAS ABOUT AUTISTIC COMMUNICATION

Neurodiversity-affirming practitioners view autistic communication as a two-way problem through the double empathy theory (30) (Table 1). Autistic people lack "social insight" into non-autistic culture and communication, but

non-autistic people lack "social insight" into autistic culture and communication preferences. Based on double empathy theory, communication between two autistic individuals is often more successful than communication between autistic and non-autistic individuals (30).

Recent experimental research has lent initial support to the double empathy theory (31). In communication experiments, autistic pairs were significantly more accurate in their communication than mixed neurotype pairs (31).

Based on these new ideas, the focus of autism conceptualization and assessment should shift from social communication as an individual skill to social communication as an interpersonal and interactional achievement (32). Conversation analysis can provide a non-pathologizing framework for understanding autistic communication (32).

The concept of monotropism, or intense attention on a limited number of interests (*Table 1*), is also useful for understanding autistic experience (33) and for moving away from a deficit-based view of autistic communication (34). Monotropism is thought to underlie the ability of many autistic individuals to immerse themselves in a specific subject of interest and develop deep expertise in that area. The Māori word for autism, takiwatanga, meaning "in their own time and space," also illustrates this ability.

Neurodiversity-affirming concepts and terminology could also be used to describe the experience of individuals with developmental language disorder (35).

Table 1. Some important neurodiversity-affirming theoretical concepts.

1.	*Social model of disability.* Disability is not an inherent characteristic of the individual but a product of individual characteristics and societal barriers. Neurodiversity-affirming practitioners critically examine and address these societal barriers.
2.	*The double empathy theory* is a theory proposed by the social scientist and autism rights advocate Damian Milton (30) who views autism-related communication difficulties as a two-way problem. Autistic people lack "social insight" into non-autistic culture and communication, but non-autistic people lack "social insight" into autistic culture and communication preferences. The resulting empathy gap explains why communication between autistic and non-autistic people is often not productive.
3.	*Monotropism* is a theory of autistic experience that was initially developed by autism advocates Dinah Murray and Wenn Lawson (33). According to this theory, autistic and non-autistic individuals have different attention styles. Autistic people tend to have a monotropic style of attention that allows an intense focus of attention on a limited number of interests, and strong preferences for routine, consistency and sameness.
4.	*Stimming* involves motor or vocal self-soothing by repetitive, rhythmic body movements. Stimming can involve skin picking, hand flapping, finger flicking, hair pulling or letting out sounds. Autistic adults say that stimming helps them to resolve stress and communicate intense emotions or thoughts. Some treatment approaches in the past have been based on trying to teach autistic individuals to suppress stimming, but these should be reconsidered (60).
5.	*Stigma*. Autistic individuals are often stigmatized. Sometimes autistic communication and behaviour, such as stimming, is also stigmatized in healthcare contexts. Autistic individuals commonly experience social isolation, bullying and various other forms of victimization. Even caregivers of autistic people can experience stigma by association (7).
6.	*Camouflaging* or masking means using conscious or unconscious strategies to appear as non-autistic or non-neurodivergent to "pass" in social situations. This may involve suppressing stimming. Camouflaging is often driven by stigma avoidance and can have both positive and negative consequences for the individual. It is associated with poor mental health and can sometimes result in autistic burnout.

SENSORY ACCESSIBILITY IS IMPORTANT FOR AUTISTIC PEOPLE

Sensory needs are often very important for autistic individuals (36). Sensory accessibility refers to environments that are designed to help manage sensory overload (see *Table 2*). Sensory accessibility is an important consideration for autistic clients (37). When designing healthcare and education facilities, it is important to take sensory accessibility into account.

NEURODIVERSITY-AFFIRMING VIEWS INFLUENCE

Table 2. Sensory accommodations for neurodiversity-affirming practice.

Sight	• Make sure that there are not bright lights • Minimize reflected light (for example, sunlight from the mirror) • Keep curtains or blinds closed if it is bright outside • Minimize visual clutter as much as possible
Sound	• Minimize background noise, turn off radio and television • Make sure that adequate sound absorbing materials are used in environments that are typically noisy • Minimize sudden noises • Reduce equipment noise by turning off machines that are not needed
Smell	• Aim for a scent-free environment. • Avoid scented detergents, cleaning products, air fresheners and perfumes.

AUTISM ASSESSMENT

Timely diagnosis and identification of support needs is vital for establishing a positive autistic identity. However, current diagnostic classifications and evaluations of autism often focus exclusively on problems (11).

Autistic adults and health professionals have noted that many autism assessment instruments are not age or gender appropriate, do not consider sensory preferences, and do not align with neurodiversity-affirming principles (24,38). Neurodiversity-affirming ideas have influenced many health professionals to reconsider how autism assessment is conducted (11,38-40).

To make a more balanced assessment and develop better support plans, healthcare professionals should pay greater attention to the autistic experience, respect the insights and wishes of the autistic community and evaluate autistic strengths (11). Some common autistic strengths include honesty, the ability to focus on specific interests and develop in-depth expertise in them, attention to detail, systemic and logical thinking and the ability to think outside the box (11).

In some countries, neurodiversity-affirming views are changing how autism assessments are conducted. In Scotland, The National Autism Implementation Team realized that some commonly used autism evaluations, such as the Autism Diagnostic Observation Schedule-2 (ADOS-2), do not always reflect the experience or preferences of their clients (38). To make diagnostic assessment more effective and respectful, they suggest adopting a neurodiversity-affirming stance. The diagnosis of autism should never be based on the outcome of one assessment tool, one part of the process or a score. Alternatives that respect the client's communication preferences and sensory preferences should be offered, and the focus of the assessment should be on identifying support needs (38).

Assessment methods that place greater focus on the autistic sensory experience and autistic strengths, and that guide a detailed evaluation of support needs, such as the Monteiro Interview Guidelines for Diagnosing the Autism Spectrum, Second Edition (MIGDAS-2)(40), can be used to complement other autism assessment methods.

WHAT TYPE OF SUPPORT IS APPROPRIATE FOR AUTISTIC CHILDREN?

In a participatory study, autistic adults, parents of autistic individuals and health professionals were asked what the best way to support autistic children would be (41). Participants were highly divided on the topic of early support for autistic children (41). About half of the participants indicated that it was appropriate to provide early support services for children, while the other half indicated that it depended on the nature of those support services. Autistic participants emphasized the importance of preserving childhood experiences and involving children in decision making. They also welcomed support services that align with neurodiversity-affirming principles. Some participants were hopeful for the positive impact that early, individualized support services could provide for autistic children (41).

Autistic adults, parents and health professionals also rated their views on what types of professional autism support should be a priority for autistic children (42). In their view, the highest priority outcome was the child's mental wellbeing. In contrast, about half of the participants thought that attempting to make the child appear more neurotypical was inappropriate. The participants were critical of social skills training. They also gave low priority ratings for trying to change sensory or avoidant behaviours and trying to reduce time spent on focused interests (42).

There is some initial research on how to provide neurodiversity-affirming early support for children. In Britain, researchers, neurodivergent parents and autistic adults co-designed a toddler-parent group intervention (43). The goal of the 12-week intervention is to support the children's attention, regulation and thinking skills and to foster their development through play and everyday activities. The programme also aims to create a welcoming and accessible space for their parents (43).

SUPPORT INCLUDES REMOVING BARRIERS TO PARTICIPATION IN SOCIETY

Autistic children face many barriers to fully participating in activities at home, school and in the community. These challenges are often not by choice, but are instead due to various limiting factors, including cognitive, sensory and environmental issues (44). Parents of autistic children wanted their children to participate in a variety of activities, but they reported that low environmental support was a major limiting factor (44).

Addressing obstacles to full participation in society is consistent with the principles of neurodiversity-affirming care (44). Parents of autistic children have an important role in their child's wellbeing. Early parenting interventions for autistic children often rely on behavioural approaches that seek to modify the child's behaviour, but this does not align with autistic community priorities. Parents of autistic children report clinically significant and higher parenting stress than other parents. For this reason, providing support that reduces parent or caregiver stress is important (45).

WHAT TYPE OF SUPPORT IS APPROPRIATE FOR AUTISTIC ADOLESCENTS AND ADULTS?

Because autism services are often designed for children, autistic adolescents and adults often have a hard time finding appropriate support. Autistic adults often experience that their words, facial expressions, sensory needs or emotions are misinterpreted (25,36).

Providing appropriate support is also not always straightforward for health professionals (16,17). Supporting daily living skills and communication are complex issues, as they often involve questioning and challenging neuronormativity (17). A neurodiversity-affirming approach involves appreciating the diversity of autistic experiences and communication styles, and eliminating practices that promote camouflaging or masking (see *Table 1*) (17). Instead, activities that incorporate preferred areas of interest and communication style, for example, video gaming, may be more effective (46). Autistic adults also ask for support for their sensory needs (36) and for assistance with navigating complex emotional experiences (25).

Some promising ways to provide support for autistic youth and adults that are consistent with a neurodiversity-affirming view of autism include the following:

The Welcome Pack is a self-guided, neurodiversity-affirming resource aimed at helping newly diagnosed autistic adults navigate their autistic identity (47). The Welcome Pack was evaluated by 11 autistic adults. They viewed it as an important and validating resource, but also asked for peer support and practical guidance (47).

The Programme for the Education and Enrichment of Relational Skills (PEERS) is an intervention developed for autistic individuals to support social communication, peer interactions, independence and interpersonal relationships. Autistic experts by experience were involved in adapting PEERS for middle-aged and older adults and to make the programme more neurodiversity-affirming (48).

CBT-DAY is a 12-week outpatient group intervention for addressing depression in autistic young people. The intervention has been designed in collaboration with autistic youth to combine cognitive behavioural and neurodiversity-affirming approaches. The group addresses emotional reactivity, self-esteem and depression. The intervention has been tested by 24 autistic youth, who generally found it acceptable (49).

Eating Disorder Initiatives involve mapping the experience of eating disorders in neurodivergent individuals (37). The PEACE Pathway (50) takes into account neurodivergent sensory and communicational differences, as well as the need for predictability, to provide better eating disorder treatment.

Gender care. Autistic transgender and gender-diverse individuals face unique communication challenges that are compounded by minority stressors. Autism should not be an obstacle to gender care and autistic people should be viewed as experts of their own gender experience and identity (51). Providing neurodiversity-affirming strategies, such as visual aids and multiple communication options, might also be helpful (51,52).

HOW TO MAKE PSYCHOTHERAPY MORE HELPFUL FOR AUTISTIC CLIENTS?

Much of psychotherapy is based on neurotypical communication styles. For autistic clients, a good therapeutic relationship may require a different approach (53).

To better understand how to make psychotherapy more helpful for autistic adults, researchers sought input from 130 autistic adults (53). In general, the autistic adults asked for a wide range of highly individual adaptations. However, neurodiversity-

affirming adaptations received broad overall support. Autistic adults preferred having a therapist who embraces autism as a difference and affirms their client's neurodivergent identity. They also mentioned many other important factors as vital for successful therapy. These included the therapist's general good practice, the cost of therapy, and various practical, sensory and environmental considerations (53).

Two autistic psychologists have offered their insights on how to improve the psychotherapy experience of autistic clients (21). They encourage psychologists working with autistic clients to approach their practice with cultural humility. To be successful, psychotherapists need to learn about autistic culture and communication. They should continually work towards understanding their clients' experiences and communication so that they do not misread and misinterpret their client's cues and experiences. Some assumptions that have previously been fundamental to the formation of a therapeutic relationship, such as the importance of eye contact, need to be reconsidered with autistic clients (21).

AUTISTIC PEOPLE NEED SUPPORT DURING LIFE TRANSITIONS

Research on the support needs of autistic individuals often focuses on young people. However, many researchers and clinical practitioners emphasize that support needs continue throughout life and vary in different situations. In particular, additional support may be needed during highly stressful life events and transitions, such as hospitalization (54), pregnancy and childbirth (54), pregnancy loss (55), becoming a parent (55) and breastfeeding (56).

CONCLUSION

Neurodiversity-affirming principles have matured from a set of ideas and theories to a vibrant new field of research. However, it is too early to say whether these practices improve care.

There is some initial empirical evidence that a positive autistic identity is associated with improved mental wellbeing (12). Autistic people develop a more positive autistic identity if they receive support for autism acceptance (12) and connect with autistic peers (57). However, more longitudinal studies are needed to investigate whether integrating neurodiversity-affirming concepts into healthcare will improve the quality of life and health outcomes of autistic individuals.

The goals and claims of the neurodiversity movement have also been criticized. Some supporters of the neurodiversity movement have self-identified as autistic without a formal diagnosis (1). Some formally diagnosed autistic individuals and parents of autistic children prefer more traditional views of autism (1). They fear that if autism is viewed solely from a depathologizing perspective, they might be left without support and services that are vital for them (1). The neurodiversity movement can provide understanding and contribute to autistic wellbeing, but it remains essential to acknowledge and respect the diversity of individual experiences, perspectives and needs.

Adopting a neurodiversity-affirming approach places substantial demands on mental health professionals. The neurodiversity movement, as a lay-led human rights initiative, integrates diverse theories, concepts and terminology. Many psychiatrists and psychologists prefer diagnostic frameworks and terms that have traditionally defined and specific meanings (2). In contrast, scholars from the social sciences and humanities may critique the human rights movement for its reliance on reductionist and medicalized "neuro" discourses (5). These differing perspectives have at times polarized discussions about autism, resulting in tensions between professionals and advocates of the neurodiversity movement (5).

Neurodiversity-affirming practice involves a new language (58,59) and new cultural competencies (21). If neurodiversity-affirming views are held consistently, autism-related terminology, diagnostic labels and classification systems will also need to change. In some countries, these changes are already underway (4).

Autistic individuals have often been viewed through a lens of deficits. Creating spaces where autistic people can express their authentic selves and be valued can greatly improve their wellbeing, and this can also be a deeply meaningful experience for the healthcare provider. We also believe that neurodiversity-affirming practice can encourage more inclusive research and revitalize clinical and therapeutic practice.

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Supplementary Material

Supplementary data are available at Psychiatria Fennica online.

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MUSIC THERAPY FOR DEPRESSION, ANXIETY AND WORK-RELATED STRESS AND BURNOUT: A NARRATIVE REVIEW

ABSTRACT

Introduction: *According to previous research and reviews, music therapy has been found to be an effective and motivating way of treating mental health disorders. Research has been conducted especially related to depression. This narrative review aims to provide an updated view of music therapy in treatment of depression, and closely related disorders, anxiety and exhaustion among working-age individuals.* ***Methods:*** *Literature included randomized controlled trials, pilot and feasibility studies, case studies, process studies and case reports, in which music therapy had been used for treating either depression, anxiety or exhaustion among working-age populations. Of all screened articles (1748) a total of 23 studies were included in the review. Additionally, three more articles were presented in the results to enrich the view of this subject, even though they did not fully meet the inclusion criteria.* ***Results:*** *The search offered a versatile and rich view to the use of music therapy in treatment of working-age population with depression, anxiety and work-related stress. The studies mainly focused on decreasing depression and depressive symptoms, but improving anxiety, stress, self-esteem and emotion regulation were also the focus of many included studies. Improvisation, music listening in some form and songwriting were among the most used music therapy methods. Mainly quantitative but also qualitative and mixed research methods were found.* ***Discussion:*** *The reporting of music therapy research seems to have improved during recent years, for example, in terms of the quality of intervention descriptions. Multiple clinical methods were utilized in different therapy settings, and clinical improvisation seemed to be one very common and effective approach, allowing new modalities for emotion expression and self-exploration. The intensity of therapy seemed to affect the treatment outcomes.*

KEYWORDS: MUSIC THERAPY, DEPRESSION, ANXIETY, EXHAUSTION, BURNOUT, NARRATIVE REVIEW

INTRODUCTION

Mental health problems affect tens of millions of Europeans. They cause a heavy burden for individuals and also for society as a whole (1). In Finland mental health issues are the most common reason for extended sick leave (2). Depression is the biggest reason for disability pension and the most common cause for receiving sickness allowances (3). The number of different anxiety disorders has also grown (4), often comorbid with depression (5), and the prevalence of burnout symptoms has increased significantly during the past five years (6). Employment status, income, physical health, experiences during childhood and adolescence among other social, economic and cultural factors impact on our mental health significantly through our lifespan. However, mental wellbeing can also be promoted and mental ill-health prevented in many ways (7). According to Finnish Current Care Guidelines (CCG) (8,9), both depression and anxiety disorders are usually treated with psychotherapy, antidepressants or both. Currently there is no CCG for burnout since it is not recognized as a diagnosis. This can have an effect in detecting the actual problem and in organizing the needed support and treatment for burnout and exhaustion.

Music therapy (MT) is clinical and evidence-based use of different music interventions aimed at accomplishing individualized goals within a therapeutic relationship conducted by a professional music therapist (10). MT can be offered as

an independent therapeutic process or added to standard care. According to Finnish CCG (11), MT is a suitable form of treatment and rehabilitation for children, adolescents, adults and older adults with different psychological or neurological disorders or limitations in general functioning. CCG state that MT can be used as a therapeutic tool, especially for children and adolescents with autism spectrum disorder (ASD). MT is also mentioned in the CCG for dementia, developmental language disorders (DLD) and schizophrenia (12). The Social Insurance Institution of Finland, Kela, reimburses MT as intensive medical rehabilitation (13) and as rehabilitative psychotherapy. Rehabilitative psychotherapy is reimbursed only for adolescents and young adults aged 16–25, based on psychiatrist's statement, if their ability to work is impaired by a mental health disorder (14). There is, however, a lot of research-based evidence to support the more extensive use of MT in treatment of adults with depression-related disorders.

Psychotherapy in its original and traditional practice is essentially a verbal experience, whereas music psychotherapy is defined by the use of music experiences together with or instead of verbal discussion (15). Music in MT can provide non-verbal means of communication and self-expression and serve as a bridge between verbal and non-verbal modes of communication (16). The role and emphasis given to music and music experiences in a therapeutic process can vary a lot. According to Bruscia (15) there are four levels of music engagement used in music psychotherapy, and the difference between these levels is how the role of music is considered and how the therapeutic issue is accessed, worked and resolved. In 1) *Music as psychotherapy*, this happens through music listening and creation with no need for verbal discussion. In 2) *Music-centred psychotherapy*, music is used similarly, but the additional verbal discussion is used to guide, interpret or enhance the music experience and its relevance to the therapeutic process and the client. In 3) *Music in psychotherapy*, the therapeutic issue is processed through both musical and verbal experiences. Music is used for its specific and unique qualities and considered as essential to the current issue and its treatment. And finally in 4) *Verbal psychotherapy with music*, music is considered as an enriching or facilitating component but not essential in terms of the therapeutic issue and its treatment. The therapeutic issue is accessed, worked and resolved primarily through verbal discussion.

Bruscia (16) originally defined four main MT methods or types of music experience that are used for assessment, treatment and evaluation. These methods are improvising, recreating, composing and listening. In this article we refer to the first three methods as active MT methods since the client or participant is actively engaging in music creation in one way or another. In practice these can be techniques such as musical improvisation, songwriting, playing an instrument or singing. Music therapists may use these techniques with any kind of instrument including their own voices (17). The fourth method we refer to here as receptive MT methods since they are based on the use of pre-composed music. These methods include, for instance, music relaxation, imaginal listening, music and imagery, song (lyric) discussion, song reminiscence or listening to client's favourite music (18). The music experience can be either objective, subjective, energetic, aesthetic, collective or transpersonal (16).

MT has been used with many kinds of client groups and there are several reviews conducted in the field of MT related to different disorders (19–21), including neurological and psychological ones. Concerning MT and depression, Aalbers et al. (21) conducted a systematic review that thoroughly assessed the effects of MT in this area. Their findings suggest that MT improves symptoms of depression when added to treatment as usual (TAU) compared to TAU alone, thus providing short-term beneficial effects for people with depression. According to the authors, MT can also be beneficial for anxiety and improve the level of functioning of depressed individuals. In addition, MT added to TAU was not associated with more or fewer adverse events than TAU alone. Authors state that relatively little research has addressed working-age individuals with depression.

METHODS

STUDY AIMS AND DESIGN

The aim of this narrative review is to provide an updated and comprehensive view of the current knowledge related to the use of MT in the treatment of depression and closely related mental health conditions, including anxiety and exhaustion. To our knowledge, there were at least several large-scale studies conducted on this topic after the systematic review by Aalbers et al. (21) in 2017. We wanted to create an overview including these new studies and previous studies other than RCTs to enrich the view to this area of research. In addition, we wanted to widen the scope to also cover anxiety disorders and exhaustion that also largely affect individuals of working age.

Narrative review is a type of review article that provides a conceptual description of the topic (22). These types of review are common, for instance, in the medical literature (23). In comparison to systematic review, narrative review has a lot of

flexibility in terms of, for example, evaluating literature and organizing and presenting findings (22). Narrative review was chosen to be able to describe and deepen the knowledge of previous research that has already identified factors related to the effectiveness of MT. Based on previous reviews, we paid specific attention to not only the results but also to the methods, MT models and implementation of interventions used in different adult populations meeting the inclusion criteria. Scale for the Assessment of Narrative Review Articles (SANRA) (23) has been utilized in the writing process. The selection process of the studies is presented next.

INCLUSION CRITERIA

Several inclusion criteria were applied for this narrative review. Only studies applying MT conducted by certified music therapists were included. MT was defined as clinical use of music interventions based on scientific research using different elements of music, such as rhythm, harmony, melody, tone, dynamics, to meet specific goals within a therapeutic relationship by a credentialled MT professional (10). Also, only studies with human participants aged 18–65 with a primary problem in depression, anxiety, exhaustion, work-related stress or burnout were included. The studies had to be peer reviewed and reported in English.

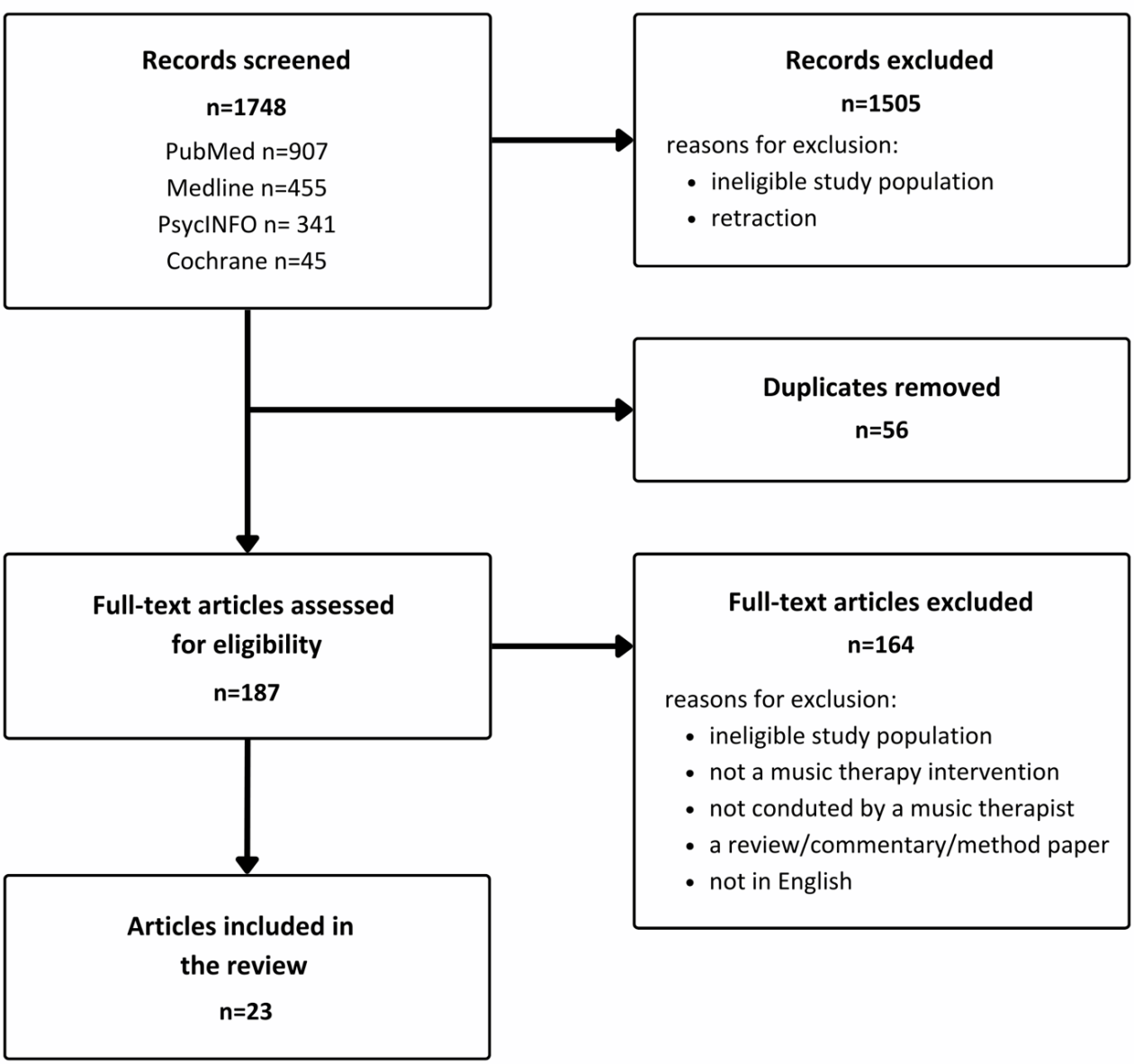
SELECTION OF STUDIES

To identify the eligible studies, computer-based searches were conducted in the medical and psychological electronic literature databases including PubMed, Medline, PsycINFO and Cochrane Library. All studies that met the inclusion criteria were included in this review. The search string used was the following in English: ("music therap*") AND (depress* OR anxi* OR exhaust* OR burnout OR burn-out OR "burn out" OR "work-related stress" OR "job-related stress" OR "occupational stress"). In addition, we used four filters to limit the results. Records had to be peer-reviewed, published between 1.1.1992–27.5.2025, concern age groups from 18–65 (working-age individuals) and human population group. The starting point of the publication date range originated in the year of the first conducted randomized controlled trial (RCT) study in MT by Chen (24) and continued until the end of May 2025.

Altogether 1748 records were found and screened. 1505 records were excluded based on the record title that indicated ineligible study population, such as ineligible age group (under 18 years old or over 65 years old) or primary problem (e.g. cancer, dementia, stroke, personality disorders, acute substance abuse). Two of the records were excluded due to retraction of the article. After this, 56 duplicates were indicated and a total of 187 articles were then assessed for eligibility by full-text articles. 164 were excluded due to ineligible study population, such as ineligible age group (under 18 years old or over 65 years old) or primary problem (e.g. cancer, dementia, stroke, personality disorders, acute substance abuse), intervention (not music therapy but, e.g. music listening), intervention being conducted by someone other than a certified music therapist (e.g. a researcher, a teacher, a nurse), article being a review, a commentary or, for example, a description of a method or in other language than English. A total of 23 studies met all the inclusion criteria for this review and were included in the review (*Figure 1*).

The literature was searched by two researchers independently. To ensure the inclusion of the newest articles, the same process was repeated a month later. The results were compared and discussed together with the whole research group.

Figure 1. Flow chart of the study selection process for this narrative review.



ANALYSIS

The articles were first read thoroughly to ensure the eligibility. The next step was focusing on study designs and aims, outcome measures and instruments, target groups, interventions, used MT methods or models, and results, implications and limitations of the studies. All this information was collected in a detailed table to be further analysed. *Tables 1* and *2* presented in this review are based on this detailed table. Also, Atlas.ti software was used to aid the coding and storing of the collected data. Content analysis was applied as described in (25) to summarize the present evidence, offer new knowledge based on the multiple original studies and describe how the present understanding of this particular topic should guide research, evaluation and clinical practice in future.

RESULTS

The included articles have been published between years 2011–2025 (see *Table 1*) and involved altogether 680 participants between ages 18–65 whose primary problem concerned depression, anxiety or work-related stress. Participants were adult outpatients with depression (26–31), adults or young adults with depressive symptoms (32–34), adult patients or outpatients with long-term depression (35), hospitalized patients with depression or schizophrenia (36), prisoners with anxiety or depression (37), adult outpatients with anxiety (38), adults with anxiety symptoms (39), hospitalized patients with anxiety (40) and working-age individuals on sick leave due to work-related stress (41).

Nine studies utilized individual MT settings, and six studies were implemented in group settings. In individual settings, reported session duration was mainly 60 minutes with the exception of one study having 120-minute sessions (41) and another study having varying duration between 20–65 minutes (40). The individual processes lasted from 4 weeks to 18 months including 1–45 sessions. Correspondingly in group settings, session duration varied from 60 to 120 minutes. These processes lasted 4–14 weeks including 4–42 sessions. Two studies did not report session length (34,36). Of the 15 original studies, seven were RCTs (26–28,30,34,37,41), two pilot studies (38,40), two feasibility studies (35,42) of which one (42) was a sub-study for one of the multiple single-case studies (33), three multiple single-case studies (32,33,39), one qualitative study (36), and two case reports (29,43) of which one (43) was a sub-study to an RCT (37). There were also five other sub-studies (43–48) mainly related to the RCTs (26,28,37) and also to a feasibility study (35). Two of the RCT studies (26,27) are also included in the systematic review published by Aalbers et al. (21).

Table 1. Included articles.

Author(s) of the original study	Author(s) of the sub-study	Year	Study design	Individual (I) / Group (G)	Duration of Sessions (min)	Number of Sessions	Duration of Treatment	Follow-up	Age range (years)	Gender (m=male, f=female)	N	Drop-outs
Erkkilä et al.		2011	RCT	I	60	20	3 mo	6 mo	18–50	f+m	79	12
	Fachner et al.	2013	sub-study, case report						18–50	f+m	62	
Beck et al.		2015	RCT	I	120	6	9 wk	6 mo	n/a	f+m	20	1
Gutiérrez & Camarena		2015	pilot study	G	120	12	3 mo	n/a	25–45	f+m	10	3
Atiwannapat et al.		2016	RCT	G	60	12	12 wk	6 mo	18–65	f+m	18	3
Chen XJ et al.		2016	RCT	G	90	20	10 wk	10 wk	18–57	m	184	16
	Chen XJ & Hannibal	2019	sub-study, case report						30	m	1	
Zarate		2016	multiple single-case	I	60	12	12 wk	n/a	20–35	f+m	16	1
Aalbers et al.		2017	multiple single-case	I	60	7	7 wk	n/a	26–64	f	10	1
Lotter & van Staden		2019	qualitative research	I	n/a	8	4 wk	n/a	18–57	f+m	20	n/a
Aalbers et al.		2020	multiple single-case	I	60	10	10 wk	4 wk	19–30	f	15	4
	Aalbers et al.	2022	feasibility						19–30	f	11	
Erkkilä et al.		2021	RCT	I	60	12	6 wk	6 mo	19–57	f+m	70	7
	Hartmann et al.	2023	sub-study						19–57	f+m	58	
	Saarikallio et al.	2023	sub-study						19–57	f+m	64	
	Snape et al.	2024	sub-study						19–57	f+m	14	
Zhang et al.		2022	RCT	G	n/a	4	4 wk	4 wk	18–20	f+m	75	4
Carr et al.		2023	feasibility	G	90	42	14 wk	6 mo	37–55	f+m	30	12
	Windle et al.	2020	sub-study, interviews						n/a	f+m	10	
Brown et al.		2024	retrospective pilot	I	20–65	1–3	n/a	n/a	25–90	f+m	56	n/a
Gaebel, Stoffel et al.		2025	RCT	G	120	10	10 wk	10 wk	18–65	f	102	14
	Gaebel, Jarczok et al.	2025	sub-study						18–65	f	102	
Lund & Drago		2025	case report	I	60	45	18 mo	n/a	44	m	1	0

mo=month, wk=week

The search offered a multifaceted view to the use of MT in treatment of depression, anxiety and work-related stress in the working-age adult population (see *Table 2*). The majority of the studies had an emphasis on ameliorating depression and decreasing depressive symptoms, but improving anxiety, stress, self-esteem and emotion regulation were also the focus of many studies included in this review. Most of the studies were quantitative but there were also qualitative and mixed methods studies (34,36,48). Improvisation was the most used activity among the studies included. Nine studies (26,28,29,32,33,36,38–40) used improvisation in an individual setting and six studies (27,30,31,34,35,37) in a group setting. Improvisation-based methods seemed to be effective in terms of recovery (26,28–34,36–40). Music listening in some form was used in nine studies (27,28,35–38,40,41,49) and songwriting in four (27,35–37) in an effective way. We will next introduce these studies in more detail.

Table 2. Methods and main results.

Author(s)/ year	Study design	Individual (I) / Group (G)	Methods, Active (A)/ Receptive (R)	Main findings
Erkkilä et al. 2011	RCT	I	A (IPMT)	improvement in general functioning, depression & anxiety
Fachner et al. 2013	sub-study			a link between increased theta power & decreased anxiety, decreased left fronto-lateral and fronto-central activity and differences in emotional expression & affect regulation
Beck et al. 2015	RCT	I	R (GIM)	improvement in wellbeing, mood disturbances & cortisol levels
Atiwannapat et al. 2016	RCT	G	A+R	statistically not significant trend towards better outcomes
Chen XJ et al. 2016	RCT	G	A+R	improvement in self-esteem, anxiety & depression
Chen XJ & Hannibal 2019	sub-study, case report			group MT has the potential to facilitate therapeutic growth and change
Erkkilä et al. 2021	RCT	I	A (IIMT)	improvement in quality of life, functioning, depressive symptoms & anxiety levels
Hartmann et al. 2023	sub-study			musical interaction seems to be associated with clinical improvement
Saarikallio et al. 2023	sub-study			emotional expression and awareness correlated positively with session value & MADRS change, pain in late part of MT predicted lower recovery
Snape et al. 2024	sub-study			listening homework seems to strengthen all kinds of effects of the therapy
Zhang et al. 2022	RCT + mixed methods	G	A (GIMT)	improvement in emotion regulation & depressive symptoms
Gaebel, Stoffel et al. 2025	RCT	G	A+R (GMT)	improvement in momentary depression, emotion and mood regulation and general health status
Gaebel, Jarczok et al. 2025	sub-study			positive effect on stress
Gutiérrez & Camarena 2015	pilot study	G	A+R	improvement in anxiety & depression levels

→

Author(s)/ year	Study design	Individual (I) / Group (G)	Methods, Active (A)/ Receptive (R)	Main findings
Carr et al. 2023	feasibility	G	mainly A	improvement in social adjustment & depression
Windle et al. 2020	sub-study, interviews			findings highlight the meaning of group dynamics in the therapeutic group process
Brown et al. 2024	retrospective pilot	I	A+R	improvement in anxiety
Zarate 2016	multiple single-case	I	A	improvement in anxiety
Aalbers et al. 2017	multiple single-case	I	A (ISIMT)	improvement in depressive symptoms
Lotter & van Staden 2019	qualitative research	I	A+R	instead of decreasing symptoms or improving mood, the goal of MT can be to enable emotion recognition and self-exploration
Aalbers et al. 2020	multiple single-case	I	A (EIMT)	improvement in emotion regulation & depressive symptoms
Aalbers et al. 2022	sub-study, feasibility			EIMT seems feasible to evoke changes in emotion regulation
Lund & Drago 2025	case report	I	A+R	there can be beneficial effects of combined MT and pharmacotherapy in outpatient treatment of depression

IPMT= Improvisational psychodynamic music therapy, GIM= Guided imagery and music, IIMT= Integrative improvisational music therapy, GIMT= Group improvisational music therapy, GMT= Group music therapy, ISIMT= Individual short-term improvisational music therapy, EIMT= Emotion-regulating improvisational music therapy

RANDOMIZED CONTROLLED TRIALS

Altogether seven randomized controlled trials studying the efficacy of MT and six related sub-studies appeared in the search. Trials are introduced here mainly in chronological order, but in such a way that the studies connected to each other are presented one after the other. The results of the trials suggest that MT is an effective treatment for depression and anxiety and also for work-related stress among adults of working age. It can be utilized efficiently in both individual and group settings with different kinds of active and receptive methods in various situations. Most of the authors identify a need for larger sample size even though they have already been relatively high and thus had mostly sufficient power.

The earliest RCT study included in this review was conducted by Erkkilä et al. (26) in 2011. The aim of the trial was to determine the efficacy of MT added to standard care compared to standard care only in treatment of depression in adult population (n=79). By the time of the publishing, it was the largest and most rigorous study in the field concerning working-age individuals with depression. The individual active MT model used was based on free musical improvisation with a mallet instrument, a percussion instrument and an acoustic djembe drum and reflective discussion. The created improvisations were recorded and thus possible to play back for further processing and discussion. The authors found out that MT added to standard care improved the participants' levels of depression, anxiety and functioning. The effect did not, however, sustain as significant to the 6-month-follow-up. According to authors, the additional value of improvisational MT seemed to be the possibility to experience and be in contact with emotions associated with depression on a symbolic and non-verbal level. They also state that improvisational interplay in client-therapist dyad offers space for transference and creative imagery. Authors report that active music playing was important to many participants, and by playing they often expressed their feelings and inner pressure. In addition, they assume that the intensity of the therapy (two sessions per week) also contributed to positive outcomes. Participants' level of engagement in the therapy process was high.

To deepen the understanding of the neural mechanisms of the treatment, Fachner et al. (44) carried out a sub-study related to the RCT described above (26). They studied depression and anxiety in relation to frontal alpha asymmetry (FAA) and frontal midline theta (FMT) and analysed topographic changes before and after the MT intervention. According to the authors, at intake the participants' FAA and FMT scores were unexpectedly low in contrast to previous findings related to depressed populations (50). All the participants had a clinical diagnosis of depression, but fronto-temporal asymmetry found was significantly related

to anxiety. Results suggest a link between increased theta power and decreased anxiety as well as decreased left fronto-lateral and fronto-central activity, and differences in emotional expression and affect regulation emergent in MT.

Erkkilä et al. (28) later conducted another RCT (n=70) to build on the positive outcomes of the first one. In this trial they utilized integrative improvisational music therapy (IIMT) model. This 12-session intervention was a slightly elaborated version of the clinical model used in previous RCT. The instruments used were pianos and djembe drums for both the participants and the therapists. The aim was to investigate whether the IIMT model can be further enhanced with the additional elements of resonance frequency breathing (RFB) and listening homework (LH) in treatment of adult participants with depression. The authors learned that MT can significantly reduce depressive symptoms and that the model can be enhanced at least with RFB. The effect sustained until follow-up at six months. The intervention also decreased participants' anxiety levels during the intervention, but this effect was not seen at the follow-up. In addition, the intervention had a positive effect on participants' health-related quality of life and general functioning. Adverse events were rare, and the drop-out rate was relatively low. The authors identify lack of no-treatment control group and limited sample size as the main limitations for this study. The authors note that future studies would benefit from also having other than purely outcome-oriented measures to understand the results more thoroughly.

Related to the RCT by Erkkilä et al. (28), multiple complementary viewpoints were examined in separate sub-studies. Hartmann et al. (45) studied the correlation between client improvement and musical interaction among 58 participants. They found that clinical improvisations seemed to be more interactive in the middle of MT. The intensity of interaction was considered an indicator of increased emotional processing. The findings suggest that clients who benefited more from therapy also interacted more with the therapist and vice versa.

Delving deeper into emotional processing, Saarikallio et al. (46) studied Music therapeutic Emotional Processing (MEP) through client self-reports of 64 participants. The emergent MEP factors, expression, awareness and pain, were correlated with recovery from depression and clients' perceptions of the therapeutic value of the sessions. Musical expression of emotions (expression) and personal awareness of emotional experiences (awareness) appeared to be central aspects of favourable MEP, demonstrating positive correlations with experienced session value and recovery from depression. The pain factor was seen as more complex since, when not experienced until the end of the therapy process, it predicted poor therapeutic outcome. Instead, the presence of pain at the beginning and in the middle of the process was seen as not beneficial but not harmful either, as music enables approaching difficult emotions in a symbolic, self-detached and bearable manner. Authors see this finding as potentially suggesting that the participants experiencing pain during the last sessions would have needed a longer process.

The additional component of listening homework, introduced in the above mentioned RCT (28), was studied by Snape et al. (47). Between the sessions, 32 participants were asked to listen to recordings of their clinical improvisations at home and fill out an online diary after listening. According to authors homework seemed to strengthen both positive and negative effects of the therapy. They reported that adherence to the homework was very low, and the experiences varied from extremely negative to positive. Challenges related to lack of motivation, stress, lack of time, technical problems and the severity of depression and anxiety. Their findings suggest that homework tasks need further investigation before implementation and should be utilized on a case-by-case basis, as difficulties in understanding the therapeutic music making, lack of skills to express oneself or a risk of dissociation can make the task intolerable.

The studies above had a focus on active MT methods where the participant is actively engaged in music creation. Instead, Beck et al. (41) studied receptive methods that utilize pre-composed music with Guided Imagery and Music (GIM) intervention to examine the effects of GIM on biopsychosocial measures of work-related stress and the length of sick leave. This was a two-arm RCT study (n=20) with MT and a wait-list control group. The intervention was based on the Bonny Method of Guided Imagery and Music (BMGIM) (51). Modifications such as including shorter music listening periods, music with less stimulating intensity profile and extra time for guided relaxation were used to meet the specific needs of the chronically stressed participants. Authors discovered that GIM was more effective than standard care alone in improving self-reported stress symptoms with this target group. It was shown to improve participants' wellbeing, decrease mood disturbances, anxiety and physical stress symptoms compared to wait-list controls. Early intervention showed a faster return to work and had an impact on perceived stress and psychological wellbeing. In addition, GIM group hormone test results indicated a reduction in cortisol levels compared to the wait-list controls. Authors found these findings encouraging and state that GIM is a promising short-term rehabilitation intervention for workers on long-term sick leave with stress. A need for a study with a larger sample size was recognised.

Only a year later Atiwannapat et al. (27) published an RCT study that compared the effects of active group MT intervention and receptive MT intervention to group counselling in treatment of major depressive disorder (MDD) in adult population (n=18). Both therapy groups showed improvement in depressive symptoms, but the results were not significant. The authors saw a trend that both MT groups improved more in terms of depressive symptoms and quality of life when compared to the control group. The effect seemed to sustain for at least three months. They also noted that the active MT group may have had a higher peak therapeutic effect, but the receptive group may have reached the peak effect faster. These findings should, however, be treated with caution due to the non-significant results. There were no dropouts in the active MT group, one out of five in receptive MT group and two out of four in control group. The authors suggest future studies to consider a wait-list control group instead of no-treatment control to reduce the drop-out rate. The authors identified the small sample size as one of the main limitations of the study. They, however, consider MT as an interesting adjunctive treatment of MDD.

Chen et al. (37) have also conducted an RCT in this field to investigate the effects of group MT on reducing anxiety and depression and improving self-esteem of Chinese prisoners (n=184). In this intervention, they used both active and receptive MT methods including clinical improvisation, music imagery and songwriting. Of these three methods, clinical improvisation was the most used. The results indicated that MT can help to reduce anxiety and depression and to improve self-esteem of prisoners with mental health problems. MT was helpful for prisoners in general but especially for those of a young age or low education level. The state anxiety of young prisoners improved faster compared to older prisoners during the therapy, but the effect didn't sustain until the end of the therapy. Concerning self-esteem, there was a greater improvement among younger prisoners. Lower education level was connected to more evidently reduced anxiety. Authors assumed that it might take less time for younger people to build a therapeutic alliance with the therapist and become engaged with the therapy. Younger people also tended to have less stable self-esteem compared to older people. The authors also assumed that criminal records might affect the future life of those with higher education levels. The drop-out rate was low and the most common reason for dropping out was transfer to another prison. Authors identified small sample size, lack of control group and lack of standardized measures as the main limitations of the study. They note that long-term effects of the therapy and its impact remain unclear and that more research is needed to examine the effects and also the therapeutic process to gain a more comprehensive understanding of MT. However, they consider the findings as strengthening the randomized evidence for MT.

As a sub-study for the RCT above, Chen and Hannibal (43) published a case report illustrating the change process of one inmate that took part in the group MT intervention. The authors learned that music imagery can help one to bridge the inner world and deepen the inner exploration: improvisation can give one a freedom to experience and explore subconscious and conscious feelings through spontaneous music creation, and songwriting can enable one to convert their unconscious feelings and thoughts into words and melodies. By studying this process in more detail, the authors learned that group MT has the potential to facilitate therapeutic growth and change.

As the previous group MT study had a focus on prisoners, Zhang et al. (34) in turn studied the effect of Group Improvisational Music Therapy (GIMT) with college students (n=75) with depression and difficulties in emotion regulation. RCT design was applied. According to authors, statistical methods were used to measure emotional changes and semi-structured interviews to analyse the intervention effect. Their aim was to evaluate the effect of GIMT on student's depressive symptoms and ability to regulate their emotions. Free improvisation was used to create personalized music to stimulate emotional experiences. Emotional regulation abilities were also at the centre of the process, and the participants were required to record their positive coping strategies and feelings when facing emotional difficulties. The authors found out that the emotion regulation abilities had improved significantly in the GIMT group, whereas with the control group the result was the opposite. They also found out that the levels of depression had decreased significantly in the GIMT group. Authors state that GIMT encourages participants to musical improvisation that, for example, promotes emotional expression, enhances social skills and elevates self-esteem and self-confidence. The authors identify several limitations including the lack of later follow-up to measure the endurance of the effect.

Finally, Gaebel et al. (30,31) recently published two articles reporting the results of an RCT study about group MT in treatment of major depression disorder (MDD) in adult female population (n=102). Both papers are relevant in terms of this review, since the focus is not only on depression and anxiety but also on work-related stress, exhaustion and burnout. The aim of the authors was to evaluate the efficacy of group music therapy (GMT) in reducing depression and stress in this outpatient group compared to TAU. The results were in line with previous findings of the health-promoting effects of MT. In the depression-related article (30), the authors report that they were able to find greater reductions in momentary

depression compared to TAU but not in self- and observer-rated depression. Improvements in emotion and mood regulation and general health status were also found post-measurement when compared to TAU alone. However, these effects did not sustain to follow-up at ten weeks. The COVID-19 pandemic posed several challenges for the study, including subsequent data loss and higher drop-out rate, but the power of the study was nevertheless sufficient.

In addition, according to the article focusing on psychobiological stress regulation (31), the psychological stress outcomes indicated that MT had a more positive effect on stress than TAU alone. Thus, MT has the potential to improve emotion regulation and to promote health by influencing psychological and psychobiological stress. The study also emphasizes the potential of MT to influence both psychological and psychobiological stress (31). Authors state that this study includes sufficient power, a comprehensive evaluation of depression and methodological innovations that offer new knowledge and pave the way for future analyses (30). They, however, also indicate that more research with robust study designs and longer interventions, than the ten weeks applied in this study, are needed to see if the effects found can be sustained (31). In addition, they recognise a need to better understand the efficacy of individual interventions inside GMT method and thus the mechanisms of MT (30).

PILOT AND FEASIBILITY STUDIES

In addition to RCTs there were also pilot and feasibility studies, evaluating different MT methods and models conducted in this field, that met the inclusion criteria of this review. Two of the studies (35,38) explored MT in a group setting and two (40,42) in an individual setting. Two studies (38,40) had a focus on individuals with anxiety and the other two (35,42) on individuals with depression. Results were promising in all studies and authors saw MT having a positive effect on the symptoms and wellbeing of the participants. In two studies (35,38), the authors recommend more robust studies with some changes or further development. One study (40) utilized tailored interventions to meet the individual needs of the participants and found this approach promising. These studies are next presented in more detail. One of the studies (42) was found feasible as such. It is a part of a larger research project (33) and will be introduced in more detail alongside the main publication later in this article.

The pilot study (n=10) was conducted by Gutiérrez and Camarena (38) to explore the possibilities of a MT application to reduce anxiety and depression levels of patients with generalized anxiety disorder (GAD) receiving pharmacological treatment. They applied both receptive and active MT methods in a group setting by using pre-recorded music, or music performed by the therapist, and by creating music themselves using either instruments or their own voices and bodies. Authors found out that the intervention significantly reduced both the anxiety and depressive symptoms. Authors speculate that using intense movement of the body in creative form might promote physical and psychological tension release and thus explain the positive effect of active MT methods. Authors were aware that music enhances the exploration of memories associated with challenging life events. They used receptive MT techniques to encourage and promote recall and emotion expression to be able to facilitate cognitive changes and modify irrational thoughts and beliefs, and thus to promote participants' abilities to manage conflict. Although the results are promising, authors recommend more robust studies in future with a bigger sample size, a control group, randomization and follow-up measurements to make the results more generalizable.

The feasibility and acceptability study in turn was implemented by Carr et al. (35). This study was about group songwriting MT intervention for adult patients (n=39) with long-term depression. They used Synchrony group MT with songwriting intervention that was mostly about working on songs with the possibility to rehearse and record or perform the created musical pieces at the end of the process. In the early phases, sharing pre-known songs was used as an ice-breaker. Also, group improvisation was used before songwriting. The outcomes suggested promising effect on depression reduction and social adjustment improvement, but this effect was seen at 3-month follow-up assessment only. Instead, numerous participants scored worse depression symptoms at post-testing. Thus, there was a delay in time with the effect. Overall attendance was poor, and the intervention needs further piloting regardless of being feasible and acceptable as such.

To increase the understanding of the individual experiences in the songwriting groups, Windle et al. (48) interviewed ten of the participants of the study by Carr et al. (35). They conducted semi-structured interviews to examine the process from the participants' perspective including helpful and unhelpful factors within the groups, and changes during the therapy and participants' contributions to possible change. Their phenomenological analysis revealed three themes, which were: 1) importance of group safety and cohesion, 2) music as a different means of processing feelings and experiences and 3) the importance of initial expectations, group composition and set-up. The qualitative findings highlight the meaning of group dynamics in the therapeutic group process, as the different

groups tended to prefer different approaches to songwriting based on individual preference and areas of discomfort. To some participants, group songwriting provided a sense of belonging and acceptance and feelings of achievement and satisfaction, while some participants felt that the personal issues they would have liked to address did not appear during this group therapy process.

Brown et al. (40) conducted a retrospective pilot study to understand the use of MT interventions on anxiety. Hospitalized patients (n=56) with verbally rated anxiety received mainly a single MT session of either active or receptive MT. The therapist tailored interventions to meet the individual needs of the patients and receptive methods such as music listening and music-assisted relaxation were the primary interventions used. Also, active methods including improvisation and writing new lyrics to familiar songs were used. The results of the study suggest that this kind of tailored MT intervention can significantly reduce the anxiety of adult hospitalized patients. Only 30 participants were between 18-65 years of age and thus on the scope of this review. However, according to the authors the results suggest responses to MT did not differ significantly based on demographic factors such as age or gender. Authors identified several limitations to this study including small sample size, researcher bias and restrictions of the retrospective nature of the study. They, however, state that this study shows that MT can be a valuable resource for hospitals in anxiety reduction and thus should be further investigated.

CASE STUDIES, PROCESS STUDIES AND CASE REPORTS

The studies in this section also underline the beneficial effects of MT and its possibilities in improving participants' everyday functioning, anxiety and depressive symptoms. The single-case study (29) and the multiple single-case studies (32,33,39) offer insight into the use of MT and identify promising patterns of change, while the qualitative study (36) goes deep into the verbal affordances of MT.

Zarate (39) conducted a multiple single-subject design (n=16) to evaluate and explore the effect of improvisational MT and vocal psychotherapy in the treatment of anxiety. The intervention offered was active MT based on clinical improvisation in an individual setting. According to the results, participants' anxiety levels decreased significantly during the therapy and especially during the first six weeks. The author recognizes a promising pattern of change in the results. They find it noteworthy that mild anxiety scores sustained throughout the study, but severe symptoms disappeared by the last session. The author interprets this as a sign of improvement in everyday functioning and anxiety management, and states that the results indicate that MT is effective in alleviating anxiety symptoms among the convenience sample of young adults participating the study. The author, however, notes that the sample size was small and thus these findings should be interpreted with caution.

Aalbers et al. (32) conducted a multiple single-case study (n=10) and introduced an easily implementable research design especially for MT clinicians who want to evaluate and monitor the impact of their interventions. Active MT model called individual short-term improvisational music therapy (ISIMT) was used with the aim to reduce the degree of participants' depressive symptoms. The changes in depressive symptoms were evaluated by the participants themselves and their informal and formal network members, such as partners, friends, relatives, psychiatrists or psychologists. According to authors, the intervention showed promising efficacy in experienced and observed depressive symptoms. The majority of the clients experienced significant benefits from MT and had significantly fewer depressive symptoms after the intervention. The network members largely confirmed the changes and reported a significant reduction in observed depressive symptoms. Authors see the similarities and differences in the scores given by the participants and their network members as having a great potential in opening a dialogue about MT and, for example, participants' needs and true feelings they might struggle to express and share. However, the authors note that the results are restricted because of a small study population, and a lack of follow-up measurements and a control group.

Aalbers et al. (33) later conducted another multiple single-case study to assess the effects of Emotion-regulating Improvisational Music Therapy (EIMT) model in reducing depressive symptoms and improving emotion regulation in young adult students (n=15) with depressive symptoms. EIMT is an improvisation-based active MT model used in an individual setting. Instruments used are cello, marimbas and djembe drums. In this study researchers found both significant reduction of depressive symptoms and significant improvement in emotion regulation at post-tests and at follow-up measurement. All participants, for example, felt better, were less sad and less tense and less or not anxious, and reported improvement in emotion regulation after MT. These results were supported by qualitative analysis. Authors considered the sample size sufficient to gain insight and explore the effects of MT but note that further research is still needed to support the generality of the results. As a part of this larger research project Aalbers et al. (42) have also conducted a process evaluation to study the feasibility of EIMT method for use in practice for young adult

students with depressive symptoms in a university context. Authors found that the client attendance rate was sufficient as well as the treatment integrity of the programme. All in all, EIMT seemed feasible to evoke changes in emotion regulation in the target population.

Lotter and van Staden (36) conducted a qualitative study and explored the verbal affordances of active and receptive MT with hospitalized adults (n=20) diagnosed with either major depressive disorder (MDD) or schizophrenia spectrum psychotic disorder (SSD). They analysed a total of 131 individual MT sessions for this study and identified 13 themes that reflect the content of participants' verbal responses to participation in active music making, receptive music listening and client-therapist dialogue. The themes concerned feeling and doing, connection with and affection of others, the reclamation of vigour and resilience and various emotions. Authors see this thematic content as central working material of the sessions, giving the therapist valuable information about the client's experience of mutual understanding that is crucial in therapy. They believe this information can help the therapist to optimize and strengthen the MT intervention and engage and reach the clients in an optimal way. The results reveal the different mechanisms of both receptive and active methods related to each thematic entity. Receptive methods elicited, for example, awareness of internal states and emotions, hopes and desires, feelings of being stuck, loss and anxiety, and motivation towards change. Active methods evoked, for example, awareness of participation in music and physical states, experiences of agency, freedom and concentration issues, symbolic representations, and offered means for emotion release and self-reflection. Often, states and feelings emerged during receptive MT, and they were further processed and released with active music making.

Authors (36) also pointed out some key differences concerning the two diagnostic groups. The MDD group, for example, articulated specific inner states of feeling more readily and displayed awareness of the suppression of emotions and their fear of facing feelings. They also expressed experiences of not being able to move and being in darkness, states of sadness, helplessness and being heartbroken. In addition, the MDD group referred to suicide numerous times, but also reported, for example, feelings of hope, emotional awakening and increased motivation and desire for happiness, shifting perspective and experiences of stress release and liberation. According to the findings of the authors, both diagnostic groups seemed to benefit from the intervention. They reported feeling better and experiencing feelings of self-significance, and experienced that MT shifted their feelings, accessed their inner strength, renewed their motivation to persist, looked to the future and altered their self-perception. Authors emphasize that their findings demonstrate how MT provides a space for the full extent of human expression, and that the goal of MT might as well be to create an environment that allows self-discovery and emotional awareness instead of improving negative mood or decreasing symptoms. Authors note that this study was limited to the verbal affordances of MT methods and that, for example, musical expressions might reveal more than was captured in it. Saturation of the data was attained suitably but the possibility of further themes emerging by other patients was also acknowledged by the authors.

A case report by Lund & Drago (29) describes a combination of pharmacotherapy and MT with a 44-year-old male, who had suffered multiple depressive episodes and was receiving treatment for depression in a hospital outpatient unit. He was also assessed with sub-threshold autism. Various medications had been tried in the past. Within the period of 18 months, the patient received 45 individual MT sessions consisting of music listening and free improvisation and continued with pharmacological treatment. During the process, the medication helped to relieve the symptoms, and MT helped him develop strategies for managing low energy and suicidal thoughts and offered a safe space to explore and process emotions. The authors note that this kind of single-case study does not allow for generalization but provides information about the beneficial effects of combined MT and pharmacotherapy in outpatient treatment of depression, and possibly inspires future research.

ADDITIONAL STUDIES

Finally, we will introduce several studies that did not fully meet our inclusion criteria and were not included in the review. They, however, offer some interesting views to the subject and are thus presented here as additional studies enriching the narration. Exclusions occurred due to ineligible study populations. One of the three studies (52) was focused on mental healthcare clients but only a part of the participants were diagnosed with mood disorders. Another two studies (53,54) were targeted to average student populations.

The effectiveness of resource-oriented MT versus TAU for mental healthcare clients with low motivation for other therapies was examined in a multi-centre RCT (52). MT seemed to be superior compared to TAU for negative symptoms, functioning, clinical global impressions, social avoidance through music and vitality. The attendance rates were promising, and MT seemed to help keep clients longer in contact with psychiatry, as their attendance in psychiatric assessment in the study was generally good. The authors emphasize that therapeutic attention should

be concentrated on the clients' strengths and potential.

Finnerty et al. (54) conducted an RCT on online MT in anxiety and stress management of undergraduate students. The comparison of online active MT, online receptive MT, online verbal-based therapy and no intervention control was conducted during COVID-19 pandemic to explore the efficacy of online group MT as a proactive intervention. Outcome measures showed significant reduction of anxiety and stress in all intervention groups with no significant between-group differences. Physiological measures turned out to be partly unreliable and unpowered due to recruitment issues, but the measured cortisol levels differed significantly between the receptive MT group and the control group. The authors suggest that many students could benefit from being able to choose the therapy type and that MT can provide an alternative option for students unable to access or reluctant to engage in verbal therapy.

Chen Q et al. (53) conducted a study about MT in treatment of student mental health challenges. The aim of the study was to evaluate the effectiveness of a 4-step structured MT programme in improving mood and symptoms of depression and anxiety among medical school students. Mental health issues were quite prevalent in this group but did not concern all participants. The implemented four-step programme included sociality, interaction via relaxation and music activities, music lessons and creative expression including creation of rhythms, songs or dances, sharing favourite songs and expressing feelings. Authors observed that the tailored four-step MT programme improved the students' mood regulation and overall wellbeing. The results were especially promising among male students, junior grade students and students specializing in clinical medicine.

DISCUSSION

The purpose of this review was to present an up-to-date and in-depth overview of the existing evidence related to the use of MT in treatment of depression and closely related mental health conditions, including anxiety and work-related stress and exhaustion in working-age population. The results indicate that MT is an effective treatment for these conditions and can be implemented successfully in both individual and group settings with many different methods. These include different modifications of improvisation-based working models (28,33,39), multi-method interventions with both active and receptive techniques (30,36,37), songwriting activities (35), guided imagery and music (41), and so on. These findings are consistent with the previous review of MT in treatment of depression by Aalbers et al. (21).

The conclusions of this review are based on 23 articles derived from 15 original studies involving altogether 706 participants, of whom 680 belong to the target group. Sample sizes in the articles ranged from one to 184 participants covering different kinds of study design from case reports to RCTs. By including different designs, we were able to reach comprehensive knowledge concerning both individual- and group-level phenomena. It is, however, possible that exclusion of studies conducted by experts other than music therapists and our definition of music intervention may have excluded some relevant information. This observation also concerns the exclusion of other than peer-reviewed articles that could have given some complementary information. This review also addresses studies reported in English only. Future studies could benefit from a wider language selection.

The attendance rate was sufficient among the included studies. Only one study (35) reported a high number of withdrawals. This was an intense group process conducted three times a week assessing the feasibility of a certain group MT method. In general, the drop-out rates were considerably low, and the participants were well engaged with the intervention. In some cases, the reasons for several dropouts were external, such as fear of infection due to the COVID-19 pandemic (30) or change in participants' location (37). In one of the additional studies, (52) it appeared that attendance rates in MT were promising even with clients with low therapy motivation. These results seem to resemble some previous findings about high motivation to participate in MT even in challenging circumstances (55,56).

In the field of MT research, similar to the fields of psychotherapy and other therapy modalities, large research designs are challenging to implement due to their complexity and cost. It appears to be typical that the same study leads to several different research reports that examine different details of the same study, and in many ways complement and enrich the information found using the actual outcome variables. During the data screening phase, it was, however, sometimes challenging to conclude which studies were independent and which ones were carried out as part of a larger research project. Transparency in reporting the relation to the original studies would help access the original sources, when needed, and deepen the understanding of the more exploratory findings in relation to the main study. In many cases this was achieved well. There also appeared to be major differences in defining MT. It turned out that in many cases pure music listening or therapeutic use of music conducted by someone other than a trained music therapist was considered as MT. These studies were not included in this review.

This review was targeted at working-age individuals between 18 and 65 years of age. Most of the studies had wide age range while others were focused on certain groups such as young adult students (33,34). One study (40) also included participants older than 65 years of age. These participants could not be separated from the analysis, but the results indicated that there were no significant differences in the effectiveness of MT due to participants' age or gender (40). This is an interesting and important finding that is both supported (26) and, concerning gender, challenged (34) by other included studies. In all included studies, gender was conceptualized in a binary manner, which may partly stem from the traditions of medical research. Some studies focused only on women (30,32,33) and some on men (37) partly due to circumstances and partly based on a decision to, for example, increase statistical power and prevent methodological bias (49). However, to achieve a more diverse understanding, in future research it might be worth expanding the concept of gender to also understand the specificities of MT and mental health in relation to participants of different genders.

In previous investigations, the intensity of the therapy has been assumed to contribute to the positive outcomes of the study. This is the impression gained in this review as well. However, the process can also be too intense and demanding and thus cause dropouts (35). The intensity of 1–2 sessions per week seems to be effective in the light of successful outcomes. Homework was used in some studies (28,42). In Erkkilä et al. (28) the homework component did not yield significant differences. Also, the more detailed findings of the related sub-study (47) were controversial. Homework task appeared to be difficult due to, e.g. motivational and technical issues or to the severity of depression or anxiety. Aalbers et al. (42) on the other hand also used homework and found it helpful in expressing emotions through music, in strengthening positive feelings and relaxation and in motivating the practice of emotion regulation in everyday life.

Musical improvisation has been reported to evoke expression of emotions and feelings and enabling self-exploration (26,42). It has also been seen as extending and complementing verbal expression and communication, enabling working with emotions on a symbolic, non-verbal level and offering an open stage for creative imagery and transference (26). Receptive methods were seen to serve as a stress management tool (41) and also as an ice-breaker before entering into active music making (35). The latter seems to be in line with some previous results that describe the role of music listening as a pathway leading towards more active agency of the participant (57). GIM also seemed to have a strong and long-lasting impact on mood-related measures including depression, anxiety, mood disturbances and wellbeing (41).

Using research designs and collecting both quantitative and qualitative data from the therapy process can be beneficial for the clinicians in monitoring the quality and the effectiveness of their interventions (32). The results also indicate that it can be useful to involve participants, their families and other professionals treating them in the evaluation of the therapy process. It was reported that participants themselves found the use of questionnaires meaningful, giving them a clear insight into the effectiveness of the MT they had received, and that similarities and differences in results between participants and their networks can create discussion about what was helpful and not helpful in MT, what might cause the differences in the scores they have given, and so on (32).

As a general overview of MT research, one key limitation found in the systematic review by Aalbers et al. (2017) was the insufficient methodological reporting, for example, regarding the description of used interventions and specific diagnoses. Historically, MT research has been focusing mainly on case studies and reports and there has been a lack of larger scale and high-quality studies. In this current review, the impression of the reporting quality was overall more positive, and reporting tended to be more accurate and detailed than estimated before. Also, sample sizes tended to be bigger and MT interventions and models described in more detail. That said, the differences in reporting styles, and occasional deficiencies in reported details still raised some challenges in comparison of the studies since, for instance, some design was based on a very short intervention and reported with some deficiencies regarding the sessions conducted (34).

All in all, there was a lot of well-reported good quality systematic research based on studied MT interventions and models. Several studies (26, 28, 33–35, 41) also report that therapists are receiving specific training for the method used in the study. All this creates an impression that the research field is heading towards more internationally shared MT models. When assessing RCT studies the question of large enough sample sizes can, naturally, always be discussed and bigger sample sizes targeted. However, the sample sizes in the studies included in this review have already been well sufficient in power and would support the broader use of MT methods in treatment of working-age population with depression, anxiety and exhaustion.

In addition to larger systematic trials that could verify and enrich current results, it would also be necessary to gain more information about the factors explaining the underlying mechanisms of MT and the dynamics of therapeutic change.

The outcome-oriented trials offer fundamental information about the efficacy of MT. However, studying experienced therapeutic change requires different kinds of methods and viewpoints. For example, qualitative and mixed methods data exploring the therapy processes and participant and therapist experiences in more detail could offer views to the factors explaining therapeutic change and the internal mechanisms of MT. The ongoing study (iMTDep) for working-age individuals with depression-related disorders is applying and comparing active and receptive MT methods with a mixed methods study design and multimodal analysis of different types of data (58). Also, a study comparing the effectiveness of group arts therapies compared to group counselling for psychiatric patients (the ERA study) is currently under implementation (59).

This review offers information filling the gap in knowledge concerning latest MT research in this field. The results show that music therapy can be effective in treatment of depression when added to standard care and also in treatment of anxiety and stress. MT can be successfully implemented in both individual and group settings with multiple different methods such as improvisation, music and imagery, music listening and songwriting. MT can support agency, self-expression and emotion regulation, offer means for emotion release and promote wellbeing. In addition to improving mental health and decreasing symptoms MT seems to facilitate self-reflection and self-awareness. This information can be applied in future research, development of clinical practice and treatment policy.

Abbreviations

A: Active music therapy
ASD: Autism spectrum disorder
CCG: Current care guidelines
COVID-19: Coronavirus disease 2019
DLD: developmental language disorder
EBM: Evidence-based medicine
EIMT: Emotion-regulating improvisational music therapy
FAA: Frontal alpha asymmetry
FMT: Frontal midline theta
G: Group music therapy
GAD: Generalized anxiety disorder
GIM: Guided imagery and music
GIMT: Group improvisational music therapy
I: Individual music therapy
IIMT: Integrative improvisational music therapy
iMTDep: Integrative music therapy for depression
IPMT: Improvisational psychodynamic music therapy
ISIMT: Individual short-term improvisational music therapy
MDD: Major depressive disorder
MEP: Music therapeutic emotional processing
ML: Music listening
MT: Music therapy
R: Receptive music therapy
RCT: Randomized controlled trial
RFB: Resonance frequency breathing
SANRA:a scale for the quality assessment of narrative review articles
SSD: Schizophrenia spectrum psychotic disorder
TAU: Treatment as usual
VAT: Vibroacoustic treatment
BMGIM: the Bonny method of guided imagery and music
GMT: Group music therapy

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SEPPO SOINILA, PAVEL ZAITSEV, ALEKSI J. SIHVONEN, MARIA NUOTIO

MUSIC-BASED INTERVENTIONS FOR NEUROPSYCHIATRIC SYMPTOMS OF DEMENTIA

ABSTRACT

Background: *Progressive ageing-related processes of deteriorating cognition, such as Alzheimer´s disease, present as both cognitive and neuropsychiatric symptoms. Insufficient effects and severe adverse effects of medications have led to increasing interest in non-pharmacological treatments. Music-based therapies have been accepted in guidelines as supplementary treatment of dementia. Yet, optimal implementation has not been defined and evidence for symptom-specific effectiveness of music is still contradictory.* ***Material and Methods:*** *We analysed all (n=55) randomized controlled trials registered in PubMed database investigating the effects of music on neuropsychiatric symptoms of dementia. Positive outcome was defined as superiority of music over standard care or non-musical intervention. Negative outcome was defined as lack of effect compared to standard care.* ***Results:*** *The trials applied both active and passive interventions, i.e. various types of physical participation in music making or mere music listening. The outcomes included behavioural and psychological symptoms of dementia (BPSD) en bloc, or specifically depression, agitation, anxiety or apathy. Music-based interventions resulted in positive outcome in 70%, 45%, 42% or 35% of interventions measuring BPSD, anxiety, depression or agitation, respectively. Negative outcome was obtained in good fourth of the interventions measuring BPSD, depression or agitation.* ***Conclusions:*** *The evidence for beneficial effects of music is firmest for unspecified BPSD or depression, moderate for agitation and anxiety, weak for aggressiveness and very weak for apathy. Mixed results may be due to heterogeneity in study design, clinical scales or make-up of patient cohorts.*

KEYWORDS: MUSIC-BASED THERAPY, DEMENTIA, NEUROPSYCHIATRIC SYMPTOM,DEPRESSION, AGITATION, ANXIETY

INTRODUCTION

Ageing of populations has resulted in increased prevalence of progressive memory symptoms, foremost Alzheimer´s disease (AD), manifesting gradually as deteriorating cognitive capacity and proceeding eventually to dementia (1). Other aetiologies of ageing-related processes of deteriorating cognition include cerebrovascular insults, Parkinson´s disease (PD), Lewy body disease (LBD) and frontotemporal degeneration (FTD). Progression of these conditions can be slowed down to some degree in AD, PD and LBD by acetylcholinesterase inhibitors or memantine. Anti-amyloid drugs lecanemab and donanemab offer a new pharmacological strategy to tackle the pathogenesis of AD and have been accepted for clinical use (2). The inevitable course of the progressive memory symptoms gradually leads to dementia, loss of cognitive skills needed to cope with activities of daily living or work and waning of social network.

Neuropsychiatric symptoms, most often depression, may be the initial symptom of incipient memory disease and precede cognitive problems (3). More commonly, deteriorating cognition is accompanied by behavioural and psychological symptoms of dementia (BPSD) at the advanced stage. These include anxiety, agitation, aggression, apathy, disturbances of sleep and diurnal rhythm or other unspecified behavioural symptoms. In a meta-analysis by Zhao et al. (4), the prevalence of symptoms suggesting psychotic disorder was 31% for delusions and 16% for hallucinations. Appearance of BPSD and its treatment with psychotropic medication may endanger the patient´s safety due to wandering and increased fall risk, particularly for those living alone. Manifestation of BPSD also commonly leads to exhaustion of the spouse or other caregivers and is often a

decisive factor leading to transition of the patient from home care to long-term care facility. Neuropsychiatric symptoms often significantly increase the workload of institutional staff and may erode their wellbeing at work.

Medication specifically targeting the deteriorating cognition, even if applied at an early stage, may temporarily curb the neuropsychiatric manifestations to some degree, but eventually the treatment must be supplemented by psychotropic medication, the potency of which, in managing the symptoms and yet maintaining reasonable capability and autonomy of the dementia patient, is limited (1). Psychotropic medication often brings about serious adverse effects, such as increased risk of injurious falls (5) and negative impact on the patient´s quality of life. For these reasons increasing interest has arisen in various non-pharmacological therapies, such as music, other forms of art, and interventions including cognitive, social or multisensory stimulation, or physical exercise (6). A growing body of evidence has accumulated showing the potential of music interventions in producing beneficial therapeutic effects in persons living with dementia (7). Although music-based therapies are now accepted as supplementary therapy of dementia in several national and international guidelines as supplementary rehabilitation method of dementia (8, 9), their effectiveness in managing specific neuropsychiatric symptoms is still contradictory.

Here we review the current literature concerning the efficacy of music-based interventions in relieving neuropsychiatric symptoms of dementia. Neuropsychiatric outcomes used in the studies include unspecified BPSD, depression, agitation, anxiety and apathy.

MATERIAL AND METHODS

The data analysed here were collected by literature search in the database PubMed using the search strategy "music AND dementia" and covering all published studies registered by March 31, 2025 (Figure 1). Search strategies "music AND (major) neurocognitive disorder" yielded one and 53 RCT´s, respectively, none of which dealt with dementia-level disorder. The initial search results were scrutinized independently by two investigators (PZ, SS). We included randomized controlled trials (RCT) applying both active and passive music interventions, i.e. the subjects physically participating in music making by singing or instrument playing or merely listening to music. We included interventions combining music with any form of simultaneous motor activity, varying from guided exercise or free movement in time with the music, to informal or formal dancing or casual movements, such as hand clapping. For cross-over studies, the period containing music intervention defined the length of intervention. Studies using repeated measures design (consecutive interventions with musical and non-musical periods offered for the same subjects) were included only if they involved a control group specifically for the music period. We excluded reviews, letters, commentaries and case reports.

Our objective was to analyse the factors behind mixed results of music-based therapies reported for BPSD. For this purpose, we categorized the responses of each intervention in superiority over standard care or superiority over non-musical control intervention: positive effects, significant difference at $p<0.05$ on the outcome measure used, indicating improvement of the patients´ condition, null effects (lack of positive effect compared to non-musical intervention or standard care) or negative effect (worsening compared to standard care, significant difference at $p<0.05$ on the outcome measures used, indicating worsening of the patients´ condition).

Statistical analysis was performed using Fisher´s Exact Test.

RESULTS

The search strategy is shown in *Figure 1* and the yield is summarized in *Table 1* and described in detail in *Table 2* (supplementary material). The total number of trials analysed was 55, comprising 65 interventions and 5430 subjects. The subject number is based on the primary recruitment, not taking into account reductions due to drop-out during the intervention or follow-up. The average number of patients per trial was 99 ± 181 (SD), range 14-976.

Intervention format was defined either as individual vs. group-based setting, or active (including physical participation) vs. passive (comprising mere listening) setting. Five trials lacked information on the first type of setting, while information on active vs. passive nature of the intervention was reported in all trials (65 interventions). 29 interventions (48%) used individual setting, and 31 interventions (52%) were group-based. 34 interventions (52%) included active participation, e.g. playing, dancing, hand clapping or other physical activities, while 31 interventions (48%) were passive, including mere music listening.

In the following analysis, we report the number of trials showing or failing to show beneficial effect of music for each class of symptom, and then specify the favourable or lacking effect of music intervention in comparison with non-musical control intervention or standard care (*Figure 2*).

22 trials, including 34 interventions, evaluated behavioural and psychological symptoms of dementia (BPSD) en bloc without further classification according to the Neuropsychiatric Inventory (NPI) (10). 15 trials showed in 21 interventions (62% of all interventions) an overall positive effect, i.e. alleviation of BPSD in response to music. Music rose above non-musical intervention in seven trials (10 interventions, 48% of positive responses) and above standard care in nine trials (11 interventions, 52% of positive responses). Eight trials showed in 13 interventions null effect, i.e. lack of positive effect by music as compared to non-musical intervention (five trials/interventions, 38%) or to standard care (six trials, eight interventions, 62%). No trials reported negative effect, i.e. increased BPSD due to music.

Depression was measured in 22 trials (28 interventions). Several validated clinical scales were used: Beck´s Depression Inventory (BDI) (11), Cornell Scale for Depression in Dementia (CSDD) (12), Geriatric Depression Scale (GDS) (13), Hospital Anxiety and Depression Scale (HAD-D) (14), Montgomery-Åsberg Depression Rating Scale (15) or Minimum Data Set (MDS) of the Resident Assessment Instrument (RAI) (16). 11 trials/interventions (39% of all interventions) reported positive effect, i.e. relief of depression. Response to music exceeded that of non-musical intervention in five trials/interventions (45%) and that of standard care in six trials/interventions (55%). Null effect was observed in 11 trials (15 interventions, 54% of all interventions). In five trials (eight interventions,53 %), music and non-musical interventions were equally effective. Six trials (seven interventions (47%) reported no response to music compared to standard care. Two trials/interventions (7% of all interventions), not shown in Fig. 1, reported a negative response, i.e. significant increase in depression score in the music group, while a decrease occurred in the non-musical control intervention group (17,18).

27 trials consisting of 32 interventions measured unspecified agitation using either long or short version of Cohen-Mansfield Agitation Inventory (CMAI) (19). No trial showed superiority of music over non-musical intervention. In seven trials (nine interventions, 28% of all interventions), music had a positive (soothing) effect compared to standard care. Null effect was reported in 19 trials (23 interventions, 72% of all interventions). Music and non-musical control showed an equal effect in 16 interventions (70%). Music had no effect over standard care in seven trials/interventions (30%).

Agitation was further classified as non-aggressive and verbally or physically aggressive subtypes in nine trials (12 interventions). Music produced a positive effect on non-aggressive agitation in four trials (six interventions, 50% of all interventions). It did not exceed non-musical intervention in any trial, yet it decreased non-aggressive agitation compared to standard care in four trials (six interventions). Music produced null effect on non-aggressive agitation in seven trials (10 interventions) including effects equal to non-musical control in six trials (9 interventions, 90%), and equal to standard care in one trial (10%). No intervention produced a negative effect, i.e. increase in non-aggressive agitation.

The effect of music on aggressive agitation failed to exceed that of non-musical interventions. As compared to standard care, music produced a positive effect in one intervention (8% of all interventions). Null effect on aggressiveness was observed in seven trials (10 interventions, 83% of all interventions). The effect of music was equal to non-musical control in five trials (six interventions, 60%) and equal to standard care in four trials (four interventions, 40%). In one trial/intervention (8% of all interventions), verbal aggression was increased after both music intervention and non-musical control intervention (20).

Anxiety was measured in 10 trials (13 interventions) using three scales, namely Rating of Anxiety in dementia (RAID) (21), Hospital Anxiety and Depression Scale (HAD-A) (14) or Hamilton Anxiety Rating Scale (22). Five trials/interventions (38%) reported a positive effect, i.e. decreased anxiety. In two trials/interventions (40%) music was superior to non-musical intervention and in three trials/interventions (60%) it was superior to standard care. Null effect was reported in six trials (eight interventions, 62% of all interventions), all of which were based on lack of difference between responses to music or non-musical interventions. No intervention increased anxiety.

Apathy was measured in only one small study using Dementia Care Mapping (23). The subjects listened to their preferred music (24). Live music resulted in relief of apathy, while recorded music had no effect compared to standard care.

In order to investigate whether the intervention format (individual vs. group; mere listening vs. active participation) is related to positive effect, we performed 2x2 analysis using Fisher´s Exact Test. No significant differences were observed.

Other neuropsychiatric manifestations included in NPI, such as disturbances of sleep, diurnal rhythm or nutrition, were not specifically reported in the present collection of studies.

Figure 1. Flow chart of the search strategy realized in PubMed using search terms "music AND dementia" and processed according the PRISMA 2020 Guideline (Page MJ et al., BMJ 2021;372:n71. doi: 10.1136/bmj.n71).

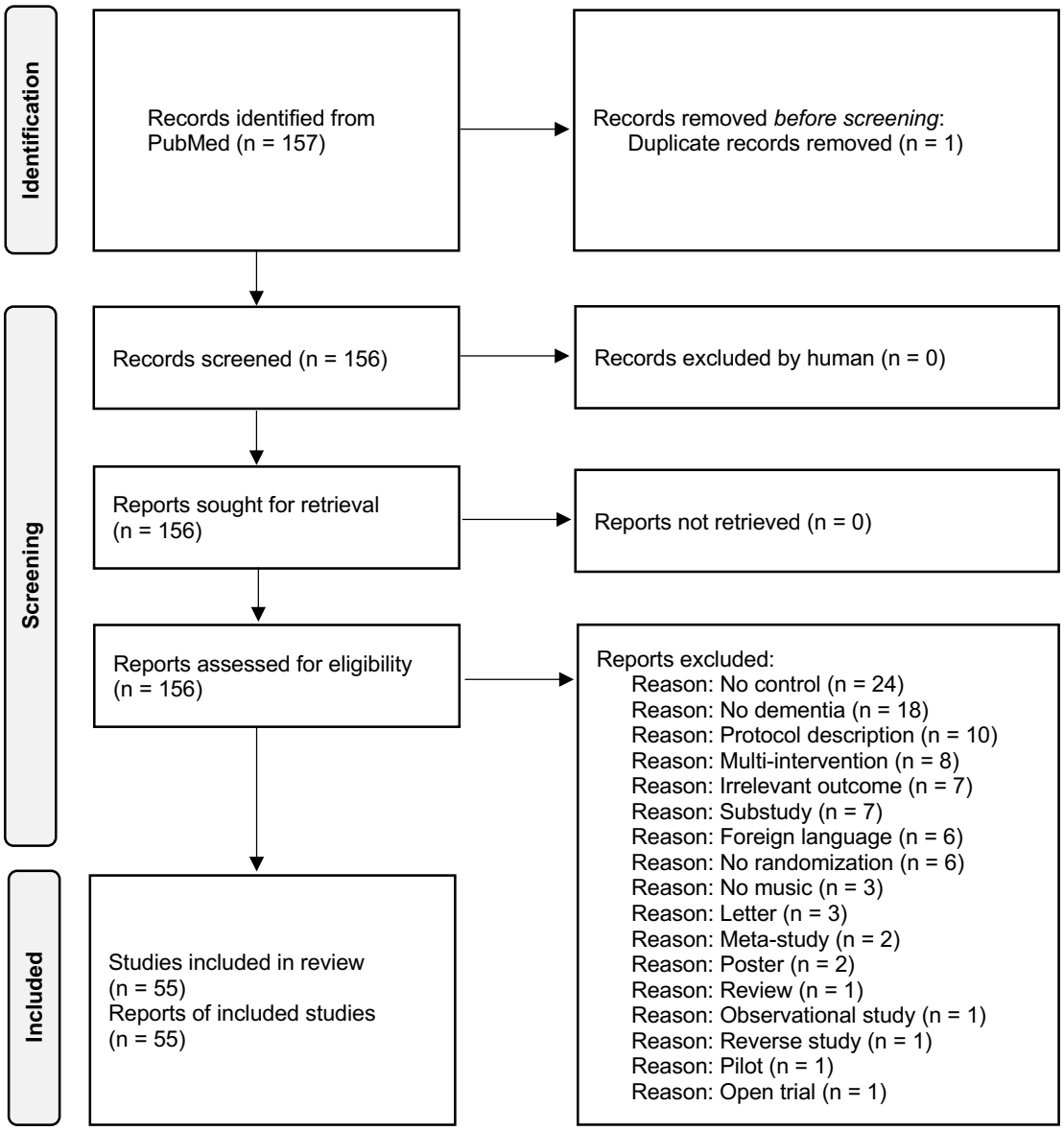
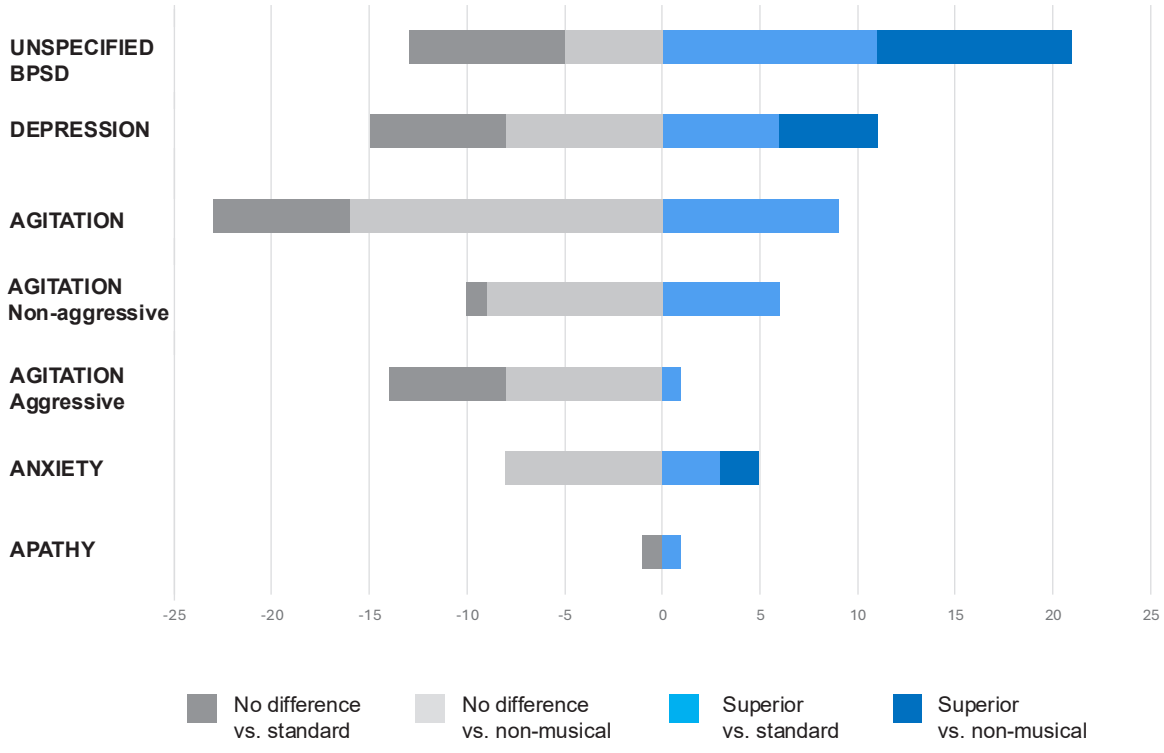


Table 1. Summary of randomized controlled studies analysed for neuropsychiatric symptoms.

		Neuropsychiatric symptom assessed	Number of studies	Number of subjects*
Total number of studies	55	Unspecified (BPSD)	22	1 466
Total number of subjects	5430	Depression	22	1 458
Studies applying preferred music	34	Agitation, unspecified	23	3 049
Studies including non- musical control intervention	28	Agitation, aggressive	9	653
Median duration of intervention (d)	56	Agitation, non-aggressive	9	653
Range 10 min - 224 d		Anxiety 10	10	551
Mean number of subjects	99	Apathy	1	32
Range 14 - 976				

BPSD=behavioural and psychological symptoms of deme
*Total number of subjects measured for each variable including musical and non-musical intervention groups and standard care group

Figure 2. Responses of persons with dementia to music interventions. Horizontal axis shows the number of interventions reporting the response indicated by the colour code. BPSD = behavioural and psychological symptoms of dementia. Please note that the number of interventions producing positive or null effect on non-aggressive agitation is greater than the total number of interventions, since in four interventions the effect was null or positive, depending on comparison with non-musical intervention or standard care, respectively. The bars representing null effects on aggressive agitation include two trials (four interventions) in which the response of music failed to differ from both non-musical intervention and standard care, making the total number of comparisons 14, although the true number of interventions producing null effect was 10.



DISCUSSION

Since 1997, over 100 systematic reviews and/or meta-analyses on music-based therapies for persons living with dementia have been published. The largest coverage so far is in the review by Lam et al., in 2020 [25], analysing 43 RCTs, some assessing outcomes other than neuropsychiatric symptoms. Of the most recent publications, the Cochrane Systematic Review (7) included 30 studies, 14 of which analysed neuropsychiatric symptoms. To the best of our knowledge, the present review of 55 RCTs, focusing exclusively on neuropsychiatric symptoms of dementia is the most comprehensive report published so far in this field.

In the present material, beneficial effects of music were reported for all outcomes studied. Yet, the percentage of interventions resulting in positive or negative outcome varied greatly. Music seems to be most beneficial in studies measuring unspecified BPSD (70% of interventions), followed by anxiety (45%), depression (42%) and agitation (35%). Apathy was measured only in one study applying two interventions, which resulted in contradictory responses. In estimation of overall effectiveness of music-based therapies, significance of positive outcomes is diluted by negative outcomes reported for all entities except for anxiety: BPSD (22% of interventions), depression (27%) and agitation (27%). In previous meta-analyses, negative outcomes have been reported for BPSD (26-28), depression (26,29-31), agitation and aggression (26,28,29,32-35). Considering this, our results are in line with the previous studies (7,25) in showing beneficial effects of music on neuropsychiatric symptoms of dementia, the firmest evidence obtained for general BPSD and depression, moderate level of evidence for agitation and anxiety, weak evidence for aggressiveness and very weak for apathy.

POSSIBLE EXPLANATIONS OF CONTRADICTORY RESPONSES

Our major goal was to appraise the divergence of responses to music interventions observed in the present material. The studies reviewed were published over a period of almost 30 years, during which time the diagnostic accuracy of dementia has substantially improved and led to earlier treatment onset. For around the same time, general awareness of the impact of music in rehabilitation has grown, and standard care has increasingly adopted musical elements. For these reasons old and recent patient cohorts may differ in clinical characteristics.

Heterogeneity of study design, measuring and reporting is a striking feature of the reviewed material. Recommended checklist for systematic reporting of data in studies of music-based interventions was first published in 2011 (36), and an attempt to reach a consensus on standardization of trials came out in 2022 (37). Yet, the analysis by Lepping et al. (38) revealed that standardization has been poorly applied. The checklist was updated in 2025 (39,40) to provide an efficient guideline for future studies.

Comparison of interventions resulting in positive or null effect does not support the hypothesis that the divergence is explained by the type (group vs. individual) or duration of intervention or by selection of music by patient vs. researcher. Estimation of the effect of disease severity is challenging, since only one study carried out severity-based subgroup analysis and only four studies exclusively included patients with defined severity of dementia (advanced stage of AD). In most studies the degree of dementia was not defined and varied from mild to severe. The possibility that the lack of effect of music may be due to natural disease progression warrants further investigation on subgroups of different severities. This issue would be clinically significant for optimal targeting of music-based therapies.

Failure of music in relieving depression in a third of the interventions is surprising, especially the observation that two studies reported worsened depression although patient-preferred music was selected for the intervention. Negative outcome did not correlate with the mode or length of intervention or the type of music, nor is it explained by difference in baseline depression. The possibility remains that depressive mood or clinical depression, which are both multifactorial and prevalent among elderly adults, are independent variables and may be caused by factors not addressed in baseline analyses.

In some studies, the data were provided by caregivers or institutional staff, in others they were collected by research personnel. Thus, the data may be subject to reporter bias due to over- or underestimation. Institutional staff and caregivers likely have a longer experience with the patient assessed and therefore may be more sensitive to observe minute changes in behaviour. Also, differences in care culture and leadership between facilities and exhaustion of personnel may have affected the accuracy of collected data.

RELEVANCE OF CONTROL GROUP

Music intervention was compared with standard care for all outcomes. This has been criticized for lack of specificity in meriting music for positive outcomes. Depending on context, musical intervention may include factors significantly influencing the outcome, such as positive social interactions, exchange of memories and inherent tendency to motor

activation. Therefore, lack of non-musical control intervention may lead to overestimation of music´s potency. On the other hand, increasing use of music in standard care may diminish apparent responses observed in trials. Therefore, in future studies it is necessary to describe the content of standard care in sufficient detail and preferably include both non-musical intervention and standard care as controls.

Some interventions included physical activity accompanied by music. Estimation of the specific effect of music would require a control group performing identical activities without music. Yet, both traditional music therapy, other music-based interventions and even music listening include various forms of motor activity, which cannot be controlled. Therefore, interventions combining music and motor activities were allowed to be included in the present analysis. We also included the study by Moreira et al. (30), in which the content of intervention changed over time, yet music was an essential factor in all interventions. Since processing of music in the brain involves extensive sensory, cognitive, emotional and motor activation and arouses individual associations (41), the question of music per se being therapeutic is highly elusive.

For all outcomes, except for apathy, music intervention was also compared with a large variety of non-musical interventions, including massage, reading, audiobook, simulated presence of relatives, cooking, art, aromatherapy, yoga, and educational, social or physical activities. Use of non-musical control emanates from the assumption that some of music´s effects may be due to other factors inducing positive responses. Generalizing conclusions of the results are difficult to draw, since some of the non-musical activities used are part of standard care in some, but not in all care units. Most studies applying non-musical control fail to present speculation of common effectors, let alone common brain mechanisms, of musical and non-musical stimuli

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STRENGTHS AND LIMITATIONS OF THE PRESENT REVIEW

We believe this is the largest collection of RCTs published so far on the effects of music-based interventions on neuropsychiatric symptoms among persons living with dementia. Notably, the temporal scope of the studies extends over almost 30 years, in which period the standards of research have changed, and therefore old and recent studies may not be fully comparable.

The competence of the persons giving the therapy varied. Some studies involved a trained music therapist, others used personnel instructed by a music therapist and some studies did not specify the competency of person providing the therapy.

Our analysis is semi-quantitative in nature, and comparisons between standard care, music and non-musical interventions are based merely on the number of trials or interventions without regard to the number of subjects in these studies.

Previous meta-analyses have aimed at revealing true positive outcomes, while the reasons for negative outcomes have not been systematically discussed. We have attempted to cover this gap.

CHALLENGES FOR FUTURE RESEARCH

We still have insufficient understanding of how the aetiology of dementia, patient´s age, gender, previous musical activity, cultural background or local resources of the healthcare system might affect the responses.

Most studies included in the present review are based on patients in institutional care, although, in fact, most persons living with dementia reside at home (42). Newly available diagnostic strategies will bring forward the time of diagnosis and increase the proportion of home-dwelling patients. A major goal for music-based rehabilitation is to postpone patient´s transfer to institutional care, which often is triggered by caregiver´s exhaustion. Future studies should focus on defining ways to optimize the caregivers´ compliance with music rehabilitation.

Implementation of music rehabilitation in persons living with dementia inevitably raises the question of added costs. In most studies professional music therapists have carried out the research protocols. Yet, in clinical reality implementation is left to regular staff. More research is needed to understand the personnel´s viewpoints, needs of training, demands for realization and rewards of music-based therapies (43). Newly developed technical devices, such as smartphone apps, online singing groups or virtual reality glasses, may offer novel and feasible opportunities with modest cost. On the other hand, most economical ways to realize effective music rehabilitation may be based on traditional set-ups, such as singing in group or group music reminiscence therapy, both shown to be effective for treatment of BPSD (44,45).

The studies reviewed here assess BPSD varying from mild to severe degree, yet remaining non-psychotic. Actually, many study protocols have excluded psychotic patients. Although psychotic symptoms are relatively common in dementia (4), the effects of psychotropic medication on music therapy´s effectiveness have not been addressed in the current material. Dopamine antagonists, such as risperidone, which is commonly used to manage BPSD, diminished healthy volunteers' reward experiences induced by music listening (46). Systematic study on these issues in clinical material is clearly needed. Interestingly,

incipient evidence is available to suggest that music therapy may be effective in treating dementia-related psychosis (47).

In conclusion, the present review demonstrates solid evidence for the efficacy of music-based interventions in managing neuropsychiatric symptoms in people with dementia. As for clinical implementation, the current data suggest that beneficial effects may be obtained regardless of format, i.e. both in individual and group setting, applying either mere music listening or formats involving active participation. Equally positive effects elicited by music and non-musical intervention in several studies raises the possibility that combination of various pleasant experiences may provide an optimal non-pharmacological treatment battery to manage PBSDs.

Supplementary Material

Supplementary data are available at Psychiatria Fennica online.

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GUIDED ART-MAKING IN A CANCER UNIT: A QUALITATIVE STUDY

ABSTRACT

Cancer survival has been increasing, but a diagnosis is still often met with fear, and the treatments can be exhausting. Mental coping strategies and positive resources are essential for treatment-adherence, functional capacity and quality of life. Art-making is a potentially powerful tool for fostering resilience, but its clinical applications in the context of serious illness are still not well established. In this pilot study, we tested the feasibility of guided art groups in a cancer centre and explored participants' experiences, with promising outcomes.

KEYWORDS: AESTHETIC EXPERIENCE, ART-MAKING, CANCER, GROUP ACTIVITY, HOSPITAL EXPERIENCE, MENTAL COPING, RESILIENCE, PEER SUPPORT

INTRODUCTION

Cancer has become a leading cause of premature death worldwide [1]. In Finland, the most common causes of death are cardiovascular diseases and cancer [2]. Cancer survival, however, has substantially improved in the past 20 years. More than half of the annual 20 million new cancer cases are still alive five years after diagnosis [3].

While cancer patients now have better prognosis and live longer, their mental wellbeing has become an increasingly central issue. Cancer is perceived as a life-threatening and potentially traumatic illness [4]. Cancer patients suffer from significant stress at all stages of the disease and anxiety is increased among them [5]. While some degree of worry and anxiety are normal responses to situations perceived as threatening, the reaction may evolve into a clinical psychiatric disorder [6].

Hospital staff and family caregivers help the patients to cope with cancer. Despite their support, the patients may experience fear and loneliness when facing a life-threatening disease. Fear of cancer progression in patients on active treatment, fear of recurrence in cancer survivors and death anxiety in palliative care can exacerbate anxiety, cause insomnia and lead to depression [6]. Hearing the cancer diagnosis is often a traumatic experience for the patient [7].

Being diagnosed with cancer and undergoing its treatment are associated with substantial distress that can cause long-lasting negative psychological outcomes. The clinical process is loaded with existential distress, worries about health and fears of dependency, loss of autonomy and death [4]. Unresolved fears and anxiety may have negative effects on adherence and consequently, on outcomes. Communication skills of professionals and social support are elementary, but not always enough for reassurance and adaptation [7].

The stress related to hospital visits and treatments can be exacerbated by re-experiencing the traumatic moment of hearing the diagnosis or progression of the disease, adverse effects of the treatments and facing new fears. The hospital visits of cancer patients and their closest ones are often loaded with expectations and emotions. The patients with clinical psychiatric symptoms or decompensation of psychological functioning need general hospital psychiatric services or targeted psychotherapeutic interventions. The symptoms of depression, often overlapping with symptoms of cancer and treatment-related adversities, are the most common reasons for psychiatric consultation among cancer patients [8].

Not all cancer patients have clinical psychiatric symptoms, but the burden of uncertainty, together with existential questions evoked by a life-threatening disease are universal [4,7]. Pain and fatigue often interfere with work, family and leisure activities.

Loss of functional social roles, reconstruction of identity, finding purpose, making meaning and finding a new sense of coherence are some of the key challenges for cancer patients [9,10]. Confronting cancer requires resilience to maintain or restore psychological wellbeing and functioning [4].

Resilience, ability to restore psychological wellbeing, "to bounce back" is described as one's capacity to employ appropriate voluntary coping strategies, learned and conscious [11]. Rewriting one's story of life and making meaning requires creative thinking, and they provide possible pathways towards resilience [4,10] Positive psychological traits, such as optimism, personal mastery and creativity, are associated with better coping and health outcomes [12]. They can be strengthened by transformative aspects of art [13,14].

Art therapies have been applied and studied in cancer care for decades, with possible beneficial effects on depression, anxiety and quality of life [15,16], but there are fewer studies about the effects of art-making [17,18], which is a non-clinical, client-autonomous, resource-oriented, cost-saving approach.

In some studies, the line between art therapy and therapeutic guided art activity may not be as explicit as the definition of art psychotherapy, but there are professional definitions for art therapy as given by a trained, credentialled mental health professional [19,20]. Art therapy is an umbrella term for a continuum of approaches (*Figure 1*) with various paradigms, some of which emphasize the transformative and healing power of creative process ("art as therapy"), while others apply art expression within psychotherapeutic context and some integrate them inseparably [21].

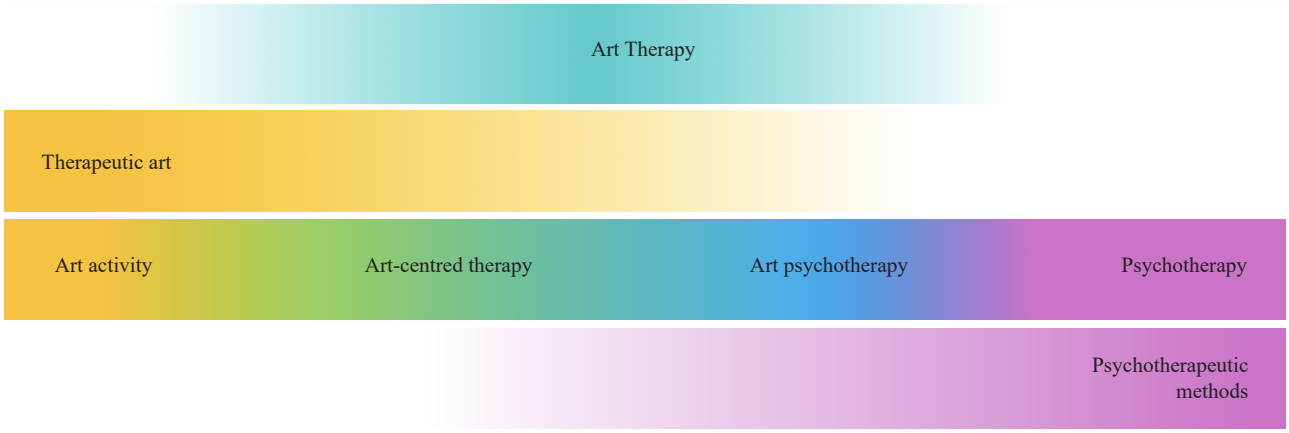
"Open studio" is an example of community-based model that covers overlapping approaches from guided therapeutic art activity to art therapy. In an Open studio setting the role of art is central and the studio provides an enabling space for individual expression within the group. The creative process is facilitated and encouraged by a group leader. Studies on the therapeutic efficacy of the open studio approach reveal that open studios make a positive contribution to the lives of participants [22].

For cancer patients, art activities bring meaningful ways for dealing with existential questions, loss and sorrow. Art-making and viewing art can offer healing aesthetic experiences and empower creative skills that are associated with functional brain connectivity, neuroplasticity, activation of the default mode network and neural mirroring. These, in turn, are elements of wellbeing, learning, self-regulation and adaptability [23].

Art-making in cancer care has been described as creative expression that brings pleasure, new knowledge and skills, and a vehicle for self-expression [18]. Enjoyable activities that are linked to fascination are viewed as involving involuntary attention. These activities are effortless, easy and restorative [17]. Art-making is considered to decrease cancer pain by both distraction and encouragement to express emotions [24].

While the evidence of art-making effectiveness in cancer pain is still quite inconsistent due to heterogeneity of methodology, art seems to provide a low-risk, pleasurable activity for patients with cancer. Art activity can be utilized during waiting times or long chemotherapy infusions by offering opportunities for patients to engage in simple art-making activities. Cancer patients may find the distracting activity and emotional expression to be personally beneficial [25].

Figure 1. The spectrum of art therapies presented as a continuum of approaches with their relation to art-based and psychotherapy-based paradigms.



Review of earlier studies suggested that programme-based art-making may provide participants with opportunities for learning about self, support, enjoyment and distraction. Individual art-making can provide learning about self, diversion and pleasure, self-management of pain, a sense of control and enhanced social relationships [18].

The aim of this study was to investigate an open-access collective art-making session available to cancer centre visitors. We wanted to determine whether our novel approach of guided art-making would support the previous preliminary, but encouraging findings. More practically, we wanted to test the feasibility of simple structured art activity organized as open group activity in a hospital setting, and more deeply, to explore qualitatively the participants' experiences to understand the meaning of art-making for them.

MATERIALS

This qualitative pilot study and developmental project was conducted with the permission of the authorities of Helsinki University Hospital Comprehensive Cancer Center. The wellbeing activity studied here was part of the hospital´s psychosocial and environmental development agenda with non-clinical approach. Ethical approval was not required. Personal identification data of participants were not collected. Feedback was collected anonymously.

Between 18th April and 31st May 2018, we organized eight open-access collective art-making sessions called "Taidehetki" (A Moment for Art) with low-threshold access at the Cancer Center, Helsinki University Hospital. Each week, or twice a week, a two-hour time window was reserved for the art activity. During this time, 30-minute guided art group sessions were held in the hospital entrance hall, where an open public space was available.

The hospital visitors were actively encouraged to participate. From 4 to 6 participants were recruited for each group. Before each art-making session, group leaders recruited participants directly from the entrance hall or cafeteria, and indirectly via leaflets and the hospital's digital information screen. Patient organization volunteers and hospital communication channels shared information about the events.

The groups were primarily designed for hospital patients and their family caregivers, but other visitors and hospital personnel were free to enter the art sessions.

METHODS

Visual arts groups were chosen because visual art practices are cost-effective, suitable for a diverse group of patients, quick to prepare and better suited to the physical setting of a cancer centre compared to dance, writing or music activities. Visual arts also allow more individual regulation of social engagement than activities that fundamentally rely on group interaction.

Art-making sessions were led by two group leaders: a teacher of nursing science and a registered nurse, both with education and experience in interactive art processes, teaching and work counselling. In addition, both were experts by experience, which provided a valuable perspective to their interaction with participants. Their method was developed specifically for collective art-making [26], and they were supervised by an art therapist throughout the project.

The participants' roles as patients or caregivers were set aside during the sessions to encourage focus on creative expression, to foster a collective and safe atmosphere and to protect participants' privacy. This allowed them to temporarily step away from illness-related roles and burdens.

Each session was built around a carefully planned structured task. The group leaders designed six tasks and used a variety of art materials, including watercolours, acrylic paints, coloured pencils and materials for collage. An example of a task is given in *Box 1*.

Box 1. An example of a guided art task.

Materials:
- Participants are given a handful of rubber bands, paper and coloured pencils.

Instructions:
- Drop the rubber bands on the paper in a random manner.
- Draw the outlines of the rubber bands on the paper, then remove the rubber bands
- Fill in the formed areas with with colours, the way you like.

Discussion:
- The participants are asked if they want to show their picture and share their experience of making the picture.

The leaders focused on inspiring the participants, guiding the creative process and encouraging shared appreciation of the artworks. Each group began with a short warm-up exercise serving as a transition into the creative process. The structure of the art-making followed several clearly defined steps, from the initial phase to the completion of each piece. All participants were able to complete their work, even those with limited physical or emotional resources.

After the art-making session, the group leaders facilitated a group discussion and provided encouraging feedback. The conversation centred on the artworks just created and the participants' experiences of the process. Participants were invited to share their thoughts with the group and give feedback to each other. Finally, they were free to choose whether to take their artwork home or leave it at the hospital.

DATA COLLECTION AND ANALYSIS

This was a descriptive, qualitive study with some limited quantitative feedback.

Anonymous and voluntary feedback was collected after each session using an electronic feedback device. Participants were asked to evaluate the impact of art-making activity during their hospital visit using a smiley face scale corresponding to a numeric range from one to five.

They were also asked whether they would participate in an art session again and whether they would recommend the sessions to others. In addition, participants were given the opportunity to write spontaneous comments. As part of the feedback form, they could also indicate their role in the hospital (patient, caregiver, staff member or other).

The spontaneous comments of the participants were qualitatively analysed using thematic analysis [27] with 6 steps: 1. familiarization with the responses, 2. identifying meaningful features and labelling them inductively, 3. searching for themes and clustering the interrelated labels, 4. reviewing the themes, 5. defining the themes deductively and 6. producing the report with citations.

After the project, the group leaders were interviewed about their experiences through open-ended questions. Their responses were collected to inform the further development of the art-making methods.

RESULTS

PARTICIPANT EXPERIENCES

There were 85 participants in the art-making sessions. However, during one session, the electronic feedback device was out of order, reducing the number of participants who provided feedback to 76. These 76 participants were included in the final analysis. The characteristics of the participants are presented in *Table 1*.

Table 1. Characteristics of participants (N = 76).

Participants	n	%
Patients	50	72%
Family caregivers	13	19%
Hospital professionals	4	6%
Other clinic visitors	2	3%

The numerical evaluation of the art-making experience yielded 70 responses (*Table 2*). Altogether, 97% (68/70) of participants gave positive feedback. Furthermore, 77% of them gave very positive feedback regarding the impact of the art-making session on their hospital visit. Nearly all, 99% (69/70), indicated that they would participate in art-making sessions again and would recommend them to others.

Table 2. Participants' experiences of art-making (70 responses).

Question	Response	N (%)
What was the impact of art-making regarding your visit in the Cancer Center	very positive positive neutral or negative	54 (77%) 14 (20%) 2 (3%)
Would you participate again	yes no	69 (99%) 1 (1%)
Would you recommend art-making to others	yes no	69 (99%) 1 (1%)

Spontaneous comments were written by 41 participants. Among these, 38 were clearly positive, while three included negative or critical elements. Positive themes included relaxation, refreshment, joy, fun, inspiration, interest, astonishment, encouragement, consolation through aesthetic experience, positive distraction, a sense of time out, healing, soothing, collectiveness, gratitude, rediscovery of the pleasure of creating art and motivation to continue with art activities.

The most commonly reported experiences included feelings of joy and pleasure (10 comments), refreshment (9 comments) and positive distraction from distressing thoughts (7 comments). The recurring themes in the written feedback were categorized, and illustrative quotes are presented in *Table 3*.

Eight participants specifically expressed gratitude for the art activity and used the terms "*therapy*" or "*therapeutic*" to describe their experience. One participant commented:

"*A very interesting and good idea. Art is a good form of therapy alongside treatment. Thank you so much*".

The three comments with negative or critical aspects expressed disappointment regarding the degree of artistic freedom or availability of materials. These were categorized as negative if they contained any negative element, even if they also included neutral or positive observations.

Some of the comments in the "positive feedback" category included multiple positive aspects. Consequently, a single participant's comment may have been classified under several themes due to overlapping content, as reflected in *Table 3*.

LEADER EXPERIENCES

The group leaders described their motivation for the participating in the project as rooted in their own lived experiences as cancer patients. They expressed a desire to support others facing cancer, as well as gratitude for having survived. They perceived their role as experts by experience as valuable in understanding participants' limited resources and in building a genuine connection.

They described the work as meaningful, rewarding and satisfying, but also intensive and demanding. After the sessions, they needed time to recover and to reflect on the group encounters together.

Table 3. Main categories of spontaneous comments with three examples (quotes) of each.

Spontaneous comments from 41 participants (some of them fell into several categories)		
Joy, pleasure	10	• I was delighted! • Therapeutic, joy-bringing • Lovely, nice
Refreshing	9	• Refreshing • An energizing event • An uplifting moment and a memory to mark the end of my last cytotherapy treatment!
Positive distraction	7	• Refreshing • An energizing event • An uplifting moment and a memory to mark the end of my last cytotherapy treatment!
Inspiring	6	• Absolutely fantastic! I'll try doing this at home too, thank you so much!!! • Thank you for this opportunity. It inspired me to continue a hobby that I nearly ended due to my illness • Cheered me up and gave me lots of new ideas that I can use on my own. Thank you for the healing moment with art..
Soothing	4	• Absolutely fantastic! I'll try doing this at home too, thank you so much!!! • Thank you for this opportunity. It inspired me to continue a hobby that I nearly ended due to my illness • Cheered me up and gave me lots of new ideas that I can use on my own. Thank you for the healing moment with art..
Surprising	4	• A nice surprise • Surprising and interesting • Uplifting and full of surprises
Time out, pause	4	• A lovely pause • A nice moment with other people • A great moment. Made me happy and got me to focus on something completely totally different. I liked it. Thanks
Critical feedback	3	• I wish there was more free painting or writing. This felt more like crafting. • The idea was interesting, but the scenic aspect was forgotten… • Today there were no more materials. I had intended to continue the sketch I started yesterday. I was disappointed.

During participant recruitment, they noted that some patients in the diagnostic phase were not interested in participating, and some undergoing active treatment were too fatigued to join. They found that an active, empathetic and encouraging approach was crucial during the initial contact. Additionally, the initial set-up of the art materials was seen as important in creating an inviting and inspiring atmosphere. The leaders also emphasized the importance of appreciation and positive feedback from participants to each other after the sessions.

They felt that the 30-minute session duration was short, but ultimately sufficient when sessions were carefully structured and facilitated with experience. This time frame was appropriate for participants with limited physical or emotional resources, although the leaders found the pace demanding.

Key outcomes perceived during the sessions included empowerment, a sense of collectiveness, joy of achievement, mental relief, escape from stress and loneliness, safety and emotional support facilitated through art-making.

The leaders expressed gratitude for the warm and trusting feedback received from participants. One cancer patient, who participated in the session with their family, reportedly said: "*This is great - we can be here doing something together*" which demonstrated the meaningfulness of the shared experience.

DISCUSSION

In this qualitative pilot study, we explored experiences of an open-access collective art-making session available to cancer centre visitors and carried out at a hospital entrance hall.

The most important finding was the significant amount of positive feedback from the participants: 97% reported a positive experience, 99% expressed a wish to participate again and 99% said they would recommend the activity to others.

Participants' spontaneous comments revealed main themes consistent with the perceptions of the session leaders regarding the effects of art-making. Joy and pleasure of creativity, a sense of collectiveness and positive distraction were common experiences among participants. These findings suggest that art-making sessions can have a beneficial impact on the hospital experience.

Art-making can activate positive feelings and personal resources such as creativity, providing relief from stress and contributing to resilience building [14,23]. Illness does not preclude positive psychological experiences; on the contrary, such experiences can emerge during post-traumatic growth [7,28]. The healing quality of aesthetic experience became evident in our study, as well as in previous studies, being crystallized in this quote from one of our participants: "*Cancer is such an ugly word, that everything beautiful, beauty, is welcome in this building, in my mind, in everything.*"

Our results are consistent with previous studies. A small Australian study [17] involving eight weekly art-making group-sessions at a community centre, led by professional artists, was found to be a safe, nurturing, enjoyable and creative experience. It provided participants with opportunities for new perspectives, social interaction and the development of new art-based skills. While most activities received positive feedback, not all did. The reported themes, expansive, belonging, nurturing, purposeful and stimulating [17], closely resemble those that emerged in our study.

In a randomized controlled pilot study [29] conducted in a in a haematology cancer ward, the effects of bedside art were evaluated. During the "Art at the Bedside programme", mean anxiety scores were significantly lower among patients who participated in guided art observation, whereas independent art viewing did not yield significant reductions in anxiety. Patient feedback revealed that 88% of the guided observation group would participate again, compared to 68% in the independent group.

Another non-randomized bedside intervention study [30], also conducted in a haematology unit, focused on mood and pain outcomes. Patients and their families participated in guided art-making using various media such as watercolours, oil pastels, coloured pencils and clay. An artist-educator provided instruction at the patient's bedside for approximately 30 minutes. This intervention significantly improved mood and reduced pain, and 85% of the participants expressed interest in future art-based activities. As in these bedside studies [29,30], the sessions in our pilot study were structured and guided.

An open art intervention study [31] examined experiences of cancer patients undergoing blood and marrow transplantation at an outpatient clinic. Participants painted ceramic tiles during treatment and were interviewed afterward. The most frequently mentioned themes were meaningful activity (32%), expression (19%) and passing time (13%). These results suggest that patients valued art-making as a positive distraction, a form of emotional expression and a meaningful activity, similar findings to those in our study.

This pilot study introduced a novel concept for our hospital: spontaneous, collective, open-access art-making sessions conducted in a hospital entrance hall, without advance registration. Participation was voluntary, and the activity was accessible even to the most physically fragile individuals. Despite the busy environment participants had the opportunity to share their experiences afterward. The appreciative feedback

of artworks among participants and session leaders fostered anonymous, egalitarian social interaction among patients, family caregivers and healthcare professionals.

Leader interviews highlighted several considerations for future projects. The leaders emphasized their intentional planning of session themes to encourage joy, empowerment and positivity. They also valued opportunities for participants to share experiences and receive positive feedback.

A key strength of this study was the innovative concept of providing open art-making in a public hospital space, making it visible and accessible to all. Another strength was the low cost and minimal resource requirement, making the activity feasible in various hospital settings.

The limitations of the study include the absence of a control group, lack of structured interviews and a small sample size due to the limited time frame of the sessions. Additionally, we cannot rule out the influence of the group leaders' personal characteristics on the feedback, which may affect the generalizability of the findings.

Our study was non-clinical as it did not include measurements of anxiety or other clinical symptoms.

Thematic analysis is a useful and flexible method for qualitative research, but it has been criticized for being less sophisticated than discourse analysis [27]. Searching for the themes is based on the researcher's subjective judgements and interpretations of the data, requiring the researcher to find meaningful connections between the emerging labels [27]. Defining and naming the themes is a deductive process, where the researcher integrates earlier research data and theories with the current data [27]. Consequently, the findings are presented through contextual understanding of the research group.

In thematic analysis, the importance of the group and group leaders were not classified here as independent themes (Table 3), although they emerged in some of the participants' written responses, like these: "*A nice moment with other people*", and "*An accepting shared activity*". Instead of written responses, the participants rather expressed their warm feedback and gratitude orally directly to leaders, which was unfortunately not systematically analysed in this study, leaving the valuable meaning of the leaders unreported. It is obvious, however, that making art together within a safe and encouraging atmosphere created by the group leaders was an essential element for the positive participant experience.

CONCLUSION

Our results provide a strong positive indication that guided, open-access art-making in a hospital environment is feasible and may enhance social involvement and active coping within a hospital setting. The stress associated with hospital visits may be alleviated and the hospital experience enriched with positive emotional tones. Art-making appears to offer at least a temporary distraction from the burden of a life-threatening illness. These qualitative pilot findings warrant further investigation in a larger-scale study.

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In the loving and inspiring memory of Hannele Niiniö.

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THE USABILITY OF ADD-ON TRANSCRANIAL DIRECT CURRENT STIMULATION IN MAINTENANCE NEUROMODULATION TREATMENTS – A CASE SERIES

ABSTRACT

***Background**: Electroconvulsive therapy (ECT) and repetitive transcranial magnetic stimulation (rTMS) are commonly used to treat treatment-resistant depression (TRD). Due to the large risk for relapses after acute treatment, maintenance ECT and rTMS are often needed. Their numbers are increasing, consuming the resources and possibly leading to increased waiting times for acute treatment. Therefore, it is important to study possible interventions to decrease the need for maintenance ECT and rTMS in depression. Add-on transcranial direct current stimulation (tDCS) is one option for this, but there are no previous studies on combining tDCS to maintenance ECT or rTMS treatment. **Objectives:** In this clinical case series, we describe a clinical development project aimed to investigate the usability and effects of add-on tDCS for depression patients receiving or fulfilling the indication for maintenance ECT or rTMS. **Methods:** Patients (n=12) with unipolar depression, without current acute suicidality or psychosis being treated with or fulfilling the indication for maintenance ECT or rTMS, were offered the possibility of tDCS in addition to or instead of the ongoing maintenance treatment. tDCS started with a 6 week (w) acute treatment, with control visits/phone calls at 1w, 3w and 6w from the start. The patients took 5-7 tDCS treatments per week at home. At 6w, tDCS was stopped or continued, with control visits/phone calls every 6w. We collected data from the medical records from baseline, 3w, 6w and 6-month check-ups. We analysed patients' adherence (whether they used tDCS), subjective view of the treatment, adverse effects, and if adding tDCS improved the clinical status, reduced the severity of symptoms and affected the frequency of rTMS or ECT maintenance treatment sessions. Due to small sample, no tests on statistical significance were done. **Results:** During the 6w acute tDCS treatment, mean BDI and GAD-7 scores decreased, and the majority of the patients benefitted from the treatment. There were minor side effects. During the 6-month follow-up, the number of both ECT and rTMS maintenance treatments decreased compared to the 6-month period before the intervention (ECT –1.8 sessions and rTMS –8 sessions). **Conclusions:** tDCS may be a potential treatment for decreasing the need for maintenance ECT or rTMS for TRD patients. More studies of longer duration, larger study population and with placebo control are needed to verify this. Furthermore, the cost-effectiveness of add-on tDCS needs to be studied.*

KEYWORDS: ECT, RTMS, TDCS, NEUROMODULATION, ADD-ON, ADJUNCTIVE TREATMENT, DEPRESSION, TREATMENT-RESISTANT DEPRESSION, TRD, TREATMENT, MAINTENANCE, RELAPSE

INTRODUCTION

Major depressive disorder, MDD, is the leading cause of disability and burden of disease in developed countries, with about 280 million people in the world suffering from depressive disorders (1). In Finland, the prevalence of depression (including MDD and dysthymia) is 5-7% (2). Pharmacological and psychosocial treatments are the first-line treatments for depression, but they have limited effectiveness, with even two-thirds of patients not experiencing sufficient benefit from antidepressant (AD) medication (3,4) The definition of treatment-resistant depression (TRD) varies but is most often described as failing two adequate antidepressant medication treatment courses (5). Numerous other ways to define TRD

have been suggested, such as the Maudsley staging method, where the treatment-resistance is staged based on three factors: the severity of the illness, the duration of the episode and the treatment(s) use. According to the Maudsley staging method, only one antidepressant medication trial can be sufficient to reach TRD (6). It has been estimated that over 100 million people worldwide and 6-55% of depression patients meet at least one definition for TRD (7). According to a Finnish cohort study conducted in 2004-2016, about 11% of patients with depression have TRD (8).

TRD leads to increased use of services, costs and suffering. Compared to non-treatment-resistant depression (non-TRD) the healthcare costs of TRD patients are nearly double (9), with outpatient service use 1.5-fold, inpatient service use 3-fold and loss of working days 2-fold (10). Furthermore, self-harming behaviour is over four times more common and mortality 17% to 23% higher (10,11). Clinical treatment-practice of depression in Finland is not adequate, as changes to treatment protocols are made slowly in clinical practice, with approximately eight months of treatment to reach the third treatment trial, thus, meeting the criteria for TRD. In addition, AD monotherapy is still the most common treatment even at the fifth line of treatment (8).

The strongest evidence for treating TRD is for ketamine, esketamine, adjunctive psychotherapy, electroconvulsive therapy (ECT) and repetitive transcranial magnetic stimulation (rTMS) (7). ECT requires anaesthesia and has possible side effects, such as transient memory deficits, headache and myalgia. rTMS does not require anaesthesia, has fewer side effects compared to ECT, but needs to be administered daily for three to six weeks in the clinic. In clinical use, a relatively recent neuromodulation method is transcranial direct current stimulation (tDCS), which is easy to use even at home with a portable device and is currently under active research. These treatments and their implementation in practice are described in *Table 1* (References (12–17)).

Table 1. Indication, mode of action, practical implementation, side effects, maintenance protocols and the evidence base of neuromodulation treatments in the treatment of depression.

	ECT	rTMS	tDCS
Indication	Severe MDE Psychotic depression In some cases, can be used also to moderate severity TRD with several treatment failures	TRD	Mild to moderate depression
Mode of action	Generalized epileptic seizure caused by electric current	Activation of cortical neurons caused by a changing magnetic field, which causes long-term potentiation of neurons and changes in deeper brain areas	Moderation of the neuronal threshold for action potential, 0.5-2mA direct current via scalp electrodes, anode excitatory and cathode inhibitory
Practical implementation	Treatment with anaesthesia and muscle-relaxation. Follow-up in recovery room. Usually requires post-ECT monitoring by an adult until next morning.	Treatment given awake. No need for any special monitoring. Can be given navigated (based on head MRI) or non-navigated.	Treatment given awake. No need for any special monitoring. Can be taken at home with a hand-held device.
Duration of one treatment session	60-90min including preparations and recovery time	10-60min[a]	30min
Frequency of treatment sessions	2-3x/week	5x/week[b]	5-7/week
Duration of acute treatment series	6-15x / 2-8 weeks	15-30x / 3-6 weeks	3-6(10) weeks
Side-effects	Muscle pains, headache, nausea, fatigue, antero- and retrograde memory problems	Headache, movement in the facial area, seizures, fatigue	Headache, skin irritation, fatigue

→

	ECT	rTMS	tDCS
Maintenance treatment protocols	Various protocols, usually tapering schedule starting after the acute series, starting from 1 treatment/week to one treatment every 4-8 weeks	Various protocols 1. Tapering schedule starting after the acute series, usually from 1-3 treatments/week to 1 treatment /month 2. Tapering schedule starting after the acute series, usually from 1-3 treatments/week to 1 treatment /month	Few studies, no established procedures
Evidence-base, based on the Finnish Current Care Guideline of Depression	A (strong evidence) in severe and/or psychotic depression C (weak evidence) for moderate severity, treatment-resistant depression	A in TRD	B (moderate evidence) for acute episode of depression. Based on Council for Choices in Health Care in Finland, no evidence in the treatment of TRD.
Price of a treatment session[c]	610e	487e	975e[d]
Price of an average acute treatment series[c]	7320e (12 treatment sessions/4 weeks)	10227e (one appointment for preparations and 20 treatment sessions/4 weeks)	3900e (30 treatment sessions/6 weeks)[e]

[a] Duration depends on the treatment protocol and the parameters used. Usually 3-38min per treatment for unilateral and 20-60min for bilateral treatments.
[b] In traditional treatment protocols. Experimental protocols with accelerated protocols (2-20x daily for 1-5 days)
[c] Prices and average durations from Oulu University Hospital neuromodulation unit
[d] Price of one appointment in the clinic or phone call check-up. Acute treatment protocol consists of four appointments or phone call check-ups during the six-week treatment period, three by a nurse and one by a doctor. Patients take the treatment at home. The price includes the costs of the tDCS device and the tDCS medical supplies.
[e] Price calculated for four appointments or phone call check-ups during the six-week treatment period. Patients take the treatment at home.

References: Isometsä et al. 2025, Lam et al. 2024, Lefaucheur et al. 2020, Wilson et al. 2022, Woodham et al. 2024, Aparicio 2019
Abbreviations: ECT = electroconvulsive therapy; MDE = major depressive episode; MRI = magnetic resonance imaging; rTMS = repetitive transcranial magnetic stimulation; tDCS = transcranial direct current stimulation; TRD = treatment resistant depression

ECT efficacy has been well shown. For example, ECT is even 4 times more effective than antidepressant drugs (18). Response is usually defined as a 50% decrease in depression rating scores (19). Response rates for ECT in patients with TRD are approximately 50-75% (19) and in psychotic depression, even higher (20). In comparison, the response to medication switch after two or more failed pharmacological trials is between 10% and 20% (4). Response rates in the treatment of depression with rTMS vary between 30-60% (13,14). For TRD, the response rate has been shown to be about 46-54% in retrospective observational studies (21,22). Newer accelerated protocols with more than one treatment per day have shown higher efficacy, with a 69% response rate at four weeks post-intervention for TRD patients, with the TRD diagnosis based on the Maudsley staging method, but more studies are needed to verify the results (23).

tDCS has been shown to be effective in the treatment of mild to moderate depression, but studies are heterogeneous and inconsistent and do not support its use in TRD (13,24,25). In a recent pooled analysis of two RCT studies of tDCS for MDD, tDCS was found to be effective in decreasing depression symptoms scores more than sham, but there was no statistically significant difference to sham in response rates (27). The other study included patients with zero to over two failed antidepressant courses and in the other, TRD was considered a contraindication (27). In earlier studies the treatment protocols included fewer sessions, such as 15 treatments during three weeks, which may have affected the results (24), and it may be that six weeks of treatment are needed, and the effects may increase up to ten weeks of treatment (28). According to recent treatment guidelines for TRD by the Council for Choices in Health Care in Finland, COHERE (Palveluvalikoimaneuvosto, Palko), tDCS is not included in the range of public health

services for treating TRD in adults, due to lack of evidence supporting its efficacy for this patient group (29). The advantages of tDCS include ease of use, minor side effects, suitability for home-based treatment and lower costs (30). However, more studies on tDCS are needed to determine the optimal treatment duration and appropriate patient selection.

The indications for different neuromodulation treatments vary somewhat (*Table 1*), but usually ECT is used to treat patients with the most severe and treatment-resistant forms of depression, such as those experiencing severe depressive episodes unresponsive to antidepressant medication and augmentation strategies. In addition, it is used to treat acute depression patients with suicidality, psychotic symptoms or catatonia —even as a first-line treatment— due to its efficacy and rapid onset of action in this usually hospitalized patient group (12,13). For rTMS, the indication is usually TRD, as it is in the recent Finnish recommendation from COHERE (29). In the Canadian treatment guidelines for depression, rTMS is recommended after two different antidepressants or if the augmentation of the first antidepressant has not been effective (13). Based on current knowledge, tDCS can be used for treating mild to moderate, non-TRD (13). Before the guidelines from COHERE, tDCS had been used for treating patients with TRD in some units in Finland, due to its ease of use and as an alternative for the other neuromodulation treatments, and also during the waiting period for other treatments.

Patients with MDD have high relapse rates. Both ECT- and rTMS-treated patients have a similar relapse risk of approximately 50% within the first year following a successful treatment series (31,32). Continuation ECT treatment is aimed at preventing the recurrence of symptoms of the same episode and is usually defined as six months additional therapy after the acute phase. Maintenance ECT treatment is used to prevent the onset of a new depressive episode and defined as treatment beyond continuation treatment (33). In clinical practice, the term maintenance treatment is often used to describe both continuation and maintenance phases. For depression patients who respond well to ECT, maintenance therapy combining ECT and pharmacotherapy has been shown to prevent relapse and hospitalization rates more than pharmacotherapy alone (34). Maintenance rTMS has demonstrated potential efficacy in reducing relapse risk, but the results are mixed, possibly due to varying criteria, protocols and parameters used (15,35,36). For rTMS, continuation and maintenance treatments have not been defined. More studies are needed on the optimal way to perform maintenance ECT and rTMS, including treatment protocols and patient-selection (15,35–38). Nevertheless, these treatments are frequently used in clinical practice (39,40), due to the limited availability of other effective options and the established safety profiles of maintenance ECT and rTMS (36,41).

tDCS has been studied very little in the context of maintenance protocols, highlighting the need for further research in this area. One study on continuation tDCS for 24 weeks included patients from two earlier RCT tDCS studies(17). One compared tDCS (n=94), escitalopram (n=91) and placebo (n=60) in the treatment of MDD, and the response rates were 40%, 47% and 23%, respectively (42). The other compared tDCS (n=30) to placebo (n=29), and the response rates were 67.6% and 30.4%, respectively (43). In a following crossover study (n=48) of these two RCTs (42,43), 15 tDCS sessions over three weeks was offered to all non-responders who had not received active tDCS previously. Continuation tDCS was offered to all patients who had responded to tDCS either during the original RCTs or the open-label phase, and 24 patients continued to the continuation phase (16 patients with unipolar and 8 with bipolar depression). tDCS was continued with 2 weekly sessions over 24 weeks, and 18 patients completed the follow-up, and the relapse rate was 22% at 12 weeks and 26.5% at 24 weeks (17). This relapse rate is less than the 48.9% relapse rate at 6-month follow-up in an earlier study (n=24) with continuation tDCS administered weekly for three months and every two weeks for three months (44), and less than the 53% relapse rate in a different trial (n=42) with continuation tDCS administered every two weeks for three months and monthly for three months (45).

The problem is that many patients require very long-term maintenance treatment with ECT or rTMS, due to the sometimes chronic nature of depression. Often, when the maintenance treatment interval is extended or the treatment is stopped, the patients relapse. Therefore, many patients require maintenance neuromodulation treatments for extended periods—sometimes even years—and the treatment interval may need to remain short, requiring substantial resources. If maintenance treatments continue for years, and more treatments are initiated than finished, the treatment numbers in neuromodulation units increase, potentially limiting access to acute care. This has happened at the neuromodulation unit at Oulu University Hospital, with increasing numbers of maintenance treatments, patients receiving maintenance treatment and number of maintenance treatments per patient, while the number of acute treatments has plateaued, for both ECT and rTMS (46,47). Furthermore, maintenance treatments may have only a partial effect in preventing relapse (36,41), and ways to improve their effectiveness are needed.

Therefore, it is important to study other treatments that can be used to maintain remission and prevent relapse after acute ECT and rTMS. Some retrospective and controlled studies

have been published on using add-on treatments or changing the treatment for maintaining the response after acute ECT. In most of these studies, maintenance ECT plus medication has been shown more effective than maintenance ECT alone (48,49). Switching from maintenance ECT to maintenance rTMS has been shown promising in two small retrospective case series (50,51). There is a small case series (n=4) of maintenance tDCS after response to acute ECT or rTMS, with 75% of patients maintaining the response or improving during the 30-120-week follow-up (52). This is quite high, compared to the usual 50% relapse risk after acute ECT or rTMS, if no maintenance treatment was used (31,32). More detailed information about studies on any add-on or switching treatments after acute ECT or rTMS can be seen in *Table 2* (48–58). To our knowledge there are no large controlled studies with a long follow-up on add-on treatments or changing the treatment for maintaining the response after acute rTMS, nor any studies on how to decrease the need for and frequency of maintenance rTMS and ECT.

Table 2. Studies on add-on treatments or switching treatments after acute electroconvulsive (ECT) or repetitive transcranial magnetic stimulation (rTMS) treatment or during maintenance ECT to maintain the treatment response or to decrease the need for maintenance treatments.

Reference	Study design and sample	Description of intervention to prevent relapse or decrease the need of maintenance ECT or rTMS	Maintenance neuromodulation treatment protocol	Results
M-rTMS after ECT				
Cristancho et al. 2013	Case series, n=6 Mean age 64 years 5/6 female 5/5 recurrent depression, 1/6 bipolar depression 4/6 comorbid GAD Follow-up 7-23 months	M-ECT replaced by M-rTMS, due to side effects or patient preference. Patients in full remission (1) or with a clinical response to ECT (5)	M-rTMS started at ratio 1:2 relative to frequency of previous ECT. –for 5 patients there was a transition period of 2-3 months, during which there were 1 ECT session and two rTMS sessions per month) -One patients switched directly from 1 ECT per month to 2 rTMS sessions per month At the end, mean frequency of rTMS was one treatment per 3.5 weeks (range 1-8 weeks)	At 3 and 6 months of M-rTMS treatment, all patients maintained or improved their clinical status At last observation time point, 4/6 maintained or improved clinical status reached with ECT 2/6 relapsed, both reached remission with acute rTMS
Noda et al. 2013	Case series, n=6 4/6 female 4/6 unipolar depression 2/6 bipolar depression all TRD and recurrent With a response to acute ECT and 5/6 had continued to C-ECT Follow-up 6-13 months	C-ECT replaced by M-rTMS or M-rTMS started after acute ECT due to side effects or poor tolerability	M-rTMS at the frequency of 1-2 treatments per week depending on symptom severity and patients' compliance	5/6 patients maintained response status at the time of the last observation rTMS well-tolerated
M-tDCS after acute ECT or rTMS				
Le et al. 2022	Case series, n=1 post-response to acute ECT, Female, age 20 years, illness duration >24 months, unipolar depression n=3 post-response to acute rTMS Female, ages 20, 21 and 59 years, illness duration 12- >24 months, unipolar depression	M-tDCS combined to ongoing treatment with pharmaceuticals and / or psychological therapy after acute treatment with ECT or rTMS	M-tDCS usually 7 times per week, post-ECT 4 times per week. Weekly evaluation. If there was clinical improvement at week 4, the treatment frequency was gradually tapered or treatment discontinued if no benefit by week 6	Mean number of tDCS sessions 305, and mean number of weeks of treatment 75 1 patient post-ECT entered remission during M-tDCS 2 patients post-rTMS stayed in remission during M-tDCS 1 patient post-rTMS discontinued M-tDCS because of relapse at 38 weeks

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Reference	Study design and sample	Description of intervention to prevent relapse or decrease the need of maintenance ECT or rTMS	Maintenance neuromodulation treatment protocol	Results
Medication vs placebo after acute ECT				
Sackeim 2001	RCT, patients (n=84) who remitted after acute ECT Follow-up 6 months	Patients randomized to three groups: -placebo (n=29) -Nortriptyline (n=27, target level 75-125ng/mL) -Combination of nortriptyline and lithium (n=28, target level of nortriptyline 75-125ng/mL, target-level of lithium 0.5-0.9mEg/L)	No ECT	Relapse rate nortriptyline-lithium / nortriptyline / placebo: 39% / 60% / 84% 13/14 of the relapsed patients in the lithium group relapsed within 5 weeks Medication-resistant patients, female patients and those with more severe depressive symptoms had more rapid relapse
Prudic 2013	RCT Phase 1: RCT (n=319), with unipolar or bipolar MDD and a pretreatment HAM-D (24) score or ≥21. Randomized to moderate dose BL ECT vs. High-dose RUL ECT AND to concurrent treatment with placebo, nortriptyline (100-120ng/mL) or venlafaxine (225mg dose). 181 patients met remission criteria post-ECT (60% reduction in HAM-D scores and maximum 10p at 2 days post-ECT and reassessment 4-8d after ECT. The remission rate was higher with RUL than with BL ECT. 122 patients continued to the Phase 2: -mean age 48.9 years -female 64.75% Follow-up until relapse or 6 months	Phase 2: patients (n=122) earlier randomized to nortriptyline or venlafaxine continued the treatment, whereas patients randomized to placebo were randomized to nortriptyline or venlafaxine and lithium was added for all patients. Target doses / blood levels: -nortriptyline blood level 100-120ng/ML, -venlafaxine targeted at 300mg dose -lithium blood level 0.5-0.7mEq/L	No C-ECT	No indication that the beginning of AD medication at the start of the ECT affected relapse rate relative to starting placebo No difference in starting nortriptyline-lithium vs. Venlafaxine-lithium 50% of patients relapsed within 6-month follow-up Older age was associated with a lower relapse risk
Medication + M-/C-ECT vs only C-/M-ECT after acute ECT				
Vothknecht 2003	Prospective, controlled study Patients (n=24) who responded to acute ECT MDD n 16 Bipolar depression n=2 Schizoaffective n=2 Depressive NOS n=1 Mean age 57 Follow-up M-ECT 1.5 years and M-pharm 1 year	Maintenance treatment modality after the acute ECT was chosen by the clinician and the patient Arguments for continuing ECT were incomplete remission, early signs of relapse and a preference of the patient for M-ECT -M-ECT (n=11) -M-Pharm (n=13, ADs, mood-stabilizers, APs, BZDs) Neuropsychological testing 1 week before and 6 weeks after acute ECT and at 6-month intervals during M-ECT	M-ECT one per week, tapered every 3 treatments when stable to ≤1 per month -Mean 1 treatment per every 2.2 weeks (0.9.4.4) -Average duration 65 weeks	Relapse rate for M-ECT vs. M-pharm was 9.1% vs 30.8% Cognitive functioning remained stable during maintenance ECT and there were no differences between the groups

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Reference	Study design and sample	Description of intervention to prevent relapse or decrease the need of maintenance ECT or rTMS	Maintenance neuromodulation treatment protocol	Results
Kellner et al. 2006	RCT Patients (n=201) who remitted after acute ECT (given 3 treatment sessions/week bilaterally until remission) Mean age 57y Follow-up 6 months	Patients randomized to two groups and followed for 6 months: -C-ECT (n=98) -C-Pharm (Lithium + nortriptyline, n=103), flexible dosing, targeting levels of 125ng/mL of nortriptyline and 0.7mEq/L of lithium	C-ECT 10x -1 treatment sessions per week for 4 weeks -1 treatment sessions per 2 weeks for 8 weeks -1 treatment monthly for 2 months	No significant difference between C-ECT and C-Pharm in relapse or remission Relapse in C-ECT/C-Pharm 37.1/ 31.6% Mean time to relapse 9.1/6.7w Remission 46.1/46.3% Dropouts 16.8/22.1%
Nordenskjold 2013	RCT (n=56), patients with unipolar or bipolar depression and a response to acute ECT, follow-up 1y	-C-ECT/pharm (n=28, two switched to pharm alone) -Pharm (n=28) Pharmachotherapy was individualized, with venlafaxine the first choice and lithium augmentantion offered to all patients AD 98% lithium 56% (mean concentration 0.56mmol/L in Pharm and 0.60mmol/L in C-ECT/pharm, antipsychotics 30%	29 ECT treatments; weekly for 6w, then every second week	Relapse rate for C-ECT/pharm vs pharm 32% vs 61% Cox proportional hazard ratio 2.32 (1.3-5.22) Cognitive functioning and memory measures stable for patients without relapse in both groups One suspected suicide and 3 suicide attempts in the pharm group
Kellner 2016	RCT, phase 2 of a two-phase multiside study. Phase 1, patients ≥60 years old with MDD received acute ECT + venlafaxine (n=240) Phase 2: remitted patients (n=120) Follow-up 6 months	-C-ECT/pharm (n=61) -Pharm (n=59) Both groups started lithium with a target blood level of 0.4-0.6mEq/L	C-ECT with an initial fixed and tapered schedule with four treatments in 1 month, and then on weeks 5-24 an algorithm was used, where 0-2 ECT treatments per week were given depending on HAM-D scores. 34.4% of patients received at least one ECT during weeks 5-24.	Mean HAM-D score for C-ECT/pharm vs Pharm was 5.5 vs 9.4, and C-ECT/pharm group had a sharper decline in HAM-D scores Relapse rate for C-ECT/pharm vs Pharm was 13.1 vs 20.3%, with the odds of relapsing 1.7x higher in the pharm group
Psychotherapy after acute ECT				
Brakemeier 2013	RCT (n=90), inpatients with MDD received acute ECT. 70% responded, 47% remitted.	Responders (n=63, of which 60 underwent randomization) continued AD medication (MED) and were randomized to add-on cognitive behavioural therapy (CBT) or C-ECT or no add-on (MED). After 6mo of continuation treatment, follow-up of 6mo.	C-ECT	CBT / ECT / MED sustained response at 6mo: 77% / 40% / 44% at 1y: 65% / 28% / 33%
Carstens 2021	Non-controlled pilot trial after inpatient ECT, n=14 8 ECT responders and 6 ECT non-responders	15 weekly sessions of group CBT with cognitive behavioural analysis system of psychotherapy (CBASP) elements offered to all patients regardless of response status to ECT. Patients continued other treatments, such as pharmacological treatments, psychotherapy, C-ECT	Medication intake, number of C-ECT sessions and individual psychotherapy were documented	Post-ECT symptom reduction sustained 6mo after the end of the group, regardless of the response status after ECT Aspects of quality of life and emotion regulation improved during group CBT and were maintained 6 mo after the end of the group

Abbreviations: ECT = electroconvulsive therapy; MDE = major depressive episode; GAD = generalized anxiety disorder; rTMS = repetitive transcranial magnetic stimulation; TRD = treatment resistant depression; BL = bilateral ECT; RUL = right unilateral ECT; M-ECT = maintenance ECT; C-ECT = continuation ECT; M-rTMS= maintenance rTMS; RCT = randomized controlled trial; MPharm = maintenance pharmacotherapy; AD = antidepressant; BZD = benzodiazepine; AP = antipsychotic; HAM-D = Hamilton Depression Rating Scale

Compared to tDCS, ECT and rTMS require more resources from the healthcare system and involve frequent hospital visits causing the need for travel for the patient. In addition, ECT may have more adverse effects for the patients and requires monitoring after the treatment. For these reasons, it is necessary to research and develop ways to decrease or replace maintenance ECT and rTMS. Despite its lack of efficacy in the acute treatment of TRD, tDCS could be one solution for decreasing the need for maintenance ECT and rTMS, as these are patients whose depressive symptoms are not as severe as they were in the beginning of the acute ECT or rTMS. Replacing or decreasing the need for maintenance ECT and rTMS with tDCS could increase the accessibility of ECT and rTMS to other patients. To our knowledge, no previous studies have examined the usability or efficacy of add-on tDCS in combination with maintenance ECT or rTMS for preventing the worsening of depressive symptoms or reducing the frequency of maintenance ECT or rTMS sessions.

AIMS

This register-based clinical case series describes a clinical development project of add-on tDCS treatment to MDD patients with ongoing or in need of ECT or rTMS maintenance treatment. For a small group, tDCS was started without previous ECT or rTMS maintenance treatment, directly after acute treatment. The aim was to investigate the usability of add-on tDCS for either improving patients' clinical wellbeing or enabling the increase in ECT or rTMS maintenance treatment interval or switching to only tDCS. The aim was to evaluate whether patients can adhere to the tDCS treatment as planned, identify any potential adverse effects and gather patients' subjective views on the treatment. We also aimed to analyse if adding tDCS improves the clinical status, reduces the severity of symptoms and affects the frequency of rTMS or ECT maintenance treatment sessions. Most of the patients in the neuromodulation unit are TRD patients.

METHODS

SAMPLE AND SETTING

The study sample consisted of patients (n=12) being treated with or fulfilling the indication for maintenance ECT or rTMS at the psychiatric neuromodulation unit at Oulu University Hospital. The unit provides ECT, rTMS, tDCS and ketamine infusions. The majority of the patients of the Oulu University Neuromodulation unit (Nemo unit) have a medication-resistant disorder, e.g. TRD where the person has used at least 2 different antidepressants with adequate dose and duration, without effectiveness. The diagnoses of the patients are based on the diagnosis made by the physicians (psychiatric or psychiatric trainee) at the appointment before starting the ECT or rTMS, and the diagnoses are not changed during the treatment. For ECT, the catchment area of the unit is Northern Ostrobothnia, with a population of 417,000 in 2022, and Kainuu, with a population of 70,521(59). For rTMS, the catchment area of the neuromodulation unit includes the wellbeing services counties of Lapland and Central Ostrobothnia in addition to Northern Ostrobothnia and Kainuu, with a total population of about 731,000 in 2022 (59). rTMS service was started in Lapland at the beginning of 2025. While tDCS is not included in the service offering for TRD patients, the unit has some devices available for home treatment.

This case series is based on a clinical development project aimed at improving the operations of the neuromodulation unit. It was implemented in daily clinical practice, with data collection being part of the routine clinical evaluation, which is why ethical approval was not required. The clinical development project started by pilot cases in 2019 and 2020, was launched comprehensively in 2021 and is still ongoing. The research permit from Northern Ostrobothnia Hospital District (145/2022) was granted on August 17, 2022, and its amendment was granted on September 15th, 2025. The design of the study is a retrospective case series. In this paper, we describe the results of the 6-month period after adding tDCS to maintenance ECT or rTMS.

TREATMENT PRACTICES IN THE OULU UNIVERSITY NEUROMODULATION UNIT

In the Oulu University Neuromodulation unit (Nemo unit), both acute and maintenance ECT and rTMS treatments are administered. Until May 2024, ECT was delivered with Somatics Thymatron® System IV device using 2x dose stimulus program, with a maximum of 1008mC energy. Pulse width and frequency are automatically adjusted to obtain the longest duration possible for any given per cent energy dial setting. Half-age method is used to calculate the initial dose (½x the approximated patient's age in per cent energy dial setting) and adjusted throughout the course depending on the seizure duration and quality. From May 2024 onwards, ECT has been delivered with Sigmastim Σigma device using Near Ultra Brief (NUB) and Brief Pulse (BP) programs. NUB with a 0.5ms pulse width is used with frontoparietal and BP with a 1.0ms

pulse width with bitemporal electrode placement. The initial stimulus frequency and duration are chosen based on the device manual's age- and sex-based table and then adjusted. The used electrode placement is usually frontoparietal (FP), to reduce side effects. FP is given only to right side. FP is the first option for depressed patients, and bilateral electrode placement (BL) for patients suffering from psychosis needing higher effectiveness. If there is no sufficient response from FP ECT during the first 6-8 treatment sessions, the electrode placement can be changed to BL based on evaluation done by the physician responsible for administering ECT. No specific measure for response has been used, but the non-response is defined as no improvement of symptoms during the course of ECT. This is the normal ECT treatment protocol in the Nemo unit, that the sample of this case series also followed.

rTMS is given with two Nexstim ® neuronavigated rTMS. In 2016-2019, depression treatment was given at the left dorsolateral prefrontal cortex (DLPFC) with a 10Hz 3000 pulse protocol. From 2019 onwards, the rTMS protocol in our unit has been intermittent theta burst stimulation (iTBS) 600 pulse protocol. If the patient had comorbid anxiety or obsessive-compulsive disorder, a 1Hz 1800 pulse protocol at the right DLPFC can be given instead of iTBS.

In our unit, maintenance treatment is started when a patient previously responsive to acute ECT or rTMS relapses within a year from the acute treatment, and additionally when re-treatment as an acute treatment series is also effective. In selected cases, if the patient relapses quickly after the acute treatment and his/her symptoms haven't reached the level prior to the initial acute treatment, maintenance treatment can be started directly without a new acute treatment, to enable faster access to treatment and to avoid worsening of the symptoms. In maintenance ECT, until the year 2023, the maintenance ECT protocol included weekly treatments for 4 weeks and then gradually increasing the treatment interval to 4-6 weeks. In 2023, the protocol was changed to one weekly treatment, two treatments with a two-week interval and then gradually the interval is increased to 4-6 weeks. For some patients the interval cannot be increased without a decline in psychiatric wellbeing and thus, it is possible to offer maintenance treatments more frequently if needed. In our unit, maintenance treatment is intended to end when low frequency (4-6 weeks) is obtained and remission has lasted for a year. Maintenance rTMS criteria and timeline are somewhat similar to that of ECT, with the difference of weekly frequency for 2-3 months and then gradually increasing the treatment interval, if possible, to 3-4 weeks. When remission has lasted for one year, maintenance rTMS is usually stopped. For some patients, it has not been possible to increase the treatment interval or to stop maintenance treatment, and some patients have received treatment for several years.

PATIENT SELECTION

From patients receiving maintenance ECT or rTMS in the Nemo unit, 12 were selected to add tDCS treatment to the ongoing maintenance ECT or rTMS or to replace these with tDCS. Selection was done by chief psychiatrist (SK). Selection was based on: 1) the need for frequent ECT or rTMS, i.e. maintenance treatment every one to three weeks, 2) the capability to perform treatment at home, and 3) clinician (SK) evaluation that either there is a need and it would be possible to improve patients' mental health from the level achieved with the current maintenance treatment, or it would be possible to decrease the frequency of maintenance ECT/rTMS treatments without a decline in mental health, or it would be possible to replace ECT/rTMS maintenance therapy with tDCS. For some patients, long distance to the hospital was an additional reason for adding tDCS. Only unipolar depression patients (ICD-10 diagnoses F32-F33) were chosen, and contraindications were acute psychosis or suicidality.

INTERVENTION

Intervention of this study was combining tDCS to maintenance ECT or rTMS, or tDCS replacing ECT and rTMS maintenance therapy. Intervention started for selected patients in intervals between spring 2019 and spring 2024. tDCS treatment was initiated as 6-week (w) period containing 5-7 treatments per week. Treatments were performed at home, with a Sooma® tDCS device, and patients got the device and equipment from the Nemo unit at the start and at check-ups. The tDCS treatment included anodal left DLPFC stimulation, with the cathode over the right DLPFC at 2 mA intensity. Each treatment session lasted for 30 minutes.

The patients were given the first tDCS session, the tDCS home device and instructions on its use during the visit to the Nemo unit. During the initial 6-w period the follow-up schedule was the following: a nurse's check-up after 1w by a phone call, a nurse's check-up at 3w by a phone call and then a psychiatrist's check-up at 6w, when the decision was made to either stop or continue tDCS, and the frequency of tDCS was planned. After the initial 6-week treatment period, the frequency of tDCS treatments was planned to be 3-7 treatments per week, depending on the tolerability of the treatment and the symptoms, and could be adjusted during the check-ups. The need for maintenance ECT or rTMS was also evaluated at

the 6-week follow-up based on clinical assessment of patients' symptoms and wellbeing, also using the symptom scale scores (described below in "Outcomes – symptom scales"), and the frequency of the maintenance treatments was planned. Then nurse's check-ups continued at 6-week intervals, with every second being a visit and every second a phone call. tDCS was planned to be stopped if there were adverse effects or response to treatment was not sufficient. Decision on stopping tDCS was done by the Nemo unit's chief physician (SK).

DATA COLLECTION AND MEASURES OF BACKGROUND FACTORS AND OUTCOMES

Background Variables

Gender, age of the patient, all psychiatric diagnoses and the medications used at the beginning of tDCS treatment were collected for each patient from their medical records. Psychiatric medications were categorized as antidepressants, antipsychotics, benzodiazepines or sedatives and mood stabilizers, based on WHO ATC classification (WHO Anatomical Therapeutic Chemical classification system) (60), except for not considering Lithium as an antipsychotic (as in ATC classification) but instead as mood stabilizer as done in clinical practice. Medication and neuromodulation treatment history before the acute ECT or rTMS preceding the start of tDCS were also collected from the medical records, to determine treatment resistance.

Outcomes – Symptom Scales

Symptom questionnaires Beck's depression inventory (BDI, (61)) and Generalized anxiety disorder 7-item scale (GAD-7, (62)) were filled by the patient at the start of tDCS and at check-ups, either 0-7 days before the check-up, during the check-up or as soon as possible after the check-up, if not done before. The check-ups were at 3 and 6 weeks from the start of the tDCS treatment and then if tDCS treatment continued, every 6 weeks. For this study, we collected BDI and GAD-7 data only from the 3-week, 6-week and 6-month check-ups. GAD-7 measure is included in the questionnaire battery of the Nemo unit for all the patients treated in the unit, since ECT, and especially rTMS, based on our experience and previous studies (63) may also alleviate anxiety symptoms of the patients.

Outcomes – Experience of the Patient, Adherence and Treatment Frequency

tDCS treatment frequency, as number of treatments per week since the start of tDCS until 6 months, adherence (i.e. if the patient continued the use of tDCS), patients' subjective experience on benefits and side effects of the tDCS treatment, as well as the patients' wellbeing and effectiveness of the treatment recorded by the nurse or the doctor during the follow-up were collected from medical records at 3-week, 6-week and 6-month check-ups. Information on patients' experience on benefits and side effects of the tDCS treatment was based on routine clinical assessment done in check-ups, and there were no specific questionnaires or structured interviews in use. The frequency of maintenance ECT or rTMS 6 months prior tDCS and during the 6-month follow-up period, the duration of maintenance ECT/rTMS, and the reason for adding tDCS were collected.

DATA ANALYSIS

Data were analysed using descriptive statistics and frequencies, and no tests for statistical significance were made. Proportions are presented for categorical variables, while means with standard deviations are reported for continuous variables. Because our sample size is small, results and characteristics of the sample with values equal to or less than 3 are blurred for data protection.

RESULTS

CHARACTERISTICS OF THE SAMPLE

The sample consisted of 12 participants, most of them being females (≥9) (Table 3). All participants were diagnosed with depression, and most of them (≥9) with TRD (i.e. having used at least 2 different antidepressants) before the start of the acute ECT or rTMS. Half of the participants had three or more previous AD courses, and four participants had previous antipsychotic augmentation. Of the sample, the majority (≥9) had severe non-psychotic depression. Five participants had single-episode depressive disorder and 7 had recurrent depressive disorder. The diagnoses were set at the time of the acute ECT or rTMS series and had not been changed even though the acute treatment may have decreased the symptom level. Majority (≥9) of participants were prescribed antidepressants, 7 participants were using antipsychotics, 6 were using benzodiazepines or sedatives and ≤3 of the participants were using mood stabilizers.

The reasons for adding tDCS were to enhance the treatment effects/decrease the symptoms (9/12), decrease the frequency of maintenance ECT or rTMS treatment sessions (5/12), to decrease the need for frequent visits to the Nemo unit due to long distance (≤3/12), adverse effects of maintenance ECT

or rTMS (≤3/12) and/or practical reasons/schedules of the patient (≤3/12).

Before starting tDCS, 6 participants had received ECT, and 6 participants had received rTMS. Three or less of the patients received 0-2 maintenance treatment sessions before starting tDCS, and the rest of the sample had been on maintenance ECT or rTMS longer (*Table 3*). The mean duration of the previous maintenance treatment was 20 months. The mean age of the participants was 48.8 years (SD=9.7).

Table 3. Background variables and characteristics of study subjects.

	N
Gender female	≥9
Severity of depression severe, non-psychotic	≥9
Recurrent depression	7
Use of medication	
Antidepressant	≥9
Antipsychotics	7
Benzodiazepines or sedatives	6
Mood stabilizers	≤3
Treatment resistance at the start of maintenance treatment	
≥2 antidepressant trials	≥9
≥3 antidepressant trials	6
Antipsychotic augmentation	4
Previous / ongoing psychotherapy at the start of maintenance ECT or rTMS	7
Neuromodulation treatment received before tDCS	
ECT	6
rTMS	6
Patients with more than one previous acute treatment series (ECT or rTMS)	6
Patients with both ECT and rTMS previously	≤3
Time of starting tDCS	
After 0-2 maintenance ECT or rTMS treatments, i.e. no or at most two maintenance rTMS or ECT treatment sessions	≤3
After receiving several sessions of maintenance ECT or rTMS	≥9

ECT = electroconvulsive therapy; rTMS = repetitive transcranial magnetic stimulation;
tDCS = transcranial direct current stimulation

USE OF TDCS DURING THE STUDY PERIOD

A total of 11 participants continued using tDCS until the end of the 6-month follow-up period. One discontinuation of tDCS happened after 24 weeks. At 6 weeks (n=12), 10 patients took at least 5 treatments per week. At 6 months (n=11), 6 patients took at least 5 treatments per week.

CHANGE OF SYMPTOMS

At baseline, the mean score for depression (BDI) was 26.7 (SD=11.8) (Table 4). After three weeks of treatment, the mean BDI score decreased slightly to 25.9 (SD=12.5), and by six weeks, to a mean of 21.8 (SD=10.1). At the six-month follow-up, the mean BDI score was 24.3 (SD=13.1), with 7 participants having completed the six-month assessment. In the six-month follow-up, all 7 participants reported either a stable or somewhat worsened score compared to their six-week follow-up, but the score still remained lower than at baseline. Regarding anxiety, the mean score of GAD at baseline was 9.3 (SD=5.5), at three weeks 6.1 (SD=2.9) and at six weeks 10.4 (SD=6.2) (*Table 4*). At the six-month follow-up, the mean GAD score was 5.7 (SD=4.2), with scores remaining stable or improving in most participants compared to baseline and the six-week measurement.

PATIENT EXPERIENCES AND CLINICIANS' OBSERVATIONS

Regarding the patients' experience of tDCS benefits at 6-week or 6-month assessment, five participants reported an increased capacity to perform daily activities like picking berries, shopping and socializing. Three or less participants

Table 4. Depression and anxiety symptoms at baseline, 3 and 6 weeks and 6 months.

	Participants with questionnaire data (n)	Mean score (SD)
Depression symptoms, BDI total score		
Baseline	10	26,7 (11,82)
3 weeks	9	25,9 (12,47)
6 weeks	9	21,8 (10,12)
6 months	7	24,3 (13,07)
Anxiety symptoms, GAD-7 total score		
Baseline	9	9,3 (5,52)
3 weeks	8	6,1 (2,85)
6 weeks	9	10,4 (6,20)
6 months	6	5,7 (4,20)

BDI = Beck Depression Inventory; GAD-7 = Generalized Anxiety Disorder scale

noted improved sleep, with longer, uninterrupted sleep and easier onset of sleep. Seven participants felt their overall wellbeing, particularly their mood, had improved. Three or less participants experienced worsening of symptoms, while eight participants showed improvement in their symptoms during the 6-month period. For ≤3 participants, there was no evaluation of their clinical status mentioned in their medical record.

During the tDCS treatment, altogether 8/12 participants reported experiencing adverse effects. Of them, six participants had skin irritation, including blisters, redness and a stinging sensation, while ≤3 participants experienced headaches. Additionally, ≤3 participants reported tiredness.

FREQUENCY OF MAINTENANCE ECT OR RTMS

For seven patients, the frequency of maintenance ECT or rTMS decreased after starting tDCS. For ≤3, there was an increase of maintenance ECT or rTMS frequency. Three or less patients had no change in maintenance treatment frequency but reported subjective improvement based on medical records. Three or less continued with tDCS as their only neuromodulation treatment, i.e. tDCS replaced maintenance rTMS or ECT.

Among patients who had received maintenance ECT (n=6), the mean number of maintenance ECT sessions during the 6 months before starting tDCS was 7.5 (range 2-10), and the number of maintenance ECT sessions during the 6 months after starting tDCS decreased on average by 2.3 sessions (range from –5 to 0 sessions). Regarding patients who received maintenance rTMS (n=5), the mean number of maintenance rTMS sessions during the 6 months before starting tDCS was 24.8 (range 11-40), and the number of maintenance rTMS sessions during the 6 months after starting tDCS decreased on average by 8.0 sessions (range –32 to +7 sessions).

DISCUSSION

MAIN RESULTS

Based on this retrospective register-based case series without control group, depression symptom scores did not change during follow-up, which may indicate no extra effect of adding tDCS, but may also indicate that adding tDCS, and at the same time for some patients decreasing the frequency of or switching from maintenance ECT or rTMS to tDCS, did not lead to increasing depression symptoms. For over half of the patients, the number of maintenance ECT or rTMS treatments decreased during the six months after starting tDCS compared to the six months before. Most participants reported benefit from tDCS treatment, for example, an increased ability to perform daily tasks, improved wellbeing and improvement in sleep quality. Eight participants experienced side effects of tDCS. Most patients continued tDCS treatment until the 6-month follow-up.

Although the BDI scores showed a slight improvement over the first 6 weeks of treatment, the results at the 6-month follow-up indicated a slight increase of depressive symptoms for most participants. This may relate to the decreased number of maintenance ECT or rTMS treatment sessions after the initial 6-week start period. Furthermore, participants whose BDI scores had increased between the 6-week and the 6-month check-up visits still reported a decrease in depressive symptoms in the clinical interview at the 6-month clinical check-up. Overall, the mean of the BDI scores was less at the 6-month check-up compared to the start of the intervention.

The findings show the potential of tDCS to reduce the frequency of ECT/rTMS without a major decline in symptom management, although not all participants were able to reduce the frequency of the other maintenance neuromodulation treatment. For 7/12 patients, the number of maintenance ECT or rTMS treatments decreased and for ≤3/12 the number of treatments increased. For ≤3/12 there was no change in the frequency of ECT or rTMS. Three or less of the patients continued with only maintenance tDCS. To summarize, for the majority, the treatment number decreased, even during this relatively short follow-up of 6 months.

The majority of the patients had previously been in ECT or rTMS maintenance treatment. Based on clinical experience, some patients' symptoms increase as the ECT or rTMS maintenance intervals are extended. Research on this topic is very limited. For ECT, in a retrospective cohort study on maintenance ECT, some patients needed reintensification of the maintenance treatments and there was large variability in how fast the treatments could be tapered (64). Further, the lack of access to ECT treatment during the COVID pandemic showed an increase in relapses due to abrupt cessation of maintenance ECT (65). As for rTMS, the findings of a systematic review on maintenance rTMS suggested that there should be over 2 rTMS maintenance treatments per month and that 1-2 treatments per month may not be sufficient (36). In our study, as a group, maintenance treatment sessions were decreased by a mean of 2.3 sessions among those in maintenance ECT, and by a mean of 8.0 sessions among those in maintenance rTMS.

COMPARISON TO EARLIER STUDIES

There are no previous studies on combining tDCS and maintenance rTMS or ECT treatment. According to the recent recommendation from the Finnish Council for Choices in Health Care, COHERE, rTMS should be offered for TRD after two failed antidepressant courses, whereas tDCS is not recommended for TRD, due to lack of evidence (29). Based on current knowledge, tDCS can be used for the treatment of mild to moderate, non-TRD (13,30). tDCS may moderately reduce depression severity in adults with treatment-resistant depression compared to placebo, but the evidence is limited (27). Though there is no evidence of effectiveness of tDCS in TRD, it is possible that it may have benefits as an add-on treatment to maintenance ECT or rTMS among this patient population. In addition, add-on tDCS may decrease the frequency of ECT or rTMS maintenance treatment sessions, which is considerable concerning the significant increase in these maintenance treatment modalities (46,47). Our study gives some preliminary support for add-on tDCS to maintenance ECT or rTMS, but larger studies are needed for better understanding of the effects of this treatment combination.

STUDIES ON EFFECTIVENESS OF COMBINATION OF TDCS AND OTHER NEUROMODULATION TREATMENTS IN ACUTE PHASE TREATMENT OF DEPRESSION

Two studies have been made on the combination of tDCS and other neuromodulation treatments in the treatment of acute phase of depression. In one study (n=16), tDCS was given concomitantly with ECT, with daily tDCS, and on ECT days, tDCS was administered just before ECT. ECT was given only six times for two weeks, so the protocol was shorter than usual. There was no difference in cognitive tests or depression severity from baseline between the tDCS+ECT and placebo+ECT groups (66). In a more recent RCT (n=240, 57.9% females), active and sham tDCS and rTMS were given concomitantly, so that there were four different groups (active tDCS+active rTMS, sham tDCS+active rTMS, active tDCS+sham rTMS and sham tDCS+sham rTMS), with a 2-week treatment protocol, 2mA tDCS given for 20min in 30-60min prior to the rTMS. rTMS was given with a 10Hz 1600 pulse protocol to the left dorsolateral prefrontal cortex. The primary outcome was the reduction in the Hamilton Depression Rating Scale (HAM-D) score at 2 weeks, which was significantly greater in the active tDCS+active rTMS group (-18.33 points), compared to the other groups (sham tDCS+active rTMS -14.86 points, active tDCS+sham rTMS -9.21 points and sham tDCS+sham rTMS -10.77 points). Further, there was no significant difference between active tDCS+sham rTMS and sham TDCS +sham rTMS groups. Thus, active tDCS did not produce a significant extra effect. At 4-week follow-up from the start, the symptoms continued to decrease, with the largest portion of response and remission in the active-active group (92% and 83%), with sham tDCS +active rTMS at 88% and 62%, active tDCS +sham rTMS at 90% and 72% and sham tDCS -sham rTMS at 92% and 55%, respectively, with a very high response and remission rate even for placebo. There were no serious adverse effects (67). These results and our small pilot study support the need of further studies on the potential of combining tDCS to other neuromodulation treatments either in acute or maintenance treatment.

THE COSTS AND ECONOMIC IMPACT OF DIFFERENT MAINTENANCE TREATMENT METHODS

The prices of ECT, rTMS and tDCS at our unit are presented in Table 1. In our unit, acute treatment with tDCS includes four visits or phone call visits during the 6-week acute treatment period and then monitoring visits every 6 weeks (visit or a phone call), i.e. a total of 11 visits during the first year. After the first year, follow-up visits decrease to 4-8 visits annually. Since the treatment is taken at home, there are no treatment visits to the clinic.

During maintenance rTMS, doctor's follow-up visits or phone calls are every 3-12 months, and for maintenance ECT, every 12 months. Weekly maintenance treatment with rTMS involves 52 sessions and visits to the clinic per year. When rTMS is administered every three weeks, the number of sessions decreases to approximately 17 per year. ECT administered every week results in 52 sessions annually. ECT given every two weeks corresponds to 26 sessions per year.

In addition to the direct treatment costs, there are additional costs associated with treatment given in the clinic (i.e. ECT and rTMS), such as travel costs, accommodation and sick leave. ECT requires more monitoring than rTMS, until the next morning, and the patients cannot drive themselves. Thus, they often use a taxi for travelling to treatments. The longest distance to treatment in our unit inside the wellbeing services area is from Kuusamo, where taxi can cost 960 € for a two-way travel (https://www.otaxi.fi/hinnasto/#hintalaskuri), making a total of 49 920 € costs for the society for yearly weekly visits. In addition, some patients need a hospital bed for monitoring after ECT treatment. Furthermore, patients usually have to take sick leave for the treatment days, especially for ECT, and also for rTMS if they live further from the hospital. If ECT

or rTMS maintenance visits can be decreased and replaced by tDCS taken at home at any time, not requiring any follow-up or travelling, these other costs can also be decreased.

Adding tDCS to maintenance rTMS or ECT may decrease the total costs, especially when the frequency of maintenance rTMS or ECT is high (e.g. weekly or biweekly), and if add-on tDCS allows to decrease of frequency. However, studies on cost effectiveness of add-on tDCS to ECT or rTMS are needed.

CLINICAL AND PRACTICAL IMPLICATIONS

From a clinical standpoint, this study gives some preliminary support for the idea that tDCS could be a valuable option for depression patients who require frequent maintenance ECT or rTMS. The ability to administer tDCS at home with minimal supervision is a significant advantage, particularly for patients who live far from treatment centres or have difficulty adhering to regular in-person appointments. tDCS could serve as a long-term solution for maintenance therapy, potentially reducing the burden on hospital resources and improving patient convenience, though studies are needed on the acute and long-term effects of add-on tDCS.

Patient preference is also considered when choosing treatments. Some patients prefer tDCS over other neuromodulation treatments for its ease of use, portability and fewer adverse effects.

Some patients (≤3/12) in our sample were even able to discontinue other neuromodulation treatments entirely, suggesting that tDCS may serve as an effective alternative or complementary approach for some depression patients needing maintenance neuromodulation treatments. Based on earlier studies, tDCS is only recommended for mild or moderate depression (30). Our study also included patients with severe depression. However, due to small sample size, we were not able to analyse the effect of add-on tDCS in severe compared to moderate depression.

Other strategies for reducing the need for rTMS and ECT maintenance therapy could include pharmacological optimization, psychotherapy and lifestyle changes. However, their effectiveness in directly replacing or reducing neuromodulation treatments remains uncertain and requires further investigation (68). More studies have been conducted on the prevention of relapses after acute ECT than rTMS, and lithium has shown the best benefit, with a meta-analysis presenting the number needed to treat (NNT) 7 and weighted odds ratio (OR) 0.55 with lithium compared to post-ECT prophylaxis without lithium. The quality of evidence was, however, very low due to most studies being observational, there being substantial heterogeneity and indications for publication bias (69). Lithium has potentially severe side effects and needs regular laboratory monitoring. Acute ECT is used for more severely ill patients, and therefore the addition of lithium is more justifiable than for patients treated with rTMS, with moderate to severe TRD. Furthermore, lithium is not suitable for all patients and still has limited efficacy. No studies on any medications to prevent relapses after successful rTMS have been made, to our knowledge.

STRENGTHS AND LIMITATIONS

This is the first study about adding tDCS to maintenance ECT or rTMS to increase the effectiveness of treatments and to decrease the need for ECT or rTMS maintenance treatments. The increasing need for maintenance ECT and rTMS is an important clinical challenge due to limited resources and lack of other efficient treatments for this patient population. The inclusion of both subjective patient experiences and objective clinician evaluations provides a comprehensive understanding of tDCS's potential benefits and side effects. Use of multiple follow-up points allows for an assessment of both short-term and medium-term outcomes. The real-world setting and the evaluation of tDCS in a clinical context is both a strength and a limitation. The sample was heterogeneous in terms of depression severity, medication use and prior neuromodulation treatments, which may have contributed to the variability in treatment responses. However, at the same time the heterogeneity is representative of clinical reality.

The largest limitation of this study was small sample size and the lack of a placebo control or a control group without tDCS. The addition of a different treatment modality and the increased frequency of follow-up visits or phone calls compared to usual clinical protocols may have affected the results. It may be the increased contact that may have beneficial effects. The sample size was small, which limits the generalizability of the results. The sample included mainly females. The length of follow-up was relatively short (6 months), and longer follow-up would have allowed more detailed analysis of potential of add-on tDCS in decreasing the frequency of maintenance ECT or rTMS. Further studies with a larger sample size, including more males and clinically/diagnostically more homogeneous samples, a placebo-control group and a longer follow-up are needed to confirm these findings and explore the long-term efficacy of tDCS in combination with ECT or rTMS as a maintenance therapy. Originally, this pilot study was designed and conducted as a clinical development initiative aimed at improving the operations of the neuromodulation unit. The study was implemented in clinical practice, with data collection being part of the clinical

evaluation. This resulted in limitations in data availability, e.g. symptoms scales were lacking for some patients, and the collection of clinical status was not systematic for all patients. The diagnoses of the patients are based on the clinical diagnosis made by the physicians (psychiatric or psychiatric trainee) at the appointment before starting the ECT or rTMS, and the diagnoses are not changed during the treatment nor evaluated using structured interviews.

However, despite these limitations, this study is important in being the first ever to report on the effects and feasibility of add-on tDCS in combination with maintenance ECT or rTMS.

CONCLUSIONS

Based on this small case series, tDCS shows promise as an adjunct to traditional neuromodulation maintenance treatments ECT and rTMS for patients with TRD. While it may not fully replace these treatments, it offers potentially a more accessible and for some patients, more achievable option for long-term treatment. Larger studies with placebo control are needed to better understand the long-term effects and optimal protocols.

Declarations of interest

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MENTAL AND SOMATIC HEALTH OF CHILDREN AND ADOLESCENTS PLACED IN OUT-OF-HOME CARE: A SYSTEMATIC REVIEW OF COMPREHENSIVE HEALTH STUDIES

ABSTRACT

Purpose: *A comprehensive understanding of the health-related trajectories of children placed in out-of-home care (OHC) is beneficial in order to increase knowledge of the lifetime health status of these children. The aim of this systematic review was to summarize research evidence of studies investigating both psychiatric and somatic health of children and adolescents before, during or after OHC.* ***Methods:*** *This review followed the PRISMA guidelines. PubMed literature search was used to find studies on OHC from the perspective of healthcare. Eleven articles fulfilled the inclusion criteria.* ***Results:*** *Eight studies evaluated the mental and somatic health of participants during, three after and none before OHC. The findings show that during OHC both mental and somatic health conditions were more prevalent among OHC-placed children compared to their peers. The difference was most apparent in mental health outcomes. After OHC, the health status of children remained worse compared to non-OHC peers.* ***Conclusion:*** *Creating a more comprehensive picture of the health of the children in OHC is important. This enables the promotion of healthy mental and physical development among children in foster care services and to avoid long-term negative outcomes in their later health and coping in life. More research is warranted to simultaneously investigate mental and physical health of children who have experienced OHC placement. Lack of research especially occurs at the time before placement, thus research in future should focus particularly on this period. Unified systematic practices for assessing the comprehensive health status and ensuring required support of children in OHC is needed.*

KEYWORDS: MENTAL HEALTH, SOMATIC HEALTH, OUT-OF-HOME CARE, PSYCHIATRIC DISORDER, PHYSICAL ILLNESS, COMPREHENSIVE HEALTH STATUS

INTRODUCTION

Out-of-home care (OHC) is the most extreme form of social service measures. Common worldwide and concerns a remarkable part of the under-aged population in western societies [1]. Globally, approximately 3% of all children are placed in out-of-home care during their childhood [2]. Commonly these children and adolescents have had exposure to adverse childhood experiences (ACEs) [3] like maltreatment, poverty or parental drug and alcohol use [4]. ACEs are shown to associate, at population level, with many health-related conditions, like current depression, drug abuse and obesity [5].

Children and adolescents placed in out-of-home care have been reported to have poorer mental and physical health in comparison to population of the same age [6]. Overall, 30-80% of children who have entered foster care have shown to have at least one medical problem, and a third of these conditions are chronic by nature [7]. They are reported to be mental health, developmental, oral and psychosocial problems [7]. Of specified disorders and conditions, children in foster care have been shown to more likely have obesity, asthma, learning disabilities, developmental disorders of speech and developmental delays than children not placed in out-of-home care [6]. Further, these children are also more likely to be diagnosed with psychiatric disorders such as depression, ADHD, bipolar disorder and behavioural disorders compared to children never placed in out-of-home care [4,8]. It has been shown that, despite a multiplicity of mental health conditions, only half of the children placed in out-of-home care receiving psychiatric services were diagnosed before their first placement [8].

Out-of-home placement during childhood and adolescence has also been shown to be associated with far-reaching

unfavourable health and social outcomes, for example, increased risk of mental and physical health problems later in adulthood [9]. Further, the same study reported that out-of-home placement influences inability to work and the increased need of security disability insurance. A nationwide Finnish cohort study showed that children placed in OHC are more likely to meet criteria for multiple adverse health and social outcomes in adulthood compared to their siblings who had not been placed in OHC [10]. For example, it was shown that out-of-home placement is associated with increased risk for common psychiatric disorders, suicidality, injuries, premature mortality, experiencing violence, antisocial behaviours, violent crime arrests and poisoning injuries. Children in OHC have also been found to constitute a group of persons with a higher risk for later substance abuse, especially for smoking tobacco and marijuana [11]. Out-of-home care placement is also associated with a higher risk for later homelessness among young adults [12] and for subsequent mortality [13].

Several studies have been published on the health of children in out-of-home care and some reviews of the topic have been made as well. The reviews have concentrated mostly on studies examining mental or somatic health separately but not on studies addressing comprehensive health status, including both somatic and mental health. Further, the psychological needs and mental health of children in foster care have been studied more extensively than their physical health [14]. To the best of our knowledge, the studies reporting both mental and physical health findings of children and adolescents measured at different timepoints, i.e., before, during or after, in relation to timing of placement in out-of-home care, have not been summarized.

Acknowledging the current picture of research, and a comprehensive understanding of the health-related trajectories of children in out-of-home care, is needed to increase knowledge of the health status of these children. Evidence on this topic could be used for the development of services able to respond to these children, in a vulnerable position with health needs, at the earliest stage possible and for implications for further research. The purpose of this review is to summarize the evidence of studies that have investigated both the mental and somatic health of children and adolescents before, during or after placement in out-of-home care.

MATERIAL AND METHODS

We conducted a systematic review of relevant studies following the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines [15].

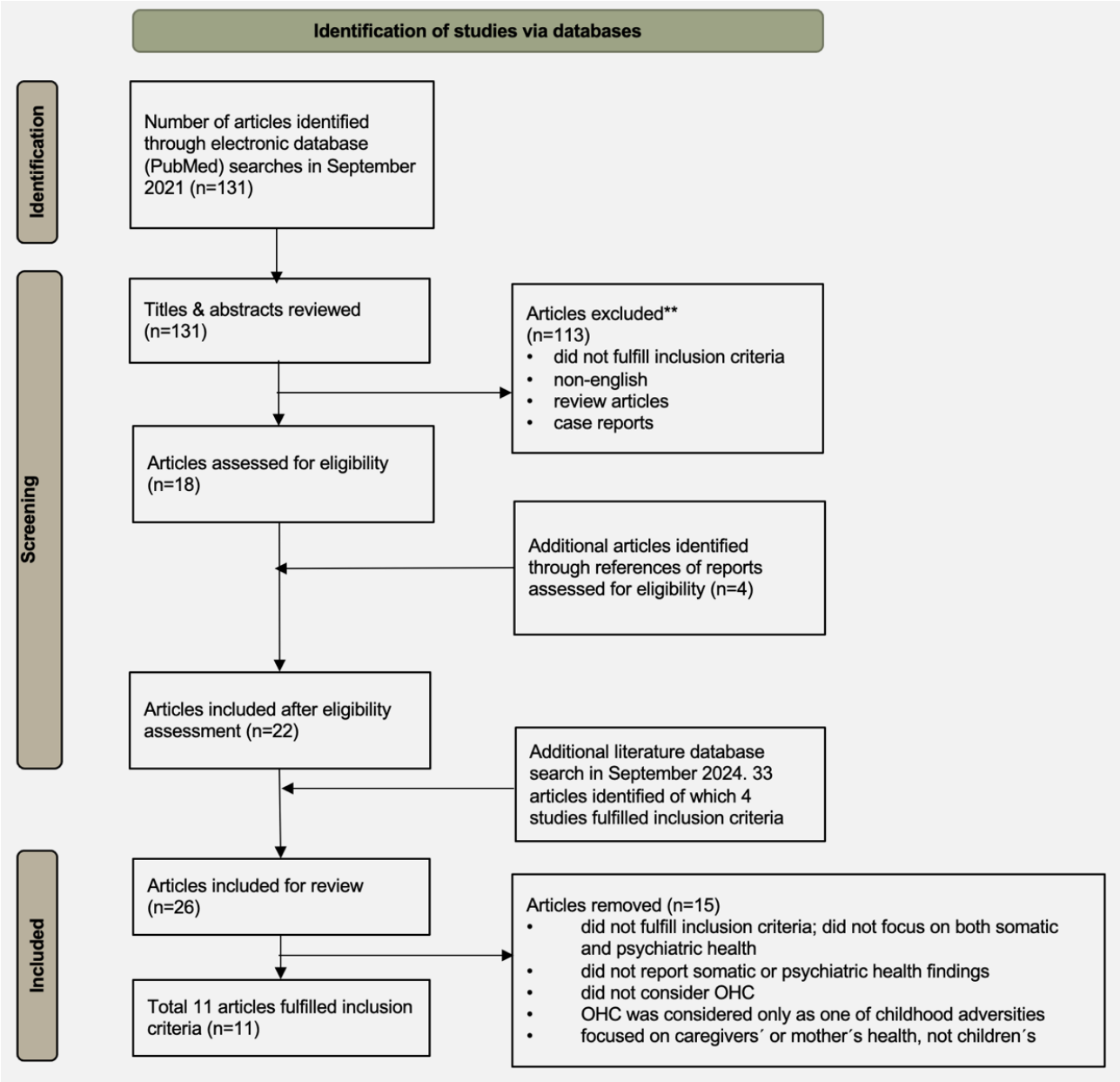
DATA SOURCES/SEARCH STRATEGY

We identified relevant studies by using a PubMed search to find studies concerning out-of-home care from the perspective of healthcare. We used a five-tiered search strategy to identify studies. A complete list of search terms used for each tier and information on how they were combined can be found in *Supplementary Table 1*. The search was conducted primarily in September 2021 and an additional literature search with same strategy was performed in September 2024. Electronic searches were supplemented with manual screening of reference lists of articles assessed for eligibility.

ARTICLE SELECTION PROCESS

The selection process of the articles followed the PRISMA guidelines [15], see *Figure 1*. Each record of the literature search was examined by scrutinizing the title and abstract. Two authors (SS and MN) reviewed the articles independently. In research group meetings the results were evaluated and disagreements resolved to reach a consensus decision. A total of 131 articles were identified as potential studies through the electronic database search in September 2021. By reviewing the titles and abstracts, 113 of the articles were excluded. 18 articles were assessed for eligibility and full papers were reviewed. Four additional articles were identified through examining reference lists of these articles. In an additional literature database search in September 2024 a total of 33 more articles were identified, of which 4 studies fulfilled inclusion criteria and were included in our evaluation of their eligibility for our review. A total of 15 of the 26 identified articles were excluded after careful reading of the full text versions. Eventually, 11 articles fulfilled the inclusion criteria and were included for final evaluation in our systematic review.

Figure 1. Selection of the articles.



INCLUSION AND EXCLUSION CRITERIA

The inclusion criteria for articles were as follows: (1) Study design: cohort studies, follow-up studies or population-based studies, (2) Health of participants placed in out-of-home care: covering both mental and somatic health, (3) Time phase: before, during or after out-of-home care, (4) Date of publication: since 2010, (5) Language: English. Exclusion criteria were as follows: (1) Case reports, review articles and qualitative studies, (2) lack of out-of-home care, (3) no data of both mental and somatic health of participants. Mortality studies were excluded because they form their own entity.

DATA EXTRACTION

The following data were extracted (by MN, SS) from the included articles: name of the study and author(s), country of residence of participants, study design, recruitment and data source, study groups, reference sample, sample, age range of participants, time phase of evaluation of psychiatric and somatic health status in relation to out-of-home care, collection of psychiatric and somatic data (self-report or clinical assessment), the measure of psychiatric and somatic findings, objective of study, somatic and psychiatric findings, conclusion.

QUALITY ASSESSMENT

A modified STROBE (Strengthening the Reporting of Observational studies in Epidemiology) checklist [16] was adapted to assess the quality of each article for this systematic review (see *Supplementary Table 2*). For each article, two researchers (SS, MN) independently evaluated a checklist of 22 items for each article on three-point scale (0=not found/ not reported, 0.5=partly reported, 1=sufficiently reported). The sum score of an article could range between 0-22. Of eleven articles under review, a full agreement (i.e. both raters assigned the same score to an item) was reached for an average 64% (range 36%-100%) of all 22 checklist items. The majority of disagreements in item scores were related to whether to assign a score 0.5 or 1 (i.e. whether an item was partly or sufficiently reported in an article). Only in four articles was a total disagreement in an item score observed (i.e. one rater had given score zero and another rater either scored 0.5 or 1). The range of quality sum scores of the articles varied between raters (SS range 18-21, MN 12-20). In the final phase, all inconsistences in item scores were carefully checked by the raters and *Supplementary Table 3* reports the consensus value of these scores.

RESULTS

STUDY CHARACTERISTICS

The characteristics of the reviewed articles (n=11) are summarized in *Table 1*. Nine studies (81.1%) were from USA, the other two from Australia [17] and France [18]. The sample size of the reviewed studies varied from 74 [19] to 1 985 180 persons [20]. The analyses were generally stratified by gender (females 42% to 56%), except in one study with only males [19] and one article did not report gender distribution [17]. Study designs included longitudinal [17,19,21,22], cohort [6,20,23,24] and retrospective studies [18,24,25], and one register study [26]. The age range of study participants at baseline varied from 0 (foetus) [6,17,18,25] to 26 years [23]. Four articles included general and school-based or within-sample matched control groups [6,22,23,25].

STUDY METHODS

Table 2 shows the time phase of the evaluation of mental and somatic health status in relation to timing of placement in out-of-home care (OHC), as well as research instruments and methods applied in the studies. None of the articles identified for this review had evaluated the psychiatric and somatic health status of participants during the time period preceding placement in OHC. Eight of the studies had evaluated the health status of participants during [6,17,18,20,22,24,25,26] and three after OHC [19,21,23].

Data on mental health status was based on self-reports (interviews, questionnaires) in six of the articles [6,19,21,22,23,26], clinical assessment (ICD/DSM-criteria) in four articles [17,20,24,25] and both in one [18]. Regarding somatic health status, six studies were based on self-reports (interviews, questionnaires) [6,19,21,22,23,26], four on clinical assessment (diagnostic criteria, clinical examination) [17,20,24,25] and one having both [18].

Table 1. Characteristics of the articles included in the systematic review.

Study	Country and study design	Recruitment and data source	Participants			
			Study group(s)	Reference group(s)	Groups statistics (n, % of females)	Age range (years)
Ahrens et al. (2014) [23]	USA: national cohort study	data from two national cohorts; the Midwest Evaluation of the Adult functioning of Former Foster Youth (Midwest Study), the National Longitudinal Study of Adolescent Health (Add Health)	young adults formerly in foster care (FC group)	two general population groups age-matched with FC group; economically secure (ES group) and economically insecure (EI group)	FC group: n = 596, 56% females EI group: n = 456, 68% females ES group: n = 1461, 55% females	17 to 26 years, mean (SD) age: FC group: T1 = 17.8 (0.4), at T2 = 26.1 (0.3) ES group: at T1 = 19.8 (0.5), at T2 = 26.3 (0.4) EI group: at T1 = 19.9 (0.5), at T2 = 26.3 (0.4)
Jones (2014) [21]	USA: longitudinal study of residential facility cohort	data from interview and questionnaires; the Child Health Questionnaire, YASR, Ansel-Casey Life Skills Assessment - Short version	former foster youth	-	n = 129, 59.8% females	at least 17, (17-20 at first interview -> 19-22 at the last interview)
Kaferly et al. (2023) [25]	USA: retrospective registry study	Medicaid-enrolled children in Colorado, Medicaid eligibility codes to indicate foster and guardianship care, adoption from foster or guardianship care, and emancipation	foster care cohort of children ≤19 years with ≥1 month of Medicaid enrollment during the study period	age-matched peers	n = 1084026, 50.3% females	0 to 18 years
Kools et al. (2013) [22]	USA: longitudinal intervention study	Data from the Foster Youth Health Project (FYHP) to cluster adolescents into 13 health profiles Inclusion criteria: adolescents in foster care who were assigned to CASAs in three northern California counties	foster youth	school-based reference sample	foster youth: n = 136, 50.7% females school-based reference sample: n = 865	Foster care: range 11.2-18.9 years, mean (SD) age = 14.8 (1.9)
Kugler et al. (2012) [26]	USA: register study	Archival data of the residential facility between 1996 and 2011 Inclusion criteria: at least 8 years of age, had completed MASC, TSCC and CDI, primary caregivers had completed CBCL and an available file of background information regarding the child´s psychosocial history.	foster care children	-	n = 161, 44.7% females	range 8 to 17 years, mean (SD) age = 10.9 (2.2)
Lindley & Slayter (2018) [24]	USA: retrospective cohort analysis	Data from National Data Archive on Child Abuse and Neglect (NDACAN) Adoption and Foster Care Analysis and Reporting System (AFGARS) Inclusion criteria: children ≤ 18 years with residence in the USA. and death between 2005 and 2015.	foster care children	-	n = 3653, 42.1% females	under 18 years, mean (SD) age = 5.9 (6.6)

→

Study	Country and study design	Recruitment and data source	Participants			
			Study group(s)	Reference group(s)	Groups statistics (n, % of females)	Age range (years)
Meinhofer et al. (2024) [20]	USA: population-based cohort study	Nationwide Medicaid claims data from 2014 to 2020 (Medicaid Analytical eXtract (MAX) and Transformed Medicaid Statistical Information System Analytic Files (TAF) Inclusion criteria: Medicaid-enrolled children with exposure to parental opioid use–related disorder (POUD) during ages 4 to 18 years	foster care children	-	n = 1 985 180 Medicaid-enrolled children, female = 49% females, person-years = 8 939 666	4 to 18 years
Neil et al. (2019) [17]	Australia: longitudinal population-based cohort study	Data from the Wave 2 linkage of the New South Wales Child Development Study (NSW-CDS). Data for analyses from the NSW Registry of Births, Deaths and Marriages, the NSW Ministry of Health´s Admitted Patient Data Collection and Perinatal Data Collection, and the NSW Family and Community Services´ Child Protection Case Management System - Key Information Directory System. Data of costs of hospitalization from National Hospital Cost Data Collection	Sub-groups: unknown to child protection services, known to child protection services and placed in out-of-home care	-	all children n = 79 285	range 0 to 13 years
Scott & McCoy (2018) [19]	USA: longitudinal study	an ongoing longitudinal study of older foster care youths in the care and custody of state authorities in a Midwestern state. Data comprised interviews, questionnaires and data on lifetime or past-year mental disorders	older foster care youths	-	n = 74, all males	range 18 to 19 years
Toussaint et al. (2023) [18]	France: retrospective study	data of all children entrusted to the care of the child protection and welfare service in Vendée	children placed to OHC	-	n = 623, female = 299 (48%), male = 324 (52%)	range 0 to 18 years
Turney & Wildeman (2016) [6]	USA: national survey	Data from the National Survey of Children´s Health (NSCH) 2011-2012, interviews of household adults (mostly parents) of focal children	foster care children	children not placed in foster care: subgroups for children adopted from foster care, children across specific family types, children in economically disadvantaged families	Non-institutionalized children n = 95 677, 48.8% females	range 0 to 17 years, mean age = 8.6

Note
Mental health measurements/classifications: YASR = Young Adult Self-Report (Jones, 2014), FYHP = Foster Youth Health Project (Kools, 2013), MASC = Multidimensional Anxiety Scale for Children (Kugler, 2012), TSCC = Trauma Symptom Checklist for Children (Kugler, 2012), CDI = Children's depression inventory (Kugler, 2012), CBCL = Child Behaviour Checklist (Kugler, 2012)
Somatic health measurements/classifications: FYHP = Foster Youth Health Project (Kools, 2013)
General abbreviations: FC = foster care (Ahrens, 2014), EI = economically insecure (Ahrens, 2014), ES = economically secure (Ahrens, 2014), CASA = Court Appointed Special Advocates (Kools, 2013), NDACAN = National Data Archive on Child Abuse and Neglect (Lindley, 2018), AFCARS = Adoption and Foster Care Analysis and Reporting System (Lindley, 2018), MAX = Medical Analytical eXtract (Meinhofer, 2024), TAF = Transformed Medicaid Statistical Information System Analytic Files (Meinhofer, 2024), NSW-CDS = New South Wales Child Development Study (Neil, 2019), NSW = New South Wales (Neil, 2019), NSCH = National Survey of Children´s Health (Turney, 2016)

Table 2. Data characteristics (time phase, method, measures) for somatic and psychiatric findings.

Study	Time phase of evaluation of psychiatric and somatic health status of children and youth in relation to timing of out-of-home care (OHC)	Somatic Health		Psychiatric Health	
		Evaluation method	Measures	Evaluation method	Measures
Kaferly et al. (2023) [25]	during OHC	clinical assessment	Pediatric Medical Complexity Algorithm, version 3.0 (PMCA) PMCA-derived chronic physical and chronic combined conditions, through all available fee-for-service and capitated behavioural health procedure and diagnostic code data	clinical assessment	ICD-10 (F00-F99)
Kools et al. (2013) [22]	during OHC	self-reports (children)	CHIP-AE (a composite measure of health status with six domains, an adolescent self-report instrument of subjective perceptions of the multidomain)	self-reports	CHIP-AE
Kugler et al. (2012) [26]	during OHC	self-reports (children, caregivers)	both caregivers and children answered certain questionnaires (CBCL)	self-reports (children, caregivers)	both caregivers and children answered certain questionnaires (CBCL, CDI, MASC, TSCC)
Lindley & Slayter (2018) [24]	during OHC	clinical assessment	The diagnosis of a chronic illness that required special medical care (e.g. cancer, HIV/AIDS, congenital anomalies)	clinical assessment	mental or behavioural health diagnosis (e.g. attention deficit and disruptive disorders, mood disorders, personality disorders) based on DSM
Meinhofer et al. (2024) [20]	during OHC	clinical assessment	ICD-10 and Current Dental Terminology codes	clinical assessment	ICD-10 (depression, anxiety, trauma and stress, ADHD, conduct disorder or impulse, suicidality or self-harm, autism or PDD, developmental delay)
Neil et al. (2019) [17]	during OHC	clinical assessment	ICD-10-AM, AR-DRG	clinical assessment	diagnoses recorded in ICD-10 Chapter V (F00-F99)
Toussaint et al. (2023) [18]	during OHC	both self-reports and clinical assessment	medical form, which comprised two sections: medical section completed by the doctor	both self-reports and clinical assessment	medical form completed by the doctor
Turney & Wildeman (2016) [6]	during OHC	self-reports from parents/ caregivers	interview (The outcome variables include 13 binary indicators of children's mental and physical health, all reported by the parent respondent. These also include 11 specific indicators of health conditions, measured affirmatively if the parent respondent reports the child has been diagnosed with the condition by a doctor or other healthcare provider and if the parent respondent reports the child has the condition at the time of the interview)	self-reports from parents/ caregivers	interview
Ahrens et al. (2014) [23]	after OHC	self-reports (youth)	interview (participants were asked for their general health, BMI and several chronic health conditions, also seizure disorder, asthma, dyslipidemia, hypertension and diabetes)	self-reports (children)	interview (including ADHD)

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Study	Time phase of evaluation of psychiatric and somatic health status of children and youth in relation to timing of out-of-home care (OHC)	Somatic Health		Psychiatric Health	
		Evaluation method	Measures	Evaluation method	Measures
Jones (2014) [21]	after OHC	self-reports (youth)	data from interview and questionnaires (CHQ)	self-reports (youth)	data from interview and questionnaires (YASR)
Scott & McCoy (2018) [19]	after OHC	self-reports (youth)	The Cardiovascular Arousal and Sleep Disturbances scale (CASD)	self reported (youth)	interview (the Diagnostic Interview Schedule, mental disorders based on DSM-IV)

Note
Mental health measurements/classifications: CHIP-AE = Child Health and Illness Profile-Adolescent Edition (Kools, 2013), CBCL = Child Behaviour Checklist (Kugler, 2012), CDI = Children's depression inventory (Kugler, 2012), MASC = Multidimensional Anxiety Scale for Children (Kugler, 2012), TSCC = Trauma Symptom Checklist for Children (Kugler, 2012), DSM = Diagnostic and Statistical Manual of Mental Disorders (Lindley, 2018), ICD = International Statistical Classification of Diseases and Related Health Problems (Meinhofer, 2024), ICD-10-AM = International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (Neil, 2019), AR-DRG = The Australian Refined Diagnosis Related Groups (neil, 2019), ADHD = Attention Deficit Hyperactivity Disorder (Ahrens, 2014), YASR = Young Adult Self-Report (Jones, 2014),
Somatic health measurements/classifications: PMCA = Pediatric Medical Complexity Algorithm (Kaferly, 2023), DSM = Diagnostic and Statistical Manual of Mental Disorders (Lindley, 2018), ICD = International Statistical Classification of Diseases and Related Health Problems (Meinhofer, 2024), ICD-10-AM = International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (Neil, 2019) , AR-DRG = The Australian Refined Diagnosis Related Groups (Neil, 2019), BMI = Body Mass Index (Ahrens, 2014), CHQ = Child Health Questionnaire (Jones, 2014), CASD = The Cardiovascular Arousal and Sleep Disturbances scale (Scott, 2018)

QUALITY OF STUDIES

Supplementary Table 2 shows the criteria for quality assessment of the articles according to the modified STROBE checklist, and *Supplementary Table 3* reports the quality scores of each article accepted for our systematic review. The quality sum scores of the articles in the review were consistently good, with the scores ranging from 20 to 22. This suggests that the articles exhibited good quality and consistency across the research topic under evaluation.

RESULTS

Findings of the reviewed studies are summarized in *Table 3*.

Mental Health During Out-Of-Home Care

Findings on mental health of children during OHC placement were reported in eight articles. Four articles reported findings about developmental health [6,17,18,24] and seven of mental/behavioural health problems [6,18,20,22,24,25,26]. Based on the self-reports and clinical assessments the children in OHC were reported to be at greater risk of having mental health problems compared to children not placed in OHC [6,20]. For example, in the clinical assessments, children in OHC exhibited higher rates of depression (10% vs 4%), anxiety (9% vs 5%), trauma and stress (35% vs 7%), conduct or impulse disorders (25% vs 12%), suicidality and self-harm (3% vs 1%), developmental delays (12% vs 7%) and substance use-related disorders (4% vs 1%) [20]. They were also more commonly diagnosed (36.5% vs. 12.1%) with behavioural health conditions [25]. In another study using clinical assessment, prior psychosocial stressors (removal from the home because of prior parental death, parental incarceration, parental inability to cope, parental abandonment, parental relinquishment or parental inability to provide adequate housing) among children in OHC were associated with increased likelihood for mental/behavioural health problems (aOR 1.53) [24]. In the other study based on clinical assessment, reasons behind hospitalizations among children with child protection services were predominantly sleep disorders and developmental disorders, including autism and oppositional defiant/conduct disorders [17].

According to the parent/caregiver self-reports, children in OHC were also more likely to have learning disabilities (14.7% vs 7.6%), developmental delays (7.3% vs 3.4%), speech problems (11.2% vs 4.7%), anxiety (14.2% vs 3.1%), behavioural problems (17.5% vs 2.9%) and depression (14.2% vs 2.0%) compared to children not in OHC [6]. For each diagnostic subgroup category for mental disorders (ICD-10: F-codes), the prevalence within the foster cohort exceeded those of peers, the most common categories being ADHD, anxiety, autistic and

major depressive disorders. Also, the psychiatric comorbidity rates were higher among the foster cohort compared to peers, the rate varying from 1.4% to 16% among foster cohort and from 0.2% to 5.2% among peers [25]. In another study using self-report questionnaires, somatic symptoms scores of children rated by their caregivers correlated positively with self-reported anxiety, depression, post-traumatic stress symptoms and dissociation among children in OHC. Children's age and time since removal from OHC, however, was shown to correlate. Children's age was negatively correlated with TSCC (Trauma Symptom Checklist for Children) anxiety (-0.18) and TSCC depression (-0.22). Time since removal was negatively correlated with TSCC subscales for anxiety (-0.21), depression (-0.21) and PTS (-0.16) [26].

Somatic Health During Out-Of-Home Care

Of eight studies reporting somatic health status of study participants during OHC, three of eight articles [17,22,25] reported the state of physical health at a general level. One study compared the population rate (per 10000 children) for hospitalization due to physical health conditions between three study groups of children (unknown to child protection services, known to child protection services, with at least one OHC placement before age 13 years). The rate was shown to decline by advancing age (by one-year age band) in the same pattern in each study group, except no change in rate was found in OHC group between ages 10 and 11 years. The population-based rates of physical hospitalizations were significantly higher for both children known to child protection services and in the OHC group compared with children unknown to child protection services (17). Further, based on clinical assessment, foster care children, compared to age-matched peers, were reported to have a higher rate of any physical health condition (1105.0 vs 685.1 per 100 000 person-months) [25]. One study utilizing children's self-reports [22] analysed health profiles of children in OHC in comparison to the school-based reference sample. The results showed that the OHC group, compared to reference sample, had relatively more "fair" (30.5% vs 29.6%), "poor" (17.6% vs 17.3%) and "worst" (13.0% vs 10.3%) health status and less "best" (38.9% vs 42.7%) health status.

Five [6,18,20,24,26] articles reported detailed findings of somatic health of children during OHC. Based on clinical assessment, prior maltreatment was shown to associate with increased sensory disability and motor disability, parental drug/alcohol use with decreased motor disability and psychosocial stressors with increased sensory disability and motor disability [24]. The study comparing fostered children to those without foster care involvement using clinical assessment, showed that fostered children exhibited higher rates of physical health conditions such as hearing problems (2% vs 1%), vision problems (3% vs 2%), middle-ear infection (13% vs 11%), respiratory infection (36% vs 35%), dental problems (7% vs 5%), dermatological problems (15% vs 13%), injuries (20% vs 18%) and complex chronic conditions (6% vs 5%) [20]. Furthermore, one study reported that 41% of the children in OHC had a medical history, 8% were in long-term care for illness, as well as 19% having regular medical treatment, of which 18% was asthma medication or antihistamines [18]. Children who had experienced sexual abuse as a psychological stressor had self-reported significantly more somatic symptoms (SS) than those without exposure to sexual abuse [26]. In the same study, females had higher prevalence of being dizzy and sick to stomach compared to males. Further, according to primary caregiver ratings, dizziness, nausea, stomach aches and vomiting were more common in females, while males had more restlessness [26]. Another study using self-reports found that children in OHC had activity limitations more commonly and they were more likely to have asthma than children not placed in OHC [6].

Mental Health After Out-Of-Home Car

Three [19,21,23] of eleven articles under review reported mental health findings in children discharged from OHC. All the findings were based on youths' self-reports. As for mental illnesses diagnosed after OHC, youths from OHC were reported more likely to have been diagnosed with ADHD compared to youths without OHC [23]. Further, physical abuse was shown to have a positive correlation with physical neglect (0.29), emotional abuse (0.71) and hiding feelings (0.31) [19]. One study documented that alcohol use, drug use and substance use varied but in total increased during follow-up period of three years after OHC [21].

Somatic Health After Out-Of-Home Care

In all three articles reporting health after OHC, physical health findings of the study subjects were based on youths' self-reported data. Two articles focused on experiences of general health status [21,23]. One study followed the health status of former foster youths three years after discharge from OHC and showed that the best health status was found at the nearest time point after discharge [21]. Further, children with a history of OHC were documented to have a higher likelihood of reporting poor or fair general health (OR 2.30) compared to children who had lived in an economically secure family environment and without history of OHC placement [23]. In their study, the youths with a history of OHC were more likely

to have cardiovascular risk factors than their peers. Negative correlation was found between seeking social support after OHC and somatic symptoms (-0.24), and meeting diagnostic criteria for conduct disorder was related to increased somatic symptoms [19].

Table 3. Main findings, conclusions, clinical recommendations and research implications of the reviewed studies.

Study	Objective of the study	Findings, somatic health	Findings, psychiatric health	Conclusion
During out-of-home care (OHC)				
Kaferly et al. (2023) [25]	To determine the prevalence and rates of physical, behavioural and chronic health conditions among Medicaid-enrolled children by foster care eligibility codes	Foster care children vs. peers: • Any physical health condition, rate per 100000 PMs (person months): 1105.0 PMs vs. 685.1 PMs • Chronic health conditions with behavioural health condition (55.2% vs. 38.6%) For both study groups the most common body-system conditions were respiratory/ pulmonary, neurologic and any progressive	Foster care children vs. peers: • Diagnosed behavioural health condition (36.5% vs. 12.1%,), rates increased with age and were higher in men • For each F-code category, prevalence within the foster cohort exceeded those of peers. Four most common were anxiety disorder, F41.9 (32.4% vs. 7.9%), ADHD, F90 (18.2% vs. 3.8%), autistic disorder, F84.0 (15.8% vs. 5.6%), major depressive disorder, F32.0 (13.9% vs. 4.6%) • Comorbidity rates among four main F-code categories were higher among foster cohort compared to peers (2 categories: 16.0% vs. 4.1%, 3 categories: 5.2% vs. 0.7%, all 4 categories: 1.4% vs. 0.2%)	Psychosocial stressors like maltreatment predicted poor physical, mental and developmental health
Kools et al. (2013) [22]	To define health profiles of adolescents during OHC	OHC children vs. school-based sample: • Excellent health (21.4% vs. 14.3%), high discomfort (6.9% vs. 5.2%), high risks (12.2% vs. 9.0%), dissatisfied/high risks (2.3% vs. 1.9%), high discomfort/ high risks (4.6% vs. 1.7%), worst health (13.0% vs, 10.3%) • Combined health categories: Fair (30.5% vs. 29.6%), poor (17.6% vs. 17.3%), worst (13.0% vs. 10.3%) and best health status (38.9% vs. 4.2.7%)	Foster care group: • 35.3% of those with worst health status and 7.8% of those with best health status had history of sexual abuse • 29.4% of adolescents with worst health status had aggression, substance abuse and suicidality, of those with best health status, 17.6% had aggression, 5.9% substance abuse and 2.0% suicidality • 17.4% with poor health and 2.0% with best health had experienced a death or a suicide of parent	Children experiencing parental opioid use disorder were involved with the foster care system at faster rates than children in the general population. Foster care involvement was associated with worse mental health, developmental, and substance use–related outcomes and with higher healthcare utilization. Children are more likely to receive healthcare services while in foster care but cease to receive these services after exiting care and are less likely to receive them prior to entering care

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Study	Objective of the study	Findings, somatic health	Findings, psychiatric health	Conclusion
Kugler et al. (2012) [26]	To determine the extent of association between somatic symptoms (SS) and clinical variables (i.e. type of abuse, anxiety, post-traumatic stress symptoms, anger, dissociation and depression)	Foster care children: • Children who had experienced sexual abuse reported to have significantly more SS than those without experience of sexual abuse (t(159)=2.69)) • On the child-rated measure of SS, gender difference (females vs. males) was found in dizzy (1.26 vs. 0.79) and sick to stomach (1.25 vs. 0.85) and sum of SS (13.28 vs. 10.65). • On the primary caregiver-rated SS, gender difference (females vs. males) was found in restless (0.76 vs. 1.07), dizzy (0.10 vs. 0.02), nausea (0.15 vs. 0.06), stomach aches (0.22 vs. 0.08) and vomiting (0.11 vs. 0.01) • Child-rated SS correlated positively with age (r=0.17) • Caregiver-rated SS correlated negatively with age (r=-0.21)	Foster care children: • Children who had experienced sexual abuse reported to have significantly more SS than those without experience of sexual abuse (t(159)=2.69)) • On the child-rated measure of SS, gender difference (females vs. males) was found in dizzy (1.26 vs. 0.79) and sick to stomach (1.25 vs. 0.85) and sum of SS (13.28 vs. 10.65). • On the primary caregiver-rated SS, gender difference (females vs. males) was found in restless (0.76 vs. 1.07), dizzy (0.10 vs. 0.02), nausea (0.15 vs. 0.06), stomach aches (0.22 vs. 0.08) and vomiting (0.11 vs. 0.01) • Child-rated SS correlated positively with age (r=0.17) • Caregiver-rated SS correlated negatively with age (r=-0.21)	Mental health hospitalizations for OHC children, 2.5 % of the cohort, were 5-fold greater than expected
Lindley & Slayter (2018) [24]	To study association between prior trauma exposure (maltreatment, parental drug/ alcohol use, psychosocial stressors) and serious illness among foster children at end of their life	34.1% of foster children had physical health problems, 10% sensory disabilities and 15% motor disabilities 68% had experienced maltreatment, 28% exposure to parental drug/alcohol misuse, and 39% psychosocial stressors Prior maltreatment associated (aOR, 95%CI) to • Physical health problems (aOR 1.78, 1.50-2.12) • Sensory disability (aOR 1.68, 1.27-2.22) • Motor disability (aOR 1.44, 1.15-1.80) Psychosocial stressors to • Physical health problems (aOR 1.48, 1.27-1.73) • Sensory disability (aOR 1.52, 1.20-1.93) • Motor disability (aOR 1.49, 1.22-1.82) Parental drug/alcohol use to * Motor disability (aOR 0.79, 0.62-0.99)	10% of foster children had mental/ behavioural health problems and 10% intellectual disabilities 68% had experienced maltreatment, 28% exposure to parental drug/alcohol misuse and 39% psychosocial stressors Prior maltreatment associated (aOR, 95%CI) to • intellectual disability (aOR 1.61, 1.23-2.10) Prior psychosocial stressors associated to • mental/behavioural health problems (aOR 1.53, 1.20-1.96) • Intellectual disability (aOR 1.40, 1.11-1.77) i Parental drug/alcohol use to • Intellectual disability (aOR 0.72, 1.11-1.77)	Children and adolescents in OHC have significantly higher healthcare needs compared to their peers
Meinhofer et al. (2024) [20]	To examine the health and healthcare outcomes of children experiencing parental opioid use disorder (POUD) with and without foster care involvement	Foster children vs. children without foster care involvement (rate difference, 95%CI): • Asthma (8% vs. 8%, diff 0.39, 0.25-0.52) • Hearing problem (2% vs. 1%, diff 0.92, 0.86-0.99) • Vision problem (3% vs. 2%, diff 1.35, 1.27-1.43) • Middle-ear infection (13% vs. 11%, diff 1.19, 1.05-1.33) • Respiratory infection (36% vs. 35%, diff 0.72, 0.51-0.93) • Dental problem (7% vs. 5%, 1.19, diff 2.06-2.27) • Dermatological problem (15% vs. 13%, diff 2.19, 2.04-2.34) • Injuries (20% vs. 18%, diff 3.45, 3.29-3.62) • Complex chronic condition (6% vs. 5%, diff 1.67, 1.56-1.79)	Foster children vs. children without foster care involvement (rate difference, 95%CI): • Depression (10% vs. 4%, diff 6.05, 5.91-6.19) • Anxiety (9% vs. 5%, diff 4.84, 4.71-4.98) • Trauma and stress (35% vs. 7%, diff 27.4, 27.2-27.6) • ADHD/conduct or impulse disorder (25% vs. 12%, diff 14.0, 13.7-14.2) • Suicidality and self-harm (3% vs. 1%, diff 2.05, 1.98-2.13) • Developmental delays (12% vs. 7%, diff 4.91, 4.74-5.07) • Substance use–related disorders (4% vs. 1%, diff 2.96, 2.88-3.05)	Children placed in out-of-home care have poorer mental and physical health compared to children not placed in out-of-home care

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Study	Objective of the study	Findings, somatic health	Findings, psychiatric health	Conclusion
Neil et al. (2019) [17]	To estimate the costs of hospitalization by child protection status, including out-of-home care (OHC) placement, and to assess the excess costs associated with child protection contact	Study addressed general physical health-related reasons for hospitalizations, no accurate diagnoses-based information The rate of hospitalization for physical health condition reduced with age for all subgroups except for the OHC subgroup at 10 ≤11 years	The study addressed all psychiatric diagnoses (ICD-10 Chapter V (F00-F99)). At 0 ≤ 1 year hospitalizations were predominantly for sleep disorder and at 1 ≤ 5 years sleep disorders, developmental disorders including autism and oppositional defiant/conduct disorders were the most prominent diagnoses According to child protection status, there was no consistent trend in the population rate for children hospitalized for mental health reasons In the first year of life the rate of hospitalization for mental health reasons were significantly lower for the children ever placed in OHC (9151.8 children/ 10000 population) compared to children unknown (9480.3/10000) and known (9456.1/10000) to child protection services	Mental health hospitalizations for OHC children, 2.5 % of the cohort, were 5-fold greater than expected
Toussaint et al. (2023) [18]	To explore overall health status of children entrusted to care of the child protection and welfare service	Of all children placed to OHC (foster care, residential care) • 41% had a medical history (for example, atopic condition, allergy, surgical history) • 8% were under long-term care for illnesses such as diabetes, epilepsy, genetic disease or rarer chronic diseases • 19% were under regular medical treatment, of which 18% were long-term treatment for asthma or an antihistamine • 68% of children had a normal BMI, 16% were below <-2SD, 13% were overweight and 3% were obese • 30% had orthodontic problems and 12% had caries	Of all children placed to OHC • 51% manifested their psychological suffering • 8% were under long-term care for illnesses such as autism, ADHD • 29% written or oral language disorder and 5% were diagnosed with "dys-" problems • 29% had sleep disorders • 19% were under regular medical treatment, 43% of these were psychiatric treatments • 16% of children over the age of 6 years already ran away or put themselves in danger (unprotected sex, sexual photos posted on social networks, criminal acts, multiple addictions with loss of self-control, dangerous acts in a car, etc.) • 44% of 501 of the study children had visual problems • 54% benefited from follow-up care, including psychomotor (15%), psychological (45%), or child psychiatric (21%) therapist • In over 12-year participants, 17% has admitted to regular tobacco use, 12% to regular alcohol use and 6% to regular cannabis use	Children and adolescents in OHC have significantly higher healthcare needs compared to their peers

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Study	Objective of the study	Findings, somatic health	Findings, psychiatric health	Conclusion
Turney & Wildeman (2016) [6]	To compare somatic and psychiatric health between children with and without history of placement in out-of-home care.	Children with OHC vs. no OHC placement (prevalence, OR, 95%CI): • Activity limitations (9.8% vs. 4.8%, OR 2.15, 1.34-3.44) • Asthma (18% vs. 8.7%, OR 2.32, 1.39-3.87) When adjusted for child´s characteristics likelihood for asthma (OR 2.10, 1.19-3.70) and activity limitations (1.85, 1.12-3.06) remained significant	Children with OHC vs. no OHC placement (prevalence, OR, 95%CI): • learning disabilities (14.7% vs. 7.6%, 2.09, 1.29-3.38), developmental delays (7.3% vs. 3.4%, 2.25, 1.36-3.72), speech problems (11.2% vs. 4.7%, 2.56, 1.40-4.68) • ADD/ADHD (21.8% vs. 7.4%, 3.51, 2.22-5.56), anxiety (14.2% vs. 3.1%, 5.10, 3.16-8.25), behavioural problems (17.5% vs. 2.9%, 7.17, 4.37-11.77) and depression (14.2% vs. 2.0%, 8.15, 4.89-13.60) When adjusted for child characteristics, a greater likelihood for ADHD/ADD (OR 4.29, 2.68-6.88), learning disability (1.90, 1.13-3.21), depression (8.88, 4.84-16.27), anxiety (6.20, 3.73-10.30), behavioural problems (7.53, 4.45-12.74), developmental delay (2.03, 1.21-3.41) and speech problems (2.68, 1.41-5.08) remained significant When adjusted for household characteristics, a greater likelihood for ADD/ADHD (3.00, 1.91-4.71), depression (4.92, 2.63-9.18), anxiety (3.94, 2.36-6.60), behavioural problems (4.22, 2.59-6.88) and speech problems (1.91, 1.01-3.61) among children in OHC remained significant	Children placed in out-of-home care have poorer mental and physical health compared to children not placed in out-of-home care
After out-of-home care				
Ahrens et al. (2014) [23]	To evaluate the risk of cardiovascular risk factors and other chronic conditions among young adults	Former foster care (FC) group vs. economical secure general population (ES) group: • poor or fair general health (FC vs. ES) (OR 2.30; 95% CI, 1.84 to 2.89) • females: high BMI (B = 1.73 CI 0.86-2.61) • males: low BMI (B = -0.26 CI -1.07-0.55) • At least one cardiovascular risk factor (FC vs. ES B = 2.20 Cl 1.76-2.76), EI vs. ES B = 1.65, Cl 1.32-2.06) These gaps were wider for females than males	FC group was the most likely to report ADHD. EI group was less likely to report ADHD than the ES group	Former foster youth have a higher risk of multiple chronic health conditions, beyond that which is associated with economic insecurity

Study	Objective of the study	Findings, somatic health	Findings, psychiatric health	Conclusion
Jones (2014) [21]	To present health problems and access to care among former foster youth	Former foster youth (n=129): At 6 months after discharge from OHC (n=92): • 22.8% excellent health, 27.2% very good health, 30.4% good health, 18.5% fair and 0% poor health At 1 year after discharge (n=66) • 16.7% excellent health, 15.2% very good, 45.5% good health, 13.9% fair and 9.9% poor health At 2 years after discharge (n=43): • 14.0% reported excellent health, 34.9% very good, 27.9% good, 14.0% fair and 9.3% poor health At the interview 3 years after discharge (n=16): • 25.0% reported excellent health, 12.5% very good, 37.5% good, 25.0% fair and 0% poor health	Former foster youth: • Clinical or borderline alcohol use: 6 months 17.8%, 1 year 18.2%, 2 yrs 19.0%, 3 yrs 37.5% • Drug use: 6 months 27.5%, 1 year 28.8%, 2 yrs 25.6% 3 yrs 31.3% • Substance use: 6 months 23.9%, 1 year 27.6%, 2 years 26.8%, 3 years 31.3% • Total problems: 6 months 18.5%, 1 year 14.3%, 2 yrs 7.0%, 3 yrs 12.5% • External problems: 6 months 23.9%, 1 year 15.2%, 2 yrs 16.7%, 3 yrs 18.8% • Internal problems: 6 months 10.9%, 1 year 7.6%, 2 yrs 14.0%, 3 yrs 18.8% • Any clinical or borderline diagnosis: 6 months 30.5%, 1 year 25.8%, 2 yrs 20.9%, 3 yrs 26.7% • Any clinical or borderline mental health and substance use diagnosis: 6 months 50.5%, 1 year 52.4%, 2 yrs 38.1%, 3 yrs 46.7%	During three years after discharge from foster care the mental health problems and substance abuse remained high among former foster youth
Scott & McCoy (2018) [19]	To study the association between somatic symptoms and psychological factors among males transitioning from foster care	Negative correlation was found between seeking social support and somatic symptoms (correlation -0.24, p<0.5). Symptoms of conduct disorder increased somatic symptoms	Physical abuse had positive correlation with physical neglect, emotional abuse and hide feelings.	Conduct disorder and seeking social support coping strategies had a significant effect to somatic symptoms

Note
Mental health measurements/classifications: ADHD = Attention Deficit Hyperactivity Disorder (Kaferly, 2023, Meinhofer, 2024, Toussaint 2023, Turney, 2016 Ahrens, 2014), CDI = Children's Depression Inventory (Kugler, 2012), TSCC = Trauma Symptom Checklist for Children (Kugler, 2012), PTS = Post-traumatic stress subscale (Kugler, 2012), ICD-10 = International Statistical Classification of Diseases and Related Health Problems, 10th Revision (Neil, 2019) ADD = Attention Deficit Disorder (Turney, 2016)
Somatic health measurements/classifications: SS = somatic symptom (Kugler, 2012), ICD = International Statistical Classification of Diseases and Related Health Problems (Neil, 2019), BMI = Body Mass Index (Toussaint, 2023, Ahrens, 2014)
General abbreviations: FC = foster care (Ahrens, 2014), ES = economically secure (Ahrens, 2014)

DISCUSSION

This systematic review aimed to clarify the understanding of health-related trajectories of children placed in out-of-home care. The aim was to elucidate studies concerning both the somatic and mental health of children in OHC in relation to the timing of placement in OHC.

An important finding of this review was that the number of articles that comprehensively reported both somatic and mental health of children placed in OHC was small, and there were no studies addressing the issue of before the placement. The small number of studies addressing comprehensive health, and their absence before OHC, was surprising, because there is a plethora of studies focusing and reporting either on only mental or physical health of children involved in OHC. It was also noteworthy that despite the inclusion criteria of the review, including articles reporting findings on both somatic and psychiatric health, the studies did not report the integrated findings of somatic and psychiatric health, and thus a comprehensive picture of health was not formed. However, since the mental and somatic health of persons are strongly linked and have a bidirectional impact on one another, research-based information including both aspects are needed and particularly in vulnerable populations like children placed in out-of-home care.

According to this review, the vast majority (73%) of the studies focused on examining the health of children during

their OHC placement. A plausible explanation for this is that during OHC, children are easily reachable for research purposes and these children are under continuous observation. Further, accessibility to research at this time point may be better, because personnel of OHC or foster parents have a duty to take care of the health of these children. It is notable that we did not find any study addressing the time before the placement in OHC, and only three reviewed articles analysed the health of children after discharge from OHC. The lack of published studies of the health status of children before their OHC placement is concerning and indicates a notable research gap of knowledge of the comprehensive health status of children in OHC. A firm and research-based understanding of the health of children before their placement is needed to find targets for early prevention of health-related adversities. Early intervention in health problems would be important because these problems are known to have a significant impact on success at school and also on later professional career [27].

In the reviewed studies, the follow-up of children with a history of OHC ended at the latest during young adulthood at the age of 26. Thus, there are no studies reporting findings of their comprehensive health in later adulthood. This finding, together with the absence of studies from the period before OHC, indicates that there is a research gap in studies that examine the lifetime trajectory of the comprehensive health of children in OHC. Much longer follow-up studies of OHC-placed persons, for example, by utilizing long-term national cohorts, would be important because there are earlier studies which indicate that OHC is associated with far-reaching unfavourable health and social outcomes, including increased risk of mental and physical health problems and inability to work [9].

The findings of our systematic review show that there are many differences between the mental and somatic health of children placed in OHC when compared to those without a history of OHC. For example, it was shown that of physical health conditions, chronic illnesses are more prevalent among foster care children compared to their peers [25]. However, it is notable that differences between the health of these two groups are most apparent in mental health outcomes [6]. An important finding concerning excess of somatic symptoms that was based on self-reports of children who had experienced sexual abuse who had significantly more somatic symptoms than those without this experience [26].

In our review only two studies were identified that examined direct differences between boys and girls [25,26], although nine studies reported the number of different genders in study samples. In the study of Kafferly et al. 2023, self-reported information on the health of children during OHC reported that girls had more dizziness, stomach aches, nausea and vomiting, compared to boys. Of mental symptoms, males had more restlessness compared to females. In the future it would be important to study more comprehensively the differences in health between boys and girls in OHC to be able to develop and direct more specific support for these children.

An important finding in this review about the methodologies of the evaluated studies was that in six of the eleven studies the findings were based on self-reports through interviews or questionnaires [6,19,21,22,23,26], and in only five articles were the findings based on clinical assessment and diagnosed disorders according to ICD- or DSM-based criteria [17,18,20,24,25]. However, despite the differences in research methods used, the results were consistent. It is also notable that the findings in all three studies that focused on health after OHC were based only on self-reports [19,21,23]. A relatively small number of studies based on objective assessment had an impact on the reliability of the results concerning health status. Therefore, it is justified to conclude that more studies with accurate diagnostic methods are needed to form a more specific picture of health of children and youth in OHC.

STRENGTHS AND LIMITATIONS

The main strength in this review was the systematic information retrieval which followed the PRISMA guidelines [15]. The quality assessment of the reviewed studies was performed by using a modified STROBE checklist [16] by whole study group.

This review has some limitations as well. First, the articles were searched by using the medical literature search interface of PubMed, and as a result it is possible that some articles may have been missed, because other databases, like Google Scholar, Scopus or Web of Science, were not utilized. However, we believe that we have found all relevant medical studies around this topic, because in this review we focused on health conditions which are most commonly reported in medical journals and we utilized the most common and comprehensive medical database [29]. One weakness in terms of generalizability of the results was that our review included only one article from Europe and the others were from USA and Australia. These countries, however, represented well the Western world.

CLINICAL RECOMMENDATIONS

The clinical health status and treatment needs of children placed in out-of-home care need be comprehensively evaluated,

covering all time phases in relation to OHC, i.e. before, during and after placement in out-of-home care. The evaluation of health status during OHC placement is of great importance, to provide and ensure timely support and treatment, especially for mental disorders and also for physical health conditions. Our findings revealing the small number of comprehensive health-related studies and the clear research gap in studies before placement indicate that health assessments are not fulfilled appropriately, although they are based on legislation. On a practical level, unified and systematic models [30] to assess the comprehensive health of the children in OHC are urgently needed to ensure health-related services [31] for these children. At the transition phase from out-of-home care to independent life, the possible need for treatment and the arrangement of treatment should be considered, as the state of health of these people is known to be weaker in the long term.

CONCLUSION

This review clearly demonstrated a paucity of research comprehensively analysing both the mental and physical health status of children needing placement in out-of-home care. The majority of the studies under review examined the health of children during OHC, but none had focused on the time frame before entering OHC. Creating a more thorough picture of the health of these children is important in order to be able to promote their healthy mental and physical development and avoid long-term negative outcomes in their later health and coping in life. In Finland, this issue is currently particularly important due to the recent and ongoing reform of social and wellbeing services, which has transferred responsibility for children's social and healthcare to wellbeing services counties.

Supplementary Material

Supplementary data are available at Psychiatria Fennica online.
Table 1.
Table 2.
Table 3.

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ILKKA OJANSUU, JARI TIIHONEN, MARKKU LÄHTEENVUO

DEATHS BY SUICIDE DURING INPATIENT TREATMENT AMONG FINNISH FORENSIC PSYCHIATRIC PATIENTS

ABSTRACT

This study examined deaths by suicide during inpatient forensic psychiatric treatment in Finland between 1980 and 2009. The cohort included 1,253 patients (153 women, 1,100 men) assigned to involuntary treatment after being deemed criminally irresponsible due to mental illness. The patients were followed until the end of 2011, during which 351 deaths occurred, including 31 suicides. Suicides occurred on average 3.3 years after treatment initiation, with a mean age of 37.2 years at death. Hanging was the most common method (64.5%), followed by drug overdose, drowning and jumping from a height. Suicide risk persisted throughout the entire course of treatment, from as early as one month to more than 14 years after admission. The analyses revealed that 32.3% of those who died by suicide had committed a violent offense against a family member (e.g. parent, child or spouse), compared to 17.7% of those who did not, a statistically significant difference (p=0.037). Additionally, substance use disorder (SUD) was significantly less common among patients committing suicide (41.9%) than among non-suicide patients (60.5%), a difference that was statistically significant (p=0.042). These findings suggest that suicide during forensic psychiatric care may be associated with a history of serious intrafamilial violence and that it may occur independently of comorbid substance use. The persistence of suicide risk over extended treatment periods highlights the importance of continuous risk assessment and individualized support strategies throughout the course of forensic psychiatric hospitalization.

KEYWORDS: FORENSIC PSYCHIATRY, SUICIDE, INPATIENT TREATMENT, SCHIZOPHRENIA

INTRODUCTION

Mental disorders are known to be associated with an increased risk of suicide (1). Due to differences in study designs and follow-up periods, results have varied, but a broad meta-analysis concluded a standardized mortality ratio (SMR) of 12.9 for suicide mortality in schizophrenia (2).

Among schizophrenia patients, suicide mortality tends to be higher in younger age groups and early stages of the illness (3,4). In a Finnish dataset, the highest risk was among those aged 15–29 (5). Other associated risk factors include male gender, high education and intelligence before illness onset, depression, previous suicide attempts and substance abuse as well as disorder-related agitation and restlessness, active hallucinations and delusions, impulsive behaviour, fear of mental disintegration, poor treatment compliance, repeated short hospitalizations and hopelessness, as well as social factors such as being single and living alone (3,6,7).

The greatest risk of suicide for schizophrenia patients is considered to be during psychiatric care and in the first few weeks following discharge, though the risk remains elevated for at least a year post-discharge. This elevated risk is thought to be related to symptom alleviation and increased awareness of one's condition. (8,9,10)

Psychiatric research often focuses on specific diagnostic groups or treatment types. For forensic psychiatric patients, however, cross-country comparisons are more complicated (11). In Finland, forensic psychiatric patients must have a diagnosed serious mental disorder, in practice psychosis and most often schizophrenia spectrum, unlike in some other countries where personality disorders, for example, can also warrant forensic psychiatric care. Therefore, comparing mortality

data internationally is problematic due to differences in legal systems, which may lead to differences in treatment practices and definitions of forensic patients.

In a British study comprising 595 forensic psychiatric patients, the standardized mortality ratio (SMR) for those treated due to a mental disorder was 6.3, while the SMR for those who died by suicide was 35.5 (12). In a Japanese study involving 785 forensic psychiatric patients receiving treatment for psychotic disorders, the overall SMR was 2.6, and the SMR for suicide mortality was 17.7 (13). In another British dataset of 5,955 forensic psychiatric patients, 54.1% were diagnosed with a mental illness (the rest had psychopathic disorder or mental impairment) (14). Among those 3,205 with mental illness, 78 patients died by suicide during treatment and 140 after treatment had ended. The SMR for suicides occurring during treatment was 40.1 for women and 6.6 for men. For suicides that occurred after discharge, the SMR was 44.9 for women and 23.3 for men.

Among Finnish forensic psychiatric patients, overall mortality has been found to be three times higher than that of the general population (15). While most deaths were associated with somatic illnesses, the largest discrepancy in mortality compared to the general population was observed in suicide mortality, which was more than sevenfold (SMR 7.1) (16).

To effectively reduce deaths by suicide, it is essential to gain further insight into the subset of patients who die by suicide during inpatient treatment.

MATERIALS AND METHODS

The sample consisted of 1,253 patients assigned to forensic psychiatric treatment in Finland from 1980 to 2009. Their mental state was assessed by the Finnish Institute for Health and Welfare (THL) based on court orders. These patients were deemed criminally irresponsible due to mental illness and were committed into involuntary treatment instead of imprisonment. Data were collected from THL's forensic psychiatric board records. The patients were followed until the end of 2011 through two national registers (National Cause of Death Register of Statistics Finland and the National Institute for Health and Welfare's Forensic Psychiatric archive). During this time, 351 patients died, and the cause of death was obtained from Statistics Finland for all deceased.

Chi-Squared Test was used to evaluate statistical difference in substance use and having the index criminal act committed against a family member between the total cohort and those who committed suicide during treatment. These variables were chosen due to being available from the dataset and being clinically relevant. No other variables were tested. P-values were not corrected for multiple comparisons and a p-value below 0.05 was considered statistically significant.

The SMR was calculated as the ratio of deaths observed in the data and deaths expected based on the mortality data for the general population and using the person-year method, 95% confidence interval and Poisson distribution.

This study was purely registry based and involved no direct contact with subjects. Approval was granted by THL and Statistics Finland.

RESULTS

The study consisted of 1,253 patients committed to forensic care, of whom 153 (12.2%) were women and 1,100 (87.8%) were men. All patients included in the data had a psychotic disorder, mostly (87%) on the schizophrenia spectrum (ICD-10: F20-29). More specifically 60% had schizophrenia (ICD-10: F20.x), 13% had delusional disorder (F22.x), 9% had schizoaffective disorder (F25.x), and the rest other psychiatric disorders affecting reality testing.

Of the patients, 31 committed suicide while in forensic psychiatric treatment. This resulted in an SMR of 7.39 (95% CI 5.2–10.5) (This figure has been previously published in a thesis)17. Of those 31 who committed suicide, 4 (12.9%) were women and 27 (87.1%) were men, 30 (96.8%) had a diagnosis of schizophrenia spectrum, more specifically 18 (58.1%) had a diagnosis of schizophrenia, 6 (19.4%) delusional disorder and 2 (6.5%) schizoaffective disorder. The only one who committed suicide without a schizophrenia spectrum disorder had been diagnosed with dementia. The average time from the beginning of treatment to suicide was 3.3 years (median 2.1 years, range 0.1–14.2 years). The average age at time of suicide was 37.2 years (median 33.2, range 19.8–71.1 years).

The most common method of suicide was hanging, which accounted for 20 (64.5%) of the suicides. Of those who hanged themselves, 18 (90%) were men and 2 (10%) were women. Hanging had been carried out on average 3.0 years from the beginning of treatment (median 2.2 years, range 0.1–12.3 years).

The second most common method of suicide was drug overdose, which accounted for 4 (12.9%) of the suicides. All of these who committed suicide were men, and the suicide had been carried out on average 2.9 years from the beginning of treatment (median 2.9, range 1.2–4.8 years).

The third most common method of suicide was drowning, which accounted for 3 (9.7%) of the suicides. All of these who

committed suicide by drowning were men, and the suicide had been carried out on average 5.8 years from the beginning of treatment (median 2.6 years, range 0.6–14.2 years).

The fourth most common method of suicide was jumping from a height, which accounted for 2 (6.5%) of the suicides. One of these patients was a woman and the other a man. These suicides had been carried out on average 1.0 year from the beginning of treatment (median 1.0, range 0.9–1.1).

The number and temporal occurrence of suicides, divided by suicide category and gender, is presented in *Table 1*.

Out of the total sample of 1,253 patients, 753 had committed a homicide, attempted homicide or aggravated assault. Of these, 226 were directed at a family member (spouse, mother, father or own child), meaning that 18.1% of the total patient sample had targeted a family member. Among those 31 who died by suicide, 22 had committed similarly serious violent crimes, and of these, 10 (32.3%) were directed at family members, indicating a statistically significant difference between the groups (X^2=4.35, p=.037). Of the total sample, 752 (60%) had a substance use disorder, while only 13 of the 31 (42%) who committed suicide had one, indicating a statistically significant difference between the groups (X^2=4.33, p=.037). A statistical comparison using the Chi-Squared Test for these variables is presented in *Table 2*.

DISCUSSION

Deaths by suicide during forensic psychiatric care were alarmingly common and the suicide mortality among Finnish forensic psychiatric inpatients was seven times higher during care than in the general population, indicating a clear failure in care. Although 87% of those who died by suicide were men, this aligns with the gender distribution of the forensic psychiatric population, indicating that there are no clear gender differences.

The timing of suicides varied widely, from 1 month to over 14 years, averaging 3.3 years, showing that suicide risk exists throughout the treatment period and requires vigilance and risk assessment from the staff throughout treatment. The

Table 1. Characteristics of suicides during treatment.

	N	Time from start of treatment, mean (years)	Age at death (range)
Suicides, all	31	3.3	37.2 (19.8-71.1)
Male	27	3.2 (0.1-14.7)	38.7 (21.0-71.1)
Female	4	4.0 (0.2-9.7)	27.7 (19.8-33.2)
Suicide by hanging, all	20	3.0 (0.1-12.3)	39.9 (25.0-71.1)
Male	18	3.1 (0.1-12.3)	41.2 25.0-71.7)
Female	2	2.7 (0.16-5.3)	29.0 (26.1-31.9)
Suicide by drug overdose, all	4	2.9 (1.2-4.8)	29.5 (21.5-38.7)
Male	4	2.9 (1.2-4.8)	29.5 (21.5-38.7)
Female	-	-	-
Suicide by drowning, all	3	5.8 (0.6-14.2)	36.7 (35.5-38.0)
Male	3	5.8 (0.6-14.2)	36.7 (35.5-38.0)
Female	-	0 (0)	0 (0)
Suicide by jumping from a height, all	2	1.0 (0.9-1.1)	20.4 (19.8-21.0)
Male	1	1.1 (1.1)	21.0 (21.0)
Female	1	0.9 (0.9)	19.8 (19.8)

→

	N	Time from start of treatment, mean (years)	Age at death (range)
Suicide by other means, all	2	5.2 (0.7-9.7)	43.5 (33.2-53.8)
Male	1	0.7 (0.7)	53.8 (53.8)
Female	1	9.7 (9.7)	33.2 (33.2)

Table 2: Statistical Comparison Between Suicide and Non-Suicide Patients using Chi-Squared Test.

Variable	Suicide Group (n = 31)	Non-Suicide Group (n = 1222)	p-value
Family-Targeted Violence	10 (32.3%)	216 (17.7%)	0.037
Substance Use Disorder	13 (41.9%)	739 (60.5%)	0.037

ages of patients committing suicide ranged from 19 to 71 years. While suicides were more common among younger individuals (median 33 years), older patients were also at risk.

Hanging was the predominant method (64.5%), likely due to limited means in closed environments. Other methods were less common, with drug overdoses and drownings averaging longer treatment durations before occurring.

Interestingly, those individuals who had committed a violent crime against their family members were more likely to commit suicide during treatment. This may be due to aggravated guilt or remorse after realization of the criminal act. Also interestingly, those patients without a substance use disorder were more likely to commit suicide during inpatient treatment. Not having a substance use disorder may be an indication of a lesser degree of antisociality and thus a better ability for empathy and guilt, which may increase risk for suicide. Other risk factors for these patients likely also include the realization of their condition, as has been reported for the general base of patients with schizophrenia. Although our results stem from a single sample and should thus be considered exploratory and reflect only associations, not necessarily causative factors, these risk factors should be taken into consideration when assessing risk for suicidal behaviour during forensic psychiatric treatment.

Beyond recognizing risk factors, it's crucial to foster protective elements: safe ward environments, visibility and supervision, staff collaboration and suicide risk awareness (18). In addition to repeated suicide risk evaluation, reductions in treatment intensity should be gradual, ensuring meaningful daily activity (6,19).

Though the sevenfold risk is unacceptable, it is still lower than in other countries: British studies have reports over 35 times and Japanese over 17 times the general population's suicide mortality among forensic patients with schizophrenia (12,13).

Finnish forensic psychiatric patients' suicide mortality is comparable to that of general Finnish patients with schizophrenia (6.6 times higher) (20), but since most suicides in schizophrenia occur outside hospitals (10), the in-hospital sevenfold rate previously reported from this sample is particularly alarming. This may be due to longer treatment durations and the gravity of offences involved.

CONCLUSION

Deaths by suicide among forensic psychiatric inpatients are alarmingly high throughout treatment, affecting both young and older patients. Interestingly, those who had committed violence against family members, as well as those without a substance use disorder, were more likely to commit suicide during inpatient treatment. These findings underscore the need to enhance risk assessment and provide a safe treatment environment to prevent such outcomes.

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BASELINE CHARACTERISTICS OF PARTICIPANTS REFERRED TO ONE-YEAR MENTALIZATION-BASED TREATMENT (MBT) IN THE WELLBEING SERVICES COUNTY OF NORTH OSTROBOTHNIA

ABSTRACT

Background and objectives: *Evidence-based and structured Mentalization-Based Treatment (MBT) is being piloted in adult specialized psychiatric care in The Wellbeing Services County of North Ostrobothnia (Pohde) to ensure access, timeliness and sufficient range of treatments. This article outlines the baseline characteristics of participants referred to one-year MBT.* ***Materials and methods:*** *This non-randomized pilot study aims to investigate the effectiveness of individual MBT and analyse changes in patients' mental wellbeing, symptoms, psychosocial functioning, mentalization, service use and quality of life during MBT. Inclusion criteria of patients included age of 18–64 years; having a complex disorder presentation, i.e. comorbidity of at least two of the following: affective disorder, psychological trauma, personality disorder or signs or symptoms of personality disorder; and decreased functioning. The baseline interviews and questionnaires collected data on sociodemographic factors, clinical characteristics and diagnostics, functioning and measures used for assessing effectiveness. Axis 1 diagnoses were assessed using MINI interview. Here, we present the characteristics of the sample and descriptives of baseline values of measures of effectiveness.* ***Results:*** *Between September 2024 and March 2025, 53 patients were referred to this study, of whom 50 participants started MBT. Patients were referred to treatment from various sources, including both primary healthcare and specialized mental health services. The majority of participants were women, unmarried and had a mean age of 31.5 years. Only a few had previously received psychotherapeutic treatment. According to the MINI interview, the most common diagnoses were depression, anxiety disorders and post-traumatic stress disorder. On average, participants exhibited moderate to marked levels of clinical symptoms and reduced psychosocial functioning, indicating a clear need for mental health treatment. A higher clinical score of CORE-OM is associated with greater anxiety, uncertainty in mentalizing ability, interpersonal problems and attachment anxiety.* ***Conclusions:*** *This study provides valuable insights for improving the care of patients with severe mental health problems and a base for future studies of the effectiveness of individual MBT.*

KEYWORDS: MENTALIZATION, MBT, SEVERE MENTAL DISORDER, THERAPY, PSYCHOTHERAPEUTIC, TRANSDIAGNOSTIC

INTRODUCTION

Mental health disorders are common worldwide, affecting approximately one in eight individuals (1). Before the COVID-19 pandemic, one in six people in the European Union struggled with mental health issues (2). Recent unprecedented crises have exacerbated this situation, making mental health a crucial public priority and highlighting the need to improve access to timely and high-quality services (3).

In Finland, the National Mental Health Strategy and Programme for Suicide Prevention 2020-2030 aim for services that meet people´s needs, are client-driven, effective and available in a timely manner (4). To support this, The First-Line Therapies (“Terapiat etulinjaan”) has developed a stepped care

model for Finnish mental healthcare structures, which provides comprehensive services for creating and maintaining a stepped care model of evidence-based psychosocial treatments (5). The Wellbeing Services County of North Ostrobothnia (Pohjois-Pohjanmaan hyvinvointialue, Pohde) has adopted this model. It has become evident that the range of psychosocial treatments at higher steps that include patients with, e.g. multi-symptom and severe symptoms, is inadequate. As a result, an evidence-based and structured Mentalization-Based Treatment (MBT) is being piloted in specialized psychiatric care to ensure access, timeliness, continuity of psychotherapeutic care and a sufficient range of treatments (6).

Pohde was the first wellbeing services county in Finland to widely train healthcare professionals in the MBT method (6). It was also the first to integrate this treatment into its stepped mental healthcare system. MBT-accredited practitioners are trained in Pohde in close collaboration with the Mentalization Association ("Mentalisaatio ry") in Finland and the Anna Freud Centre (AFC) in the United Kingdom. MBT practitioner trainees are required to have at least one year's work experience in mental health services. Their educational backgrounds include a master's degree in psychology or a bachelor's degree in nursing or social services. Additionally, some completed psychotherapy training and worked as psychotherapists. By June 2024, 20 MBT-accredited practitioners had been trained in Pohde, and a new MBT training programme with 15 trainees was underway for the whole Northern Finland cooperation area.

Mentalizing is the process of understanding ourselves and others through thoughts, emotions and mental processes, both unconsciously and consciously (7). Mentalization is a skill needed to regulate emotions and relationships in various life situations. MBT is originally a structured, multimodal treatment with carefully managed pathways, both in terms of time in therapy over 12–18 months and within sessions, to treat patients with borderline personality disorder (BPD). The goal of the treatment is to increase individuals' mentalizing capacities. Effective mentalizing can strengthen self-understanding and the ability to deal with conflict, allowing better control of behaviour (8). MBT is a potentially effective approach for a wide range of clinical disorders, including personality disorders, depression and eating disorders. According to previous studies, it offers positive outcomes for patients with severe psychiatric diseases, high comorbidity, and for those who do not fit into a specific diagnostic category (9).

Previous studies have focused on MBT adaptations for specific disorders, such as antisocial personality disorder (MBT-ASPD; 10,11), narcissistic personality disorder (MBT-NPD; 12,13), trauma (MBT-TF; 14), psychotic disorder (MBTp; 15) or eating disorders (MBT-ED; 16). However, there is a growing need for a transdiagnostic approach (17) to better address the complexity, dimensionality and comorbidity of mental health symptoms in the current patient population. While MBT has been found effective for complex disorder presentation, existing studies have been nonetheless primarily concerned with specific diagnostic groups with comorbid presentation. To our knowledge, no previous studies have assessed the effectiveness of MBT in the more heterogeneous context of the stepped mental healthcare system. Due to the heterogeneity of the presentation, this pilot has focused on individual-level treatment. The training of the practitioners has included sections on the more common severe mental health disorder presentation through an MBT lens. Compromised ability to mentalize is a transdiagnostic risk factor for psychiatric ill-being, while changes in mentalizing have been considered a common factor in effective psychosocial treatments (18,19,20,21).

This article aims to describe a group of patients referred to MBT. It is important to characterize this group of patients because MBT is a new form of treatment within public mental and psychiatric services and units. Furthermore, previous research on MBT has focused primarily on group settings and psychotherapy centres abroad. The data for this study were collected throughout the Pohde outpatient psychiatric and mental health services region, including healthcare centres at both primary and specialized level from small municipalities to large cities, as well as specialized psychiatry outpatient clinics at Oulu University Hospital. Here, we present the sociodemographic background and clinical characteristics, diagnostics, and psychological state and trait characteristics of participants referred to one-year MBT.

MATERIALS AND METHODS

The Pilot study on Effectiveness of Mentalization-based Treatment (MBT) as Part of Stepped Mental Healthcare in Finland was approved by the Regional Medical Research Ethical Committee of the Wellbeing Services County of North Ostrobothnia (26/2024, August 19, 2024) and Oulu University Hospital (240/2024, September 12, 2024). The protocol was prospectively registered at the ClinicalTrials.Gov (ID: NCT06659211, September 25, 2024) before the first participants were interviewed. This individualized MBT methodology has been previously manualized and described by Bateman and Fonagy (as described; 8).

STUDY DESIGN AND GENERAL DESCRIPTION OF THE STUDY

The study design is a non-randomized clinical pilot study. The Pilot study on Effectiveness of Mentalization-based Treatment (MBT) as Part of Stepped Mental Healthcare in Finland aims to investigate the effectiveness of individual MBT and analyse changes in patients' mental wellbeing, symptoms, psychosocial functioning, mentalization, service use and quality of life. The data collection and MBT treatments started in September 2024 and are currently (in June 2025) ongoing. The length of MBT treatment is 12 months. Data collection includes a structured baseline clinical interview and a self-report survey of several measures, such as psychiatric symptoms, quality of life and psychosocial functioning. The primary outcome measure is the change in psychological symptoms and wellbeing, measured by Clinical Outcomes in Routine Evaluation – Outcome Measure (CORE-OM) (22,23). All outcomes are assessed at 6, 12 and 18 months. Further, we intend to collect data from medical records on a comparison group of patients receiving psychiatric treatment as usual, allowing the comparison of outcomes such as use of psychiatric services and medications and psychiatric symptoms.

In this current article, we will describe the data collected at the baseline of the study.

PARTICIPANTS

Participants were recruited from public outpatient mental health services in Pohde. The unit, which had newly accredited MBT practitioners, recruited participants for MBT from the mental health services referral queue or from the patient population already in the services. Among the patient population already in the services, we included patients who had started treatment within the last 3 months or who had been referred to MBT by another professional from mental health services. Thus, for MBT therapists, the patient starting MBT was new.

Patients were selected for MBT based on inclusion and exclusion criteria as presented in *Table 1* and patient preference. Patients aged 18-64 years were required to have a complex disorder presentation, i.e. symptomatic and functional severity and comorbidity of at least two of the following: affective disorder, trauma, personality disorder or signs or symptoms of personality disorder. This choice was made due to the increasing need in mental healthcare for the treatment and therapy of this multi-symptom and severely symptomatic group of patients, which also makes the study's results more generalizable to real life. In addition, MBT practitioners assessed the patient's suitability for MBT (e.g. willingness to engage in active psychotherapeutic work, interest in the inner world of experience and willingness to work interactively).

Table 1. Inclusion and exclusion criteria applied for the Mentalization-Based Treatment (MBT) patient group.

Inclusion criteria	Exclusion criteria
• Age 18-64 years. • Severe psychological symptoms and decreased functioning ability for long-term • Challenges with interpersonal relationships and emotional regulation • Patients willing to receive MBT **At least two of the following:** 1. Depression (ICD-10 diagnosis codes: F31.3-F31.5, F32.0-F32.9, F33.3-F33.9, F34.1) or anxiety disorder (diagnosis codes: F40-F48) 2. Trauma background either as diagnosis or as need for treatment 3. Signs of personality disorder (suspected or diagnosed)	• Active substance use disorder (i.e. intoxication F1x.0, active dependence F1x.24, Continuous use F1x.25, a physiological withdrawal state F1x.3 and F1x.4, or psychotic disorder F1x.5). • Acute psychosis (defined as the recent onset of severe psychotic symptoms that interfere with functioning and are not yet in a therapeutic state. (Non-acute psychotic symptoms are not exclusionary) • Disorder requiring inpatient treatment • Previously received MBT • Currently receiving psychotherapeutic treatment (previous psychotherapeutic treatment is not an exclusion) • The exclusion criteria, therefore, do not exclude psychotic disorders or any other psychiatric illness (except active substance abuse disorders)

BASELINE ASSESSMENT

The baseline data consisted of a structured clinical interview and two questionnaires which contained altogether ten different self-report instruments and questions about sociodemographic factors (*Table 2*). The baseline data for patients was collected from September 2024 to March 2025. Patients deemed suitable for research by the MBT practitioners were interviewed by the clinical research nurse. The baseline interviews were conducted in Pohde, at the units where the patient's MBT was set to begin. The duration of the baseline interview ranged from 1.5 to 3 hours. The results of the baseline interviews were reviewed, and conclusions on diagnosis and rating of symptoms and functioning were drawn from within the research team, together with a principal investigator (EJ) and the clinical research nurses. Prior to the baseline interview, all patients signed a written consent form to participate in the study. The consent form also included a request for permission to audio- or video-record MBT sessions for the purposes of treatment fidelity monitoring, therapeutic support and the supervision of the approved MBT supervisor.

Shortly after the baseline interview, participants received an email containing a link to complete two self-report surveys. These included ten self-report instruments and a background information form assessing psychosocial functioning. The questionnaires were created using Research Electronic Data Capture (REDCap), a secure web application developed for digital data collection (24,25).

The contents of the baseline clinical interview and the self-report survey are presented in *Table 2*. The primary outcome measure of this study is CORE-OM. The CORE-OM is a 34-item self-report measure to assess psychological distress and clinical outcomes (22,23). Validated Finnish translations of the questionnaires used in this study have been found to be functional and have good internal reliability (26). Mentalization capacity was measured using the Certainty About Mental States Questionnaire (CAMSQ) and the Reflective Functioning Questionnaire (RFQ) (27,28). Of note, the version of the RFQ used in this investigation is the unidimensional RFQ-6 due to it being more psychometrically optimized from the original RFQ-8 (27).

Table 2. Clinical interview measures and baseline self-report survey.

Baseline interview		**Target variable / cut-off scores**
Mini International Neuropsychiatric Interview (29)	MINI	Psychiatric symptoms and possible diagnosis of Axis I disorders
Social and Occupational Functioning Assessment Scale (30)	SOFAS	Psychosocial functional capacity. Score of ≤70 indicating the presence of a functional deficit (30)
A need for treatment assessment		Reason for seeking treatment, psychological wellbeing, concurrent medications, previous and current treatment
Montgomery-Åsberg Depression Rating Scale (31)	MADRS	Depression symptoms. 15-24 indicating mild depression, 25-30 moderate, 31 or higher indicating severe depression. Score 10 or less indicates remission (32)
Clinical Global Impression - severity (33)	CGI-S	Clinical severity
Self-report survey		
Sociodemographic questions		Reported in Table 4
Clinical Outcomes in Routine Evaluation - Outcome (34)	CORE-OM	Global level of distress (wellbeing, problems, functioning, risk). The clinical cut-off score is 9.5. A higher score indicates more problems, while a decreasing score for an individual indicates an improvement in subjective wellbeing (34)

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Generalized Anxiety Disorder-7 (35)	GAD-7	Measures severity of anxiety. 0–4 indicating minimal anxiety, 5–9 mild anxiety, 10–14 moderate anxiety, 15–21 severe anxiety (35)
Big Five Inventory-2 Extra Short Form (36)	BFI-2-XS	Big Five personality dimensions
The Inventory of Interpersonal Problems (37)	IIP-32	Interpersonal problems
Experiences in Close Relationships Short version (38)	ECR-R	Attachment anxiety and avoidance
Rosenberg Self-Esteem Scale (39)	RSE	Self-esteem
Emotion Regulation Questionnaire (40)	ERQ	Emotional regulation styles
The Certainty About Mental States Questionnaire and The Reflective Functioning Questionnaire (27,28)	CAMSQ RFQ-8	Mentalization capacity Of note, the version of the RFQ used in this investigation is the unidimensional RFQ-6 due to it being more psychometrically optimized from the original RFQ-8 (27)
The World Health Organization Quality of Life (41)	WHOQOL	One question on Quality of life

STATISTICAL ANALYSIS

All statistical analyses were run with IBM SPSS Statistics Software version 29.0.0.0. Missing sociodemographic information from the self-report surveys were filled in from the interview data. Descriptive data is presented with frequencies and percentages (%) and means and standard deviations (SD). To explore the associations between the self-report measures, normality of outcome distributions were checked before calculating Pearsons's correlation coefficients between the self-report measures. Due to non-normal distributions on the BFI-2-XS dimensions, it was left out of the correlation analyses. Internal consistency was explored by calculating the Cronbach's alpha for all self-report measures.

RESULTS

Altogether, 53 patients were referred to this study. Three patients either withdrew from the study before the baseline interview (n=2) or did not meet the study's inclusion criteria (n=1). The sample included 50 participants receiving MBT. In this sample, 46 responded to the online self-report survey, and baseline clinical interview data was available for 50 participants. A flowchart of the study population at each stage of the study process is shown in *Figure 1*.

In Pohde, outpatient psychiatric and mental health services are provided by the healthcare centres at primary and specialized level and specialized psychiatry outpatient clinics at Oulu University Hospital. Some units operate only at primary level, where the patients are classified as primary-level patients, even if the physician responsible is a consulting psychiatrist. Participants were referred to MBT mainly by another professional (n=24), by referral or the treatment queue of the unit (n=17), and a few of them by another psychiatric care unit (n=9) as presented in *Table 3*.

Figure 1. Flowchart of the Mentalization-Based Treatment (MBT) Study.

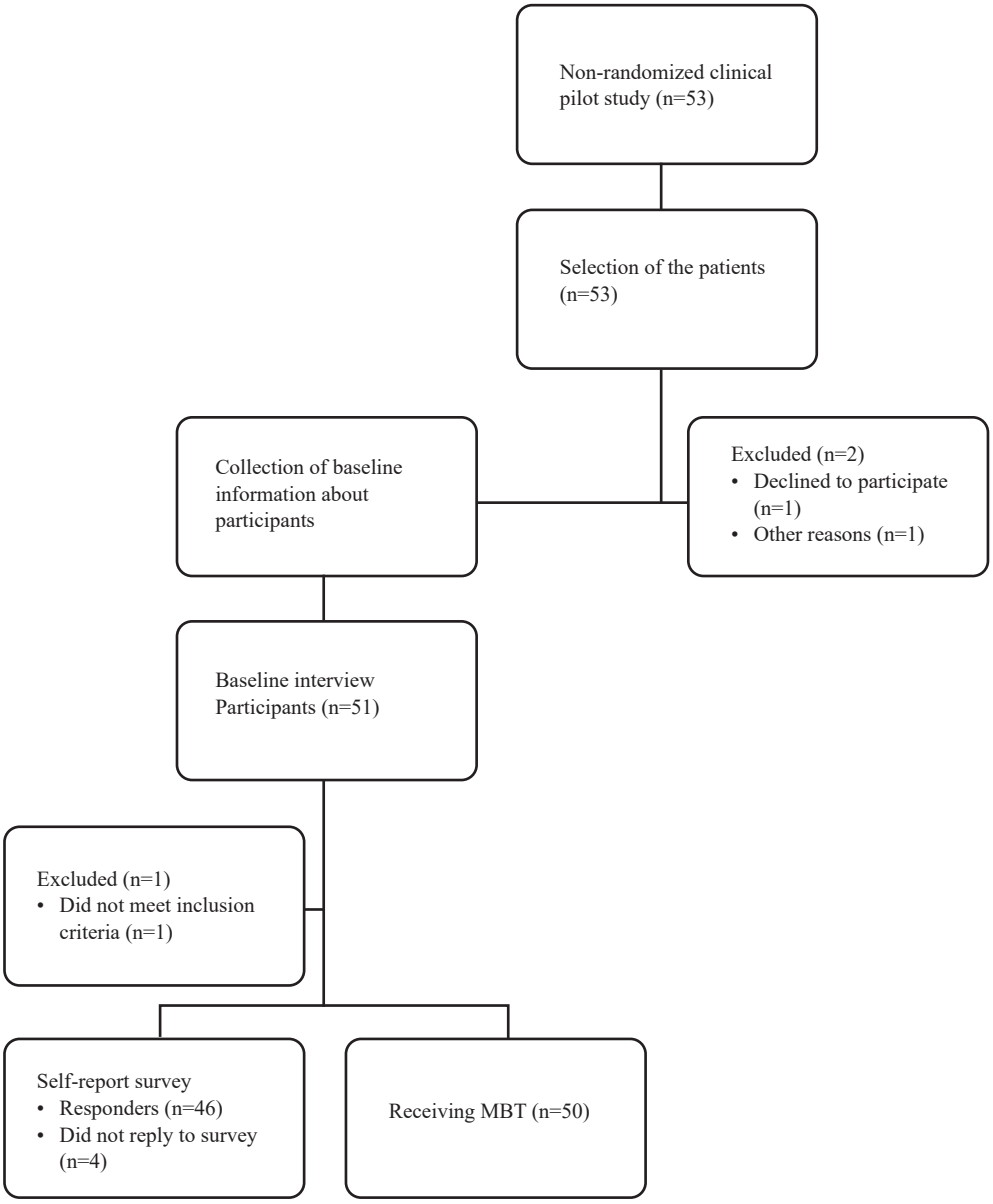

Table 3. Participant referral to Mentalization-Based Treatment (MBT).

Referred to treatment	MBT in primary care	MBT in specialized care
By another professional	8	16
Referral or treatment queue of the unit	5	12
From another psychiatric care unit		9
Total	**13**	**37**

SAMPLE CHARACTERISTICS

Sociodemographic Factors

The mean age of the sample was 31.5 years (SD=9.13, range 18–60). The other sociodemographic factors are presented in *Table 4*. Most of the participants, 37 (74%), were females. Eighty-four per cent of the participants were not married. Additionally, 22% of the participants had a bachelor's degree or higher education, and 38% lived alone or alone with their children in the household. Furthermore, 54% of the participants did not have any children, and 44% of them had one or more children.

Of the participants, 54% had previously received outpatient care, 34% inpatient care, 20% psychotherapeutic treatment and 10% vocational rehabilitation. Additionally, 42% had an additional physical medical condition.

Table 4. Sociodemographic factors (n=50).

Variable	n (%)
Gender	
Female	37 (74.0 %)
Male or other	13 (26.0 %)
Marital status	
Married	8 (16.0 %)
Not married	42 (84.0 %)
Education	
Comprehensive school	10 (20.0 %)
Vocational school	17 (34.0 %)
High school diploma	10 (20.0 %)
Bachelor’s or Master’s degree	11 (22.0 %)
Missing data	2 (4.0%)
Living situation	
Lives alone or alone with kids	19 (38.0 %)
Lives with (spouse, roommates, parents etc.) or otherwise	29 (58.0 %)
Missing data	2 (4.0 %)
Number of children	
No children	27 (54.0 %)
One or more children	22 (44.0 %)

Variable	n (%)
Missing data	1 (2.0 %)
Participants	
Who have previously received:	
Psychiatric outpatient care	27 (54.0 %)
Psychiatric inpatient care	17 (34.0 %)
Psychotherapeutic treatment	10 (20.0 %)
Vocational rehabilitation	5 (10.0 %)
Missing data	4 (8.0 %)
Who have:	
Physical medical condition	21 (42.0 %)
Physical medical symptoms	20 (43.5 %)
Missing data	4 (8.0 %)

Clinical Characteristics

The clinical characteristics are presented in *Table 5*. The most frequently diagnosed Axis I disorders of the participants were depressive disorder (70%), anxiety disorder (62%) and post-traumatic stress disorder (28%). Out of the participants, 42 (84%) had two or more Axis I diagnoses. Additionally, 68% of the participants were using psychiatric medication. The number of participants who reported having previously been diagnosed with BPD or were suspected of exhibiting symptoms in the sample was 9 (18%). The majority of participants (84%) showed clinically significant depressive symptoms based on MADRS scores.

Table 5. Clinical characteristics (n=50).

Variable	n (%)
MINI Interview, Diagnoses of Axis I disorders	
Depressive disorder	35 (70.0 %)
Anxiety disorders	31 (62.0 %)
Post-traumatic stress disorder	14 (28.0 %)
Psychosis or bipolar disorder	7 (14.0 %)
Substance use disorder	6 (12.0 %)
Obsessive-compulsive disorder	5 (10.0 %)
Eating disorder	4 (8.0 %)
Unspecified mental disorder	1 (2.0 %)

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Variable	n (%)
% of participants who reported that their symptoms started before turning 18 years old *	34 (68.0 %)
Number of persons using psychiatric medication, self-reported	34 (68.0 %)
Number of medications, self-reported	
Antidepressants	31 (62.0 %)
Antipsychotics	23 (46.0 %)
Sedatives	9 (18.0 %)
Mood stabilizers	3 (6.0 %)
% of participants who score above the cut-off for clinically significant symptoms	
CORE-OM (9.5) * Missing data	43 (93.5 %) 4 (8.0 %)
MADRS (10) *	42 (84.0 %)
GAD-7 (5) * Missing data	42 (91.3 %) 4 (8.0 %)

* Clinical cut-off reference values were used based on the studies: 32,34,35. Abbreviations: MINI = Mini International Neuropsychiatric Interview; CORE-OM = Clinical Outcomes in Routine Evaluation – Outcome; GAD-7 = Generalized Anxiety Disorder-7; MADRS = Montgomery-Åsberg Depression Rating Scale. n = sample size

Primary Outcome Measure

The mean CORE-OM scores and respective dimensions are presented in *Table 6*. A large-scale investigation utilizing the Finnish translation of the CORE-OM presented a clinical cut-off score of 9.5 (34). In our study 93.5% of the participants scored higher than 9.5 in terms of clinical scores on all items. The scores in this data ranged from 6.5 to 33.2.

Secondary Outcome Measures

The low level of general functioning was reflected by the mean scores of the SOFAS (mean=54.9, SD=11.2), with healthy functioning established as scores ranging from 80–90. Additionally, a score of 50 or below is seen as severe impairment in social- and work-related functioning. In the current investigation 19 participants (38%) exhibited severe impairment. Other secondary outcomes and their respective mean scores are presented in *Table 6*.

Psychological Symptoms and Wellbeing

The psychological symptoms and wellbeing are presented in *Table 6*.

The correlation matrix for the self-report measures is presented in *Table 7*. The CORE-OM demonstrated strong positive correlations with the GAD-7 ($r=0.72$, $p<0.01$), and moderate positive correlations with RFQ-6 ($r=0.47$, $p<0.01$), IIP-32 ($r = 0.44$, $p < 0.01$) and ECR-R (Anxiety) ($r=0.38$, $p<0.01$). Furthermore, there were strong negative correlations with the RSE ($r=-0.72$, $p<0.01$), and moderate negative correlation with CAMSQ (Self) ($r=-0.46$, $p<0.01$) and ERQ (Reappraisal) ($r=-0.37$, $p<0.05$).

Internal Consistency

The internal consistency for all the self-report measures was from moderate to very high, with Cronbach's alpha ranging from 0.74–0.93. An outlier was the BFI-2-XS where alpha ranged from 0.56–0.67.

Table 6. Psychological symptoms and wellbeing.

Questionnaires (N = 46)	Mean (SD)
CORE-OM	
Clinical scores	18.50 (6.61)
Wellbeing	9.33 (3.43)
Symptoms/problems	27.43 (9.82)
Functioning	22.91 (8.16)
Risk	3.20 (3.76)
Non-risk items	59.67 (19.87)
All items	62.87 (22.47)
BFI-2-XS	
Extraversion	7.20 (2.54)
Agreeableness	10.57 (2.14)
Conscientiousness	9.20 (2.27)
Negative emotionality	12.11 (2.21)
Open-mindedness	9.98 (2.42)
GAD-7	12.02 (5.05)
IIP-32	1.80 (0.48)
Total score	57.65 (15.33)
ECR-R	
Anxiety	4.44 (1.26)
Avoidance	3.28 (1.19)
RSE	9.48 (6.11)
ERQ	
Cognitive reappraisal	3.90 (1.48)
Expressive suppression	3.48 (1.31)
CAMSQ	
Self-certainty	4.23 (1.18)
Other-certainty	4.71 (1.15)
Self-Other-Discrepancy	0.47 (1.30)
RFQ-6*	4.38 (1.18)
WHOQOL	2.61 (0.93)
Interview (n=50)	**Mean (SD)**
MADRS	21.20 (11.49)
SOFAS	54.86 (11.29)
CGI-S	4.20 (0.95)

* = The RFQ-6, uncertainty in mentalizing were scored using the recommendations of Müller et al. (42).
Abbreviations: BFI-2-XS =Big Five Inventory Extra Short Form; CAMSQ = The Certainty About Mental States Questionnaire; CGI-S = Clinical Global Impression – severity; CORE-OM = Clinical Outcomes in Routine Evaluation – Outcome; GAD-7 = Generalized Anxiety Disorder-7; ECR-R = Experiences in Close Relationships Short version; ERQ = Emotion Regulation Questionnaire; IIP-32 = The Inventory of Interpersonal Problems; MADRS = Montgomery-Åsberg Depression Rating Scale; RFQ-6 = The Reflective Functioning Questionnaire; RSE = Rosenberg Self-Esteem Scale; SOFAS = Social and Occupational Functioning Assessment Scale; WHOQOL = The World Health Organization Quality of Life.
n = sample size. SD = standard deviation

Table 7. Correlation matrix between the self-report measures, n=46.

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. CORE-OM (Clinical score)	-										
2. CAMSQ (Other)	-0.02	-									
3. CAMSQ (Self)	-0.46**	0.38**	-								
4. RFQ-6	0.47**	0.16	-0.39**	-							
5. GAD-7	0.72**	0.08	-0.22	0.43**	-						
6. IIP-32	0.44**	-0.12	-0.29	0.32*	0.49**	-					
7. ECR-R (Anxiety)	0.38**	0.25	0.03	0.40**	0.40**	0.48**	-				
8. ECR-R (Avoidance)	0.18	-0.09	-0.39**	0.19	0.05	0.20	-0.12	-			
9. RSE	-0.72**	0.05	0.36*	-0.27	-0.49**	-0.32*	-0.23	0.00	-		
10. ERQ (Reappraisal)	-0.37*	0.00	0.33*	0.00	-0.22	-0.08	-0.03	0.00	0.19	-	
11. ERQ (Suppression)	0.19	-0.20	-0.32*	0.14	0.13	0.38*	-0.16	0.53**	-0.31*	0.16	-

Pearson's correlation coefficients, ** = p<0.01, * = p<0.05
BFI-2-XS was excluded due to non-normal distribution of its dimensions
Abbreviations: CAMSQ = The Certainty About Mental States Questionnaire; CORE-OM = Clinical Outcomes in Routine Evaluation – Outcome; GAD-7 = Generalized Anxiety Disorder-7; ECR-R = Experiences in Close Relationships Short version; ERQ = Emotion Regulation Questionnaire; IIP-32 = The Inventory of Interpersonal Problems; RFQ-6 = The Reflective Functioning Questionnaire; RSE = Rosenberg Self-Esteem Scale; WHOQOL = The World Health Organization Quality of Life

DISCUSSION

According to the results the patients included in the study were referred to treatment from various sources, including both primary healthcare and specialized mental health services, reflecting the widespread need for psychosocial interventions in mental healthcare. The majority of participants were women, unmarried and had a mean age of 31.5 years. Most participants were already receiving outpatient psychiatric care but only a few had previously received psychotherapeutic treatment. A third of the participants had been in psychiatric inpatient care, and an equal size of participants reported symptom onset before the age of 18. Approximately one third were currently using psychiatric medications, most commonly antidepressants. Although the study's inclusion criteria influenced the composition of the patient sample, it is noteworthy that a substantial proportion of participants met the diagnostic criteria for at least two mental disorders. According to the MINI interview, the most common diagnoses were depression, anxiety disorders and post-traumatic stress disorder, following the inclusion criteria. Eighty-four per cent of participants scored above the cut-off for clinically significant depressive symptoms. On average, participants exhibited moderate to marked levels of clinical score on CORE-OM and reduced psychosocial functioning, indicating a clear need for mental health treatment.

The results of correlation between baseline measures indicate that an increased clinical score of CORE-OM is associated with greater anxiety, uncertainty in mentalizing ability, interpersonal problems and attachment anxiety. The positive correlation between the CORE-OM and RFQ-6 indicates

that individuals with higher levels of psychological distress may struggle to understand and reflect on their own and others' mental states. Furthermore, as the primary outcome measure of this study, CORE-OM's clinical scores were associated with a multitude of the other measures used (Table 7), which reflects its relation to multiple facets of psychopathology and suitability for use in this study with no specific disorder or symptom-specific groupings.

In this kind of study, it is important that the patients' wellbeing and their psychological symptoms are of same range as in other similar studies. The baseline mean clinical scores on CORE-OM (mean=18.5, SD=6.6) and IIP-32 (1.8 (0.5)) are comparable to previous studies using clinical samples internationally and in Finland (CORE-OM: 18.3 (7.1) & 16.7 (6.6) (34,43) IIP-32: 1.7-3.16 (44,45,46)). These comparisons highlight that the clinical characteristics of this study sample are equivalent to established literature. They also secure the suitability of these measures in this kind of investigation. This kind of control is needed to ensure the comparability of the results of this study to previous research surrounding MBT.

The internal consistency for all the self-report measures was from moderate to very high, indicating reliability of the measures based on this sample. Additionally, the outlier results for the BFI-2-XS are consistent with the original psychometric evaluation of the measure (α=0.51–0.72), which is explained by its brief length (three items per personality dimension) and its focus on content validity rather than internal consistency (36).

A significant strength of this study is that it is the first to evaluate the effectiveness of individual MBT in the Finnish population and in the context of the stepped mental healthcare system, where MBT is provided as an individual outpatient service. Although the effectiveness of MBT has been examined internationally, differences in service structures limit the generalizability of those findings to the Finnish stepped mental healthcare context. A key strength of this study is that it includes a group of patients diagnosed with a range of severe mental disorders. Notably, our findings extend previous research by examining treatment outcomes not only in patients with BPD, but also in those with other complex psychiatric conditions.

Our study examines a group of patients diagnosed with a range of severe mental disorders. The mentalization paradigm offers one viable approach for a patient who does not fit into a specific diagnostic category. Mentalization can be thought of as a key factor in functional mental health (salutogenesis), while a lack of mentalization may indicate underlying psychopathology (19). Additionally, psychopathology can be further examined transdiagnostically using the concept of the psychopathology factor (p-factor) (47).

According to the results, most participants (66%) who were referred to MBT were already receiving outpatient psychiatric care. However, only 20% of all participants had received psychotherapeutic treatment. This highlights the lack of availability of psychosocial treatments at higher steps of mental healthcare. The results also indicate a high level of comorbidity among patients with severe psychiatric disorders, which makes it difficult to select effective psychosocial treatment. Previous studies, such as Juul et al. (48), have shown that baseline clinical characteristics related to psychiatric comorbidity and symptoms were relatively similar to the present study, with the most common diagnoses being anxiety disorders, depressive disorders and post-traumatic stress disorder. Sociodemographic characteristics, including gender, age and marital status, are also comparable. However, the sample in the Juul et al. (48) study was significantly larger, and all participants had a diagnosis of BPD. At this stage of our study, we do not yet have precise data on diagnoses of personality disorders, since due to resources, it was not possible to conduct diagnostic interviews for personality disorders at baseline. However, we will be able to collect the data on diagnosed personality disorders and other diagnoses from the medical records later on. Compared to previous studies, our study includes more diagnostically diverse patients, which may reflect the broader spectrum seen in general mental health services. This study may therefore help to define more targeted treatment approaches for patients in these diagnostic groups.

This study has strengths and obvious limitations. First, the study design is a non-randomized clinical pilot study conducted only in the Wellbeing Services County of North Ostrobothnia. Therefore, we will not be able to make definitive causal conclusions about the effectiveness of MBT. Second, the MBT practitioners are newly qualified, and the practitioners' professional experience in practicing MBT may affect the patient selection and future analyses in treatment outcomes. Third, in the future the relatively small sample size makes identifying significant relationships from the data difficult. A small number of participants reduces statistical power and makes generalization difficult. A limited sample may not be representative of the broader population, as participants may have characteristics such as higher motivation. Fourth, personality functioning and disorders were not explicitly assessed in this study, although indications of personality dysfunction can be seen in the mean values of the ECR-R and the IIP-32. Furthermore, several factors influence the suitability and effectiveness of MBT, including clinical setting, the competence of the MBT practitioner, heterogeneous context and the complexity of psychiatric presentation in patients.

This is the first study to evaluate the effectiveness of MBT within Finland's public mental health service system. The article describes the types of patients referred to MBT, which may also reflect the profile of patients referred in the future. Although the sample size is limited, it is sufficient to yield results regarding changes in patients' psychological wellbeing. This study is also among the few that have examined psychotherapeutic treatment within the framework of Finland's mental healthcare service system.

CONCLUSION

There is a clear need for MBT, as patients were referred to MBT from different sources. The patients presented with a wide range of clinically significant symptoms and comorbidities. It was notable that relatively few of them had previously received psychotherapy. This study provides valuable insights that have the potential to improve care for patients with severe mental health problems in real-world clinical settings and in the context of the stepped mental healthcare system. As a result, new knowledge about MBT's implementation, evaluation and effectiveness can be shared nationally. However, further research is necessary to evaluate the effectiveness of MBT in complex clinical environments, especially among transdiagnostic psychiatric patient populations. This pilot study provides a base for future studies on the effectiveness of individual MBT.

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COGNITIVE BEHAVIOURAL INTERVENTION FOR CHILD AND ADOLESCENT ANXIETY (ALI) IN FINNISH STUDENT WELFARE SERVICES - A SYSTEMATIC DESCRIPTION OF THE INTERVENTION DEVELOPMENT BASED ON GUIDED FRAMEWORK

ABSTRACT

Background: *The proportion of children and adolescents reporting anxiety symptoms has increased over several years in Finland, being currently more than 20%. Low-threshold evidence-based interventions for primary care are needed. Brief cognitive intervention for child and adolescent anxiety (ALI) has been developed for student welfare services. In general, descriptions of new interventions and their development are under-reported.* ***Aims:*** *The aim of this study was to examine how and from which conceptual foundations the ALI was developed.* ***Methods****: The qualitative study followed theory-driven content analysis using the Guidance for Reporting Intervention Development (GUIDED). Interview questions were based on the GUIDED and supplemented by one open-ended item to capture inductive data. In addition, a document analysis was conducted.* ***Results:*** *ALI was developed in response to the needs of children and adolescents experiencing anxiety symptoms, as well as the needs of student welfare professionals. Development was executed in a fairly short time by a small group of experts in child and adolescent psychology and psychiatry supported by a steering group. No established guidelines or theoretical frameworks were used in the development process. Several contextual issues related to student welfare services affected the development.* ***Conclusions:*** *ALI was developed purposefully targeting strong contextual fit in student welfare services. Now that the development phase is completed, it is crucial to assess its effectiveness in a student welfare setting. In the future, when new structured psychosocial interventions are needed to promote mental health of children and adolescents, the choice between developing a new intervention and adapting an existing evidence-based intervention should be carefully considered.*

KEYWORDS: ANXIETY, INTERVENTION DEVELOPMENT, CHILDREN, ADOLESCENTS, CONTEXTUAL FIT

BACKGROUND

Anxiety disorders are amongst the most common psychiatric disorders, occurring in 6.5% of all children and adolescents worldwide [1]. In a nationwide register-based study in Finland [2], new psychiatric diagnoses in children and adolescents increased by nearly a fifth between 2017 and 2021, with the second largest increase by diagnostic group (after eating disorders) found for depression and anxiety (21%). Further, 21.4% of adolescents reported having moderate or severe anxiety symptoms during the past two weeks in the national Finnish School Health Survey conducted in 2023 [3,4], which is a significantly larger amount compared to previous reports [5]. Despite the high prevalence, less than one half of children and adolescents diagnosed with anxiety disorder receive any care [6,7].

Due to the increased prevalence, the need for feasible evidence-based (EB) psychosocial interventions is evident. The Finnish Mental Health Strategy 2020-2030 emphasizes provision of short, EB low-threshold interventions in primary care [8] especially to address the most common clinical problems, such as depression and anxiety [9]. Also, the Finnish Government aims to improve support for the mental health of children and adolescents with a new legislative reform regarding the therapy guarantee for children and young people, that was put into effect in May 2025 [10]. The law guarantees children and adolescents

equal access to brief psychotherapy or other kinds of effective psychosocial treatment, which must be initiated within 28 days after the need for treatment has been assessed.

According to The Current Care Guidelines on Anxiety Disorders, the first-line treatment for anxiety in adolescence is psychosocial intervention, with interventions based on a cognitive behavioural framework having the strongest evidence [11]. Cognitive behavioural therapy (CBT) has been shown to be effective for preventing and treating childhood anxiety across a range of ages and formats [12,13]. However, CBT has not been found to reliably outperform active control conditions [14,15]. A meta-analysis that examined brief CBT interventions in treating anxiety disorders in youth showed that there was no significant difference between brief (M 5,9 sessions (SD 3,2)) interventions and standard length CBT [16].

As part of Finnish national health and social services reform between 2020-2022, primary care practitioners, including professionals working in school welfare services, were trained to use cognitive behavioural intervention Cool Kids™ (CK) [17]. CK is a licensed intervention with 10-12 sessions designed for treating anxiety in children and adolescents. CK was developed in Australia and has over 20 years of research supporting its efficacy in reducing anxiety symptoms [18–20]. However, healthcare providers in student welfare services have encountered challenges in implementing CK into the services [21]. Finnish student welfare services include school and student healthcare, and services of school social workers and psychologists.

In general, one central reason for poor implementation is limited intervention-context fit [22,23]. Contextual fit has been defined as the match between the strategies, procedures or elements of an intervention and the values, needs, skills and resources available in a setting [24]. The importance of contextual fit has been recognized, although there is no consensus or strong evidence on the elements that constitute contextual fit [24,25]. However, it has been stated that an intervention possesses good contextual fit when implementers, recipients and other stakeholders (e.g. parents or administrators) identify the intervention as acceptable, feasible, effective and sustainable [24].

In the case of psychosocial interventions, poor contextual fit can lead to impractical modifications of an intervention or even to a situation where the intervention is not used at all. This seems to be at least partially the case with CK in Finland, as in a thesis study interviewing professionals working in student welfare services, CK was reported as too long and rigid to be used in the services [21].

There are several options for addressing situations where the contextual fit of an existing EB intervention is limited like in the case of CK in Finnish student welfare. They include [26,27]:

1. adapting the existing evidence-based intervention
2. transferring a new EB intervention with an assumed better contextual fit without adaptation (i.e. adoption)
3. transferring and adapting a new EB intervention
4. developing a new intervention.

Adaptation is defined as intentional modification of an evidence-informed intervention, in order to achieve a better fit between an intervention and a new context [27]. There is evidence that interventions that are simply replicated (i.e. adopted with high fidelity) might be less likely to reproduce effects than those adapted to achieve a good fit between intervention and context [28,29].

To address CK implementation challenges in student welfare services and to achieve better contextual fit in Finnish primary care, the brief cognitive intervention for child and adolescent anxiety (Lasten ja nuorten ahdistuksen kognitiivinen lyhytinterventio, ALI) was developed in 2022-2023. ALI is a CBT-based time-limited psychosocial intervention designed for 7–17-year-olds, comprising three to eight sessions (Table 1) (Figure 1) [30]. The primary objective is to reduce anxiety symptoms and alleviate functional impairment caused by anxiety or avoidance behaviour. ALI was developed and is maintained by a Finnish government-funded project First-line Therapies Initiative (Terapiat etulinjaan) and aims at creating a modified stepped care model of psychosocial treatments appropriate for Finnish healthcare structures [31]. At the same time, to address the need for effective anxiety treatment in Finnish primary care, other interventions were also developed and evaluated, including a 9-session internet-based cognitive behavioural therapy programme called Master Your Worries [32].

Intervention development phase refers to the period when the intervention is developed to the point where it can reasonably be expected to have a worthwhile effect [33]. There are several approaches to intervention development, including a target population-centred approach, where the intervention is based on the views and actions of the people who will use it, or an implementation-based approach, where the intervention is developed with attention to ensuring it will be used in the real world [34]. The end point of the development phase is typically the production of a document or manual describing the intervention and how it should be delivered [35]. A successful intervention development was defined in a study by Turner et al. [36] as a process that resulted in effective interventions that were relevant, acceptable and could be implemented in real-world contexts.

There are several guidelines and frameworks for supporting intervention development [26,37–40], such as Guidance for Reporting Intervention Development (GUIDED) [37]. GUIDED aims to improve the quality and consistency of intervention development reporting in health research. Presenting intervention development following GUIDED will enable commissioners and practitioners to understand the context and methods that were used to develop the intervention, to help them make judgements about the quality and relevance of the intervention [37].

However, intervention development processes are globally under-reported. A more systematic, comprehensive and transparent approach to intervention development reporting is likely to enhance understanding of the process. Further, it would facilitate assessment of how intervention development approaches can lead to either effective or ineffective interventions that do or do not translate into practice change [37,38].

The aim of this study was to retrospectively assess how and from which conceptual foundations ALI was developed. The study focused on the perspectives of professionals who had been involved in developing the intervention. The specific research questions were:

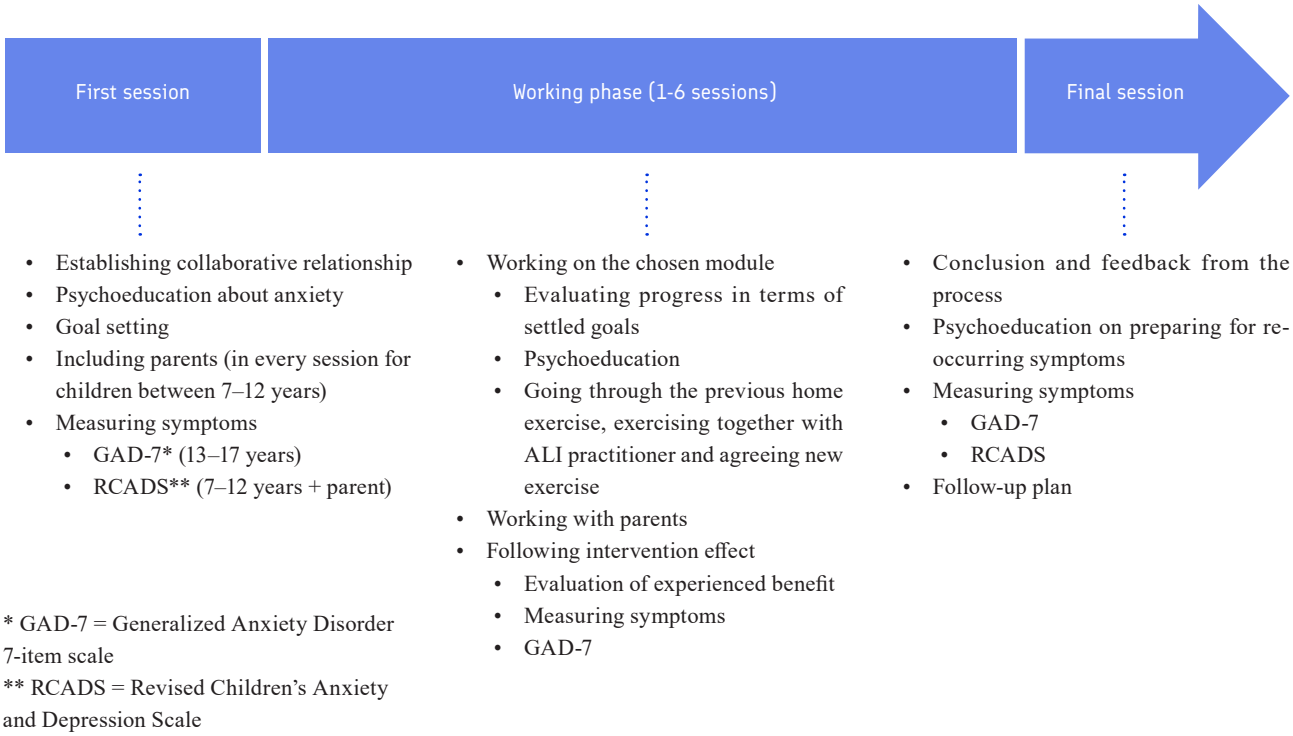
1. How was the ALI intervention developed when explored through the GUIDED intervention development reporting items?
2. What factors beyond the GUIDED influenced the development of the ALI intervention?

METHODS

INTERVENTION

As a part of this study, an intervention description of ALI (*Table 1*) was written. Description covers all the items of Template for Intervention Description and Replication (TIDieR) checklist [41], supplemented with additional information. Description was mainly based on the information provided on the e-learning platform of ALI and it was checked by the intervention developer. In addition, the process of executing ALI is presented in *Figure 1*.

Figure 1. ALI intervention process.



* GAD-7 = Generalized Anxiety Disorder 7-item scale
** RCADS = Revised Children's Anxiety and Depression Scale

Table 1. Description of the brief cognitive intervention for child and adolescent anxiety (ALI).

Intervention description item	ALI intervention description
Target population	The intervention is aimed at the early treatment of anxiety symptoms and fears in children and adolescents aged 7 to 17. Intervention is not suitable if a child or adolescent has: • severe anxiety symptoms • comorbidity • self-harming behaviour or suicidal thoughts • psychotic symptoms*
Goals	To reduce anxiety symptoms and alleviate functional impairment caused by anxiety or avoidance behaviours
Theory background	Cognitive behavioural therapy
Core elements/core components*	• A collaborative relationship between the professional and the child • Psychoeducation • Exposure in child's everyday contexts • Cognitive restructuring of thoughts and beliefs • Physiological relaxation techniques • Training problem-solving skills • Parental support
Training	• Duration ~6 months • 20 hours of online training including following theory modules: i) general information about anxiety, ii) introduction to cognitive approach, iii) specific characteristics of interventions for children and adolescents, iv) identifying and evaluating anxiety, v) interaction skills for professionals, vi) introduction to the ALI intervention • At least 12 hours of case work under supervision • 12 hours of supervision: 2 hours every ~three weeks in a group of 4-6
Providers	Social and healthcare professionals working in student welfare services or other primary care settings, who encounter children and adolescents experiencing anxiety or fear-related symptoms in their work. Support staff are not needed to provide the intervention.
Setting	Especially student welfare services but also other primary care services that provide mental health services for children and adolescents.

Execution	• Individual or individual + parent
	• Face-to-face
	• ALI includes four working modules of which one is chosen based on the needs of the child or adolescent. In addition, one complimentary module is included. The modules include:
	  • Facing fears
	  • Strengthening self-confidence
	  • Reducing worry
	  • Managing panic
	  • Supplementary module: Parental support
	• 3-8 sessions provided weekly (can be reduced to every 2-3 weeks), 45 minutes per session, 60 minutes if parents attend
	• See the detailed description of the ALI process from Figure 1.
	• It is estimated that preparing for an ALI session takes 30 minutes during the training and 15 minutes as more experience is gained. Documentation of patient/client information after the session takes 5-15 minutes.
	• Execution requires printed materials, paper, pen and rubber
	• Execution requires quiet working space

→

Intervention description item	ALI intervention description
Tailoring	Of the four modules, the practitioner, in collaboration with the child/adolescent, selects the most appropriate module. Based on child's/adolescent's needs, exercises from additional modules may be integrated. The structured intervention protocol provides session-by-session content, which the practitioner tailors to the requirements of the child and family. It is recommended that the intervention includes working with the parents, especially in the case of younger children. In the case of adolescents, intervention providers decide the extent of parent involvement. All intervention exercises are delivered with consideration of the child's age and developmental level.
Fidelity assessment	No specific fidelity measure. Supervision included in the training.
Manual	The intervention theory and provision are described in the e-learning platform (https://koulutus.mielenterveystalo.fi/). The platform includes session-by-session description of the content, structure and materials (exercises, measures and other client material) needed to provide the intervention.

The content marked with * was partly derived from the e-learning platform of ALI and partly complemented by the intervention developer

STUDY DESIGN

The study design was a retrospective qualitative interview study. The aim of the qualitative study approach was to collect as rich a dataset as possible to enable a comprehensive and trustworthy description of the foundations, contributing factors and key stages of the development of the intervention [42,43].

STUDY POPULATION

A total of six professionals (n=6) participated in the study, all of whom had been involved in the development of the ALI intervention during the years 2022-2023. The participants were all current or former employees of the First-line Therapies Initiative. Their roles in the development of ALI comprised: contributing to the development of the intervention's content and materials, designing and implementing the associated training, defining the theoretical foundations and mechanisms of change for the intervention and participating in decision-making processes related to the development.

DATA COLLECTION

The data was collected by interviewing professionals who had contributed to the development of ALI. The First-line Therapies Initiative named three key informants and the other participants were recruited by using the snowball sampling method. Each interviewee was asked to identify key individuals who had been involved in the development of the intervention. The participants named overlapping individuals who had played a significant role in at least some phase of the development process.

At the beginning of each interview, participants were informed about the purpose of the study and data management procedures in accordance with good scientific practice, and the pseudonymization of the data. Informed consent to participate in the study was obtained from all interviewees. Due to the very limited number of individuals who were involved in the development of ALI, no further information regarding their demographic characteristics, specific professional fields or job titles is reported in order to protect the privacy of study participants.

The semi-structured interviews were conducted in Finnish from April to May 2025 by using Teams video software. Interview included 16 questions which were formulated to align as closely as possible with GUIDED (*Table 2*). In addition, one open-ended question, regarding other aspects the interviewee would like to add, was presented at the end of the interview. Clarifying questions were posed when needed, while the order of the main questions remained consistent across all interviews. The interview themes included, for example, the context of the intervention's development, its purpose, target group, theoretical background, areas of uncertainty and decision-making processes.

The duration of the interviews ranged from 32 minutes to 1 hour and 52 minutes (M=58,83, SD=25,09, Md=53,5). At the end of the interviews, participants were invited to submit relevant documents describing key developmental phases. The items 13 and 14 in GUIDED were left out because they are reported separately in this study (*Table 1*). The interviews were audio recorded and transcribed with the level of detail required according to the research method. All identifying information referring to personal data was removed from the transcriptions during the pseudonymization process.

Table 2. Interview protocol.

1. What has your role been in the development of ALI?
2. Who participated in developing ALI with you?
3. How was the decision made to start developing ALI?
4. What was the purpose of developing ALI?
5. For which context was ALI developed?
6. For which target population was ALI developed?
7. How systematic was the development process of ALI, and was any framework or development approach utilized in the development?
8. How was the intervention development guided by effectiveness-oriented thinking?
9. If/how existing theoretical framework informed the development of ALI?
10. How were components of existing interventions used in the development of ALI?
11. What kind of factors guided decision making regarding developing ALI? (eg. principals, people)
12. Which stakeholders contributed to the development of ALI and how?
13. How did ALI change in content and format during the development process?
14. If/how certain subgroups like language and age groups were considered during development?
15. What kinds of uncertainties were identified during the development process and how were they solved?
16. What documentation exists regarding the development process of ALI (e.g. manual versions)?
17. Is there something else you would like to add?

DATA ANALYSIS

Theory-driven content analysis, using the GUIDED intervention development reporting items, was chosen as the analysis method, as it enabled a structured response to the first research question and facilitated a systematic description of the development of ALI through the GUIDED [37]. This approach was methodologically appropriate for the current study, as it allowed for the systematic examination of how empirical material reflected and challenged the chosen theoretical constructs and enabled a structured interpretation of complex phenomena within a specific framework (GUIDED). The theory-driven content analysis ensured the analytical alignment with the theoretical predefined framework and supported the structured examination of the data [42,43].

The interview data transcription consisted of 109 pages, and the eight phases used in the analysis process are described in *Table 3*.

Table 3. Description of the analysis phases, methods and measures.

Analysis phase and method	Measure
1. Familiarizing with the data *Theory-driven content analysis*	• The transcribed data consisted of 109 pages (Word document) • The pseudonymized data were imported into the ATLAS.ti software • Forming a preliminary understanding of the data content, how it aligns with the theory-driven main categories and to the separate main category 13 • Main categories 1-12 named, subcategories not formed yet
2. Definition of coding rules for the main categories *Theory-driven content analysis*	• The coding rules were developed in reference to the GUIDED and documented in a separate document • Two coders verified that they had a shared understanding of the coding rules
3. Preliminary coding of data observations under main categories *Theory-driven content analysis*	• The data observations were coded in ATLAS.ti according to main categories numbered 1 to 12 • Preliminary patterns of subcategories began to emerge under each main category
4. Reviewing of coding rules for main categories *Theory-driven content analysis*	• The coding criteria for the main categories were further specified • Any potential overlaps were systematically examined • Revisions and clarifications were recorded in a separate document • Two coders reviewed and cross-checked their coding of the data observations to ensure consistency
5. Defining names for data-driven subcategories *Theory-driven content analysis*	• Data observations under main categories 1–12 were further organized into subcategories according to recurring thematic patterns • Each subcategory was assigned a descriptive label • Corresponding coding rules were developed for the subcategories
6. Generation of the results table and description of its content *Theory-driven content analysis*	• Frequencies of data observations within each main and subcategory were recorded in Table 5 • The percentage of the total number of observations was calculated to illustrate the relative distribution • To support the reporting of the findings, representative quotations were chosen to exemplify representative data observations corresponding to each subcategory • Six initially defined subcategories were integrated into other categories as they represented overlapping thematic content
7. Description of main category 13 *Data-driven content analysis*	• Corresponding coding rules were developed for the subcategories in main category 13 • Data observations under main category 13 were organized into subcategories according to recurring inductive thematic patterns
8. Description of the timeline *Document analysis*	• The content of the documents (n=21) was classified following the description of the material, interview number, usage status, justification for exclusion, content included in the timeline and other remarks • Information from the documents describing the timing of the development phase (n=6) was used to create the timeline in Table 4

The 12 theory-based main categories (*Table 3*) were complemented by a 13th category, which was developed inductively based on interview question number 17 (*Table 2*). This ensured that perspectives not covered by the original items were included in the analysis. This category was created to ensure analytical comprehensiveness and to enable a trustworthy response to the second research question [44].

At the end of the interview, participants who had been involved in documenting the development of ALI were asked to submit any materials they considered valuable for illustrating the developmental stages of the intervention. These were analyzed by document analysis [45] which is described in detail in *Table 3*. The selected materials were used to construct a timeline presented in *Table 4*.

RESULTS

The results are presented in three parts. First, we present a timeline for the development of ALI (*Table 4*). ALI development started in May 2022, the first version was ready in September, and the pilot was executed from January to June in 2023.

Second, we describe the development of ALI by categorizing the qualitative data according to the GUIDED (*Table 5*, main categories 1-12). Third, we present additional factors that influenced the development of ALI (*Table 5*, main category 13).

Table 4. The timeline for the ALI intervention's development process.

	Spring 2022	Autumn 2022	Spring 2023	Autumn 2023
Intervention development	• Decision about the development by the executive team of the First-Line Therapies Initiative • Development of ALI 1.0 started	• The first version of the content	• Content development based on the pilot • Ali 2.0 is ready	
Training model		• Developing Ali training and supervising model 1.0 • Supervisors' training started	• Training diary is finalized • Development of the training model (e.g. materials, diary, supervision) based on the pilot	• Training model 2.0 was developed based on the pilot feedback • First ALI 2.0 training
Piloting and implementation		• Recruiting pilot areas	• Pilot evaluation model finalized • Ali 1.0 pilot with 61 trainees in 6 wellbeing services counties and the city of Helsinki • Feedback survey for the trainees and supervisors • Reflection of the feedback with the pilot areas and the steering group	• Final survey of the pilot • ALI 2.0 implementation started

Table 5. Main and subcategories identified in the development of the ALI intervention including total number and frequencies of observations.

Main categories	Subcategories	Data observations in total	Percentage of total data observation
1. Context to which ALI was developed	1.1 Considerations regarding intervention practitioners in student welfare	12	
	1.2 Funding and financial considerations in the development of the intervention	6	
	1.3 Issues related to the contextual fit of existing interventions	32	
	1.4 Development in the service system	11	
	1.5 Increased prevalence of anxiety symptoms	3	
		Total: n=64	15%
2. Purpose of ALI development process	2.1 Early-stage support for anxiety symptoms	6	
	2.2 The contextual fit of ALI	16	
	2.3 Intervention accessibility	7	
		Total: n=29	7 %
3. Definition of the target group for ALI	Data-driven description: definitions of age groups and occurring anxiety symptoms	9	
		Total: n=8	2 %
4. Framework and approach for ALI development	Data-driven description: no formal development framework	9	
		Total: n=9	
			2 %
5. Evidence-informed thinking in the development of ALI	5.1 Previous interventions and research	17	
	5.2 The input of the developers	4	
		Total: n=21	5%
6. Theory-informed thinking in the development of ALI	Data-driven description: cognitive behavioural framework	10	
		Total: n=10	2 %
7. Using components from existing interventions in the development of ALI	7.1 Identification of components of existing interventions	9	
	7.2 Modification of components of existing interventions	6	
		Total: n=15	4 %

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Main categories	Subcategories	Data observations in total	Percentage of total data observation
8. Principles guiding decision making in the development of ALI	8.1 Key professionals involved in the development process	35	
	8.2 Expectations and requirements of student welfare professionals	26	
	8.3 Guidance provided by the steering group	6	
	8.4 Previous research and knowledge from other interventions	28	
	8.5 The objectives set for the ALI intervention	57	
		Total: n=152	36 %
9. Stakeholder contribution in the development of ALI	9.1 Piloting in student welfare services and feedback from professionals	20	
	9.2 Comments from child and adolescent psychiatry professionals and other stakeholders	14	
		Total: n=34	8 %
10. Changes in the content and form of ALI during its development	10.1 Modification needs from the feedback of ALI practitioners	5	
	10.2 Development of the content of the training	9	
	10.3 Changes in the content or form of the intervention	10	
		Total: n=24	5%
11. Considering subgroups in the development of ALI	Data-driven description: considerations of subgroups based on age, language or other factors	13	
		Total: n=13	3%
12. Uncertainties in the development of ALI	12.1 Considerations related to the intervention practitioners' basic mental health training	11	
	12.2 Considerations of suitability for different age groups	4	
	12.3 General considerations concerning implementation	6	
	12.4 Considerations related to the availability of time and resources	8	
		Total: n=29	7%

Main categories	Subcategories	Data observations in total	Percentage of total data observation
13. Other factors influencing the development of ALI	13.1 Tensions within the development environment	10	
	13.2 Critical assessment of the need for a new intervention	10	
		Total: n=20	5%
		Overall total: n=428	**100 %**

To answer the research questions, we present illustrative quotations that provide insight into the recurring responses within each subcategory. To support the pseudonymization of the research data, the interview quotations are presented without participant labels. The quotations (in total 39) have been selected from all participants as follows: 1. Interview 21%, 2. Interview 15%, 3. Interview 5%, 4. Interview 23%, 5. Interview 3% and 6. Interview 33%.

How was the ALI intervention developed when explored through the GUIDED intervention development reporting items? (RQ1)

Main category 1. Context to which the ALI was developed
The content of this main category was constructed from data observations in which the interviewees described the context into which the ALI was developed. By context, the interviewees referred to the environment in which the ALI was intended to be delivered. Further in this main category they referred to the factors that initiated ALI development and to factors related to context-fit issues. In addition, the observations were reflecting the changes in service system and organizational structures due to the health and social services reform in Finland.

Subcategory 1.1 Considerations regarding intervention practitioners in student welfare:

> *"The need probably arose most strongly from the school world, from student welfare services."*

Subcategory 1.2 Funding and financial considerations in the development of the intervention:

> *"That has probably been the central issue all along, that there hasn't been that kind of long-term funding element."*

Subcategory 1.3 Issues related to the contextual fit of existing interventions:

> *"This kind of licence-based system was too difficult to maintain... It (the Cool Kids intervention) had been made there, by them, for entirely different people and a different context (Australia)."*

> *"And then, of course, there was already user experience with Cool Kids, that it is quite too heavy for the school environment."*

Subcategory 1.4 Development in the service system:

> *"A complex service system with different professionals and different levels. There is a need for different anxiety treatments that share similar elements but are suited to different levels."*

Subcategory 1.5 Increased prevalence of anxiety symptoms:

> *"This anxiety had been increasing over the past ten years, so the need was pretty much obvious at that point already."*

Main category 2. Purpose of ALI development process
The second main category describes the objectives of ALI. The interviews highlighted a perceived need to develop an intervention that could offer children and adolescents support for anxiety symptoms in primary care. Another key theme identified in the data was the contextual fit of ALI for the student welfare services as it was considered as a foundational element in its development. In addition, participants highlighted that ensuring the accessibility of both ALI and its training was considered important already during the development phase.

Subcategory 2.1 Early-stage support for anxiety symptoms:

> *"...There would be a very low-threshold service, which would be easily accessible and also without long waiting time."*

Subcategory 2.2 The contextual fit of ALI:

> *"...that it would of course provide needed competence and knowledge....but would not be overly burdensome. And it could be incorporated to that work (in student welfare services) as well as possible."*

Subcategory 2.3 Intervention accessibility:

> *"...The wish that things would be nationwide... if there is a child suffering from anxiety, that they would at least receive certain information and that the parents would receive certain information somehow, about what it is all about."*

Main category 3. Definition of the target group for ALI

The data observations within the third main category focused on identifying the target group for whom ALI was developed. Participants described the intended age range, as well as children and adolescents exhibiting early signs of anxiety-related symptoms. In addition, they noted the involvement of parents in the intervention process.

> *"The target group was 7–17-year-old children, adolescents, and their families or parents. And particularly those at the entry point of the treatment system... presenting with mild anxiety symptoms."*

Main category 4. Framework and approach for ALI development

The data observations within this main category related to how participants described the potential use of a formal development framework in the development process of ALI. Participants consistently indicated that no formal development framework had been utilized. The development process was described as iterative, involving professionals with expertise in the subject matter.

> *"It is obvious that the way of developing the intervention could have been more systematic... Perhaps our starting point here was more like... that we had top experts in a particular therapeutic intervention and framework, who follow international developments in the field and are most familiar with them."*

Main category 5. Evidence-informed thinking in the development of ALI

The data observations within this main category included participants' reflections on what research evidence was used as a foundation for the development of ALI. Participants mainly described research originating from the cognitive framework, particularly regarding the elements of various EB CBT-based interventions. According to the interviews, the specialists involved in the development process had clinical experience of other interventions with research-based evidence of effectiveness. Participants also noted that there was no accompanying research project during the development of ALI, in which the potential effectiveness of the intervention would have been evaluated.

Subcategory 5.1 Previous interventions and research:

> *"When we started thinking about what components and elements the ALI intervention should consist of, we reviewed the latest research and existing interventions ...to get an understanding of what is effective based on current evidence"*

Subcategory 5.2 The input of the developers:

> *"The initial proposal for the structure was reviewed collectively, and feedback was requested. However, there was no clearly defined or systematic procedure in place; instead, consensus was sought through informal discussion."*

Main category 6. Theory-informed thinking in the development of ALI

The data observations within this main category consisted of how participants described the influence of existing theories on the development of ALI. Participants primarily referred to interventions and therapeutic approaches derived from the cognitive framework.

> *"What is generally known about cognitive approaches and the tools they offer, and what within that framework is useful"*

Main category 7. Using components from existing interventions in the development of ALI

The data observations within this main category captured participants' descriptions of the role that other interventions played in the development of ALI. Participants described how contents and components from existing interventions were

incorporated into the development process. Many participants in the study had prior training in various interventions based on the cognitive framework, as well as practical experience in applying these interventions. When modifying the content of ALI, particular emphasis was placed on ensuring that the exercises and material were understandable and accessible to professionals working in student welfare services.

Subcategory 7.1 Identification of components of existing interventions:

> *"Of course, it adds a bit of credibility to the new intervention when the components within it are ones that have been studied."*

Subcategory 7.2 Modification of components of existing interventions:

> *"...constructing an exposure hierarchy is something that appears in almost all anxiety treatment models in some form. So, in those aspects, there was no attempt to reinvent the wheel."*

Main category 8. Principles guiding decision making in the development of ALI

This main category contained the largest number of data observations. It included participants' descriptions of the individuals, sources of information, perceived needs and goals that guided decision making during the development of ALI. Participants consistently identified the same key individuals who were involved in both the development and coordination of the process. According to the data, decision making was influenced by feedback from student welfare professionals regarding the limited contextual fit of the Cool Kids intervention for school settings, as well as by an expressed need for practical tools that student welfare professionals could use to support children and adolescents with anxiety symptoms. In addition, decisions were informed by feedback from pilot groups, which was discussed within steering group and with professionals responsible for the training, and by existing research evidence on the effectiveness of other CBT-based interventions.

Subcategory 8.1 Key professionals involved in the development process:

> *"X (specialist's name) was the one who decided that development will be made".*

> *"X (specialist's name) was the one who did the most difficult structuring, which are those models and if we should keep the alternative modules"*

Subcategory 8.2 Expectations and requirements of student welfare professionals:

> *"All the feedback we receive through intervention supervision sessions, from the feedback questionnaires... from the training diaries, and also from what we hear from the coordinators within the service system, all of that contributes."*

Subcategory 8.3 Guidance provided by the steering group:

> *"From the very beginning, we had a steering group in this project, which included representatives from child psychiatry, adolescent psychiatry and adult psychiatry. We also had representatives from primary healthcare units and various others, so it was actually quite a broad group."*

Subcategory 8.4 Previous research and knowledge from other interventions:

> *"In other words, every component of the intervention must be justifiable and based on something. Interventions should not be created from scratch."*

Subcategory 8.5 The objectives set for ALI:

> *"The starting point was to genuinely increase the competence and understanding, and then to provide professionals with tools to go through these matters with the child or adolescent."*

Main category 9. Stakeholder contribution in the development of ALI

This main category focused on the involvement of stakeholders in the development of ALI. The data observations described the participation of external collaborators who did not hold formal responsibilities within the development process. Interviewees particularly emphasized the role of pilot groups within student welfare services and the feedback received from practitioners, which contributed to the refinement of the intervention. In addition, the data included references to input and recommendations provided by professionals in child and adolescent psychiatry, which were utilized to inform further development.

Subcategory 9.1 Piloting in student welfare services and feedback from professionals:

> *"We had a really good pilot group, and we received very active feedback from them."*

Subcategory 9.2 Comments from child and adolescent psychiatry professionals and other stakeholders:

> *"X (specialist's name), for example, handled those texts, and they commented and gave their input, and then they made corrections or additions, changes accordingly."*

> *"The coordinators conduct surveys in their regions and, of course, listen to the practitioners, and through them we receive feedback in regular coordination networks about how well intervention has fit."*

Main category 10. Changes in the content and form of ALI during its development

This main category focused in the ways the content and form of ALI evolved during its development. In general, the modifications were minor according to the interviews. The data observations included descriptions of modifications made based on feedback from practitioners, as well as the progression of the training process during the piloting phase. Examples of modifications included adapting forms to be understandable for younger children, producing a video to encourage parental involvement, and refining training materials to improve their pedagogical clarity and structure. In addition, participants reported needs to further develop ALI into a group-based format and to ensure its suitability for use with children from immigrant backgrounds.

Subcategory 10.1 Modification needs from the feedback of ALI practitioners:

> *"In the first version, at least, there was the wish that there would be more forms suitable for younger children... So we immediately started producing that material."*

Subcategory 10.2 Development of the content of the training:

> *"For the first group, we even had an extra survey halfway through the training, so we got the first training feedback already after the first few months, which gave us the opportunity to develop things already while the pilots were still ongoing."*

> *"An effort was made to find a balance between the lightness of the training and its sufficiency, particularly in terms of ensuring that professionals acquire adequate competence."*

Subcategory 10.3 Changes in the content or form of the intervention:

> *"The development and modification have been about supplementing and clarifying the materials."*

Main category 11. Considering subgroups in the development of ALI

In this main category, the data observations focused on how the specific needs and characteristics of different subgroups were addressed during the development of ALI. The data included considerations of how the intervention was targeted to particular age groups and how its suitability for children of various ages was assessed. Furthermore, the material highlighted the perceived need for language-specific versions and reflected on how other subgroups, such as children with immigrant backgrounds or those experiencing learning difficulties, were considered in the design of the content and materials of ALI.

> *"ALI is available in Finnish and Swedish… and the materials distributed to families are available in English. And especially in the wellbeing services counties where there are many immigrants… this request (of other languages) keeps coming up regularly."*

> *"A separate supplementary material for these neurodevelopmental difficulties has been made…"*

Main category 12. Uncertainties in the development of ALI

This main category focused on uncertainties associated with the development of ALI that emerged during the developmental process. The data observations included descriptions of concerns regarding the intervention practitioners educational background, as well as doubts about the applicability of the intervention to populations outside the defined target group (children and adolescents aged 7–17). Additionally, the data reflected concerns about the potential for the intervention to be used inappropriately, such as in cases involving severe mental health disorders which the intervention was not designed for. Resource-related uncertainties also emerged, including the availability of sufficient funding and time allocated for the development work. In addition, the data revealed reflections on the potential risks associated with exposure exercises, which were considered from multiple perspectives.

Subcategory 12.1 Considerations related to the intervention practitioners' basic mental health training:

> *"A clear limitation that we made was that exposure conducted in appointment was not included in ALI, even though there is very strong research evidence that it is very effective. We thought that it is an element that already requires more understanding."*

Subcategory 12.2 Considerations of suitability for different age groups:

> *"We have so far remained quite cautious, that we are by no means yet recommending it from our side for that (7-17-year-old) age group"*

Subcategory 12.3 General considerations concerning implementation:

> *"One uncertainty that comes clearly to mind was the evaluation aspect, how well the professionals are able to assess the question of for whom this is suitable and for whom it is not."*

Subcategory 12.4 Considerations related to the availability of time and resources:

> *"The project funding periods have been two or three years long. We have received additional funding piece by piece. That has been the challenge throughout, these are such long processes."*

What factors beyond the GUIDED influenced the development of the ALI intervention? (RQ2)

Main category 13. Other factors influencing the development of ALI

In this main category, the findings focused on factors that, according to the interviewees, influenced the development of ALI. The data observations highlighted some of the tensions within the broader development environment, including challenges related to the development, possibilities for adaptation and implementation of other interventions like cognitive brief therapy (Finnish acronym KLT). Furthermore, the data revealed how the critical assessment of the need for a new intervention, namely ALI, was conducted in relation to the existing service system and concurrent development initiatives in Finland.

Subcategory 13.1 Tensions within the development environment:

> *"The copyright negotiations with the Australians (Cool Kids). That probably took about a year and a half... so we quite quickly got the impression that this probably wouldn't work out."*

> *"What has perhaps bothered me from the beginning is somehow the setup… that there was an attempt to somehow replace Cool Kids or create a new Cool Kids or something like that."*

Subcategory 13.2 Critical assessment of the need for a new intervention:

> *"We looked in sync at what kinds of synergy benefits there might be, for example, since Cool Kids was already in place both for youth and children. And whether something separate like this is needed."*

> *"The central, interesting question is precisely related to the relationship between cognitive brief therapy and ALI, how they match."*

DISCUSSION

The results of this qualitative study present how ALI was developed based on the needs of professionals working in student welfare services in a situation where anxiety symptoms of children and adolescents have increased notably. Content of ALI relied mainly on components of existing CBT-based interventions and cognitive framework. ALI was developed and nationally implemented in a relatively short time due to exceptional government funding and already existing infrastructure, meaning e-learning platform, training system and national implementation network. The findings in this study suggest that the ALI development process could have benefited from a clearer structure, although many intervention development phases described in previous intervention development studies [37,39] could be identified.

Using the GUIDED in this study made it possible to get a comprehensive view on the ALI development process including influencing factors and uncertainties. As revealed by the data, quite a small group of specialists in child and adolescent psychology and psychiatry were responsible for developing ALI. According to the interview data, professionals involved in the development of ALI were described as having relevant knowledge of CBT, perceived competence, and suitable educational and professional backgrounds.

The interviewees of this study reported that no specific guidelines or frameworks were used in developing ALI. Characteristics of implementation-based and target population-based intervention development [34] can be recognized in ALI development, although according to interviewees the development was carried out without a specific development approach or application of structured models specifically designed for intervention development.

When viewed retrospectively, various items of the GUIDED were identifiable when reporting the development of ALI in this study. Some items were more explicitly reflected in the findings, whereas others were less evident. The UK Medical Research Council (MRC) published influential guidance on developing and evaluating complex interventions [26]. This was further supported by O'Cathain et al. [39] on actions to take during intervention development: i) seeing intervention development as a dynamic iterative process, ii) involving stakeholders, iii) reviewing published research evidence, iv) drawing on existing theories, v) articulating programme theory, vi) undertaking primary data collection, vii) understanding context, viii) paying attention to future implementation in the real world and ix) designing and refining intervention using iterative cycles of development with stakeholder input throughout.

The results of the study show that all of the above actions except for articulating programme theory could be identified from the development of ALI. Programme theory describes how an intervention is expected to lead to its effects and under what conditions [26]. Describing ALI programme theory in the future would support intervention providers' understanding of the change mechanisms of the intervention. Even though different steps of intervention development could be identified from ALI development, according to the findings, the actions were not always conscious decisions or systematic. Using published intervention development guidance to support ALI development could have made the process more structured and better documented.

This study revealed that one of the main reasons for developing ALI was that it seemed that the Cool Kids intervention, which was implemented at the time, was not feasible in student welfare services. Consequently, one key feature of developing ALI is that the development was guided by systematically collected feedback from professionals working in student welfare services. Involving stakeholders has been described to be a crucial part of intervention development [26,39].

Interviewees described that already from the beginning of the development of ALI, the target was national dissemination, which was possible due to already existing training and implementation structures. An acknowledged challenge in research literature is that many interventions have only been implemented in the academic settings in which they were developed [36]. Since the ALI pilot in spring 2023, a total of 438 ALI practitioners had been trained nationwide and 300 are currently in training (verbal communication provided by First-Line Therapies Initiative in June 2025).

Contextual fit is highly important in implementing interventions [46] and should be considered already in the development phase of the intervention [24,26,39], as was done during the development of ALI. In the study, interviewees reported that ALI practitioners had given mainly positive feedback about the fit of ALI to student welfare services. From the data, it was possible to identify that ALI intervention and training were developed according to this feedback. However, the data does not show modifications in detail. Interviewees reported that intervention practitioners have requested materials in most common immigrant languages, which has not yet been possible to execute due to limited resources. A systematic evaluation of contextual fit could benefit further development of the intervention in general and especially if applied to minorities.

According to the findings, one of the context-related uncertainties in the development process was to what extent it is safe and feasible to include exposure exercise. Uncertainty arises from the fact that public health nurses and social workers working in student welfare services do not generally have mental health training, so strong exposure of children and adolescents to their fears and avoided difficult feelings might be too risky for the participants, and too demanding for the providers without more profound training. Currently in ALI, exposure exercises are primarily conducted independently as homework assignments rather than in sessions with a student welfare professional. In a meta-analysis by Whiteside et. al [15] it was suggested that in-session exposure improves the efficacy and effectiveness of CBT protocols. Consequently, leaving it as an optional assignment for the participant might decrease the effectiveness of the intervention.

In addition, another significant contextual fit-related uncertainty reported in the study was that terms like therapy or treatment could be perceived as alienating, as Finnish student welfare services are a part of preventive healthcare - meaning that the focus of the work is in preventive interventions instead of treating mental disorders. These types of issues might be relevant in terms of implementation and highlight the importance of considering contextual fit while developing new interventions [24].

In the development of ALI, components of existing EB CBT-based interventions were used and current evidence guided decisions regarding content and structure of ALI. However, in the light of this study it is not possible to say to what extent. In general, there is a lack of evidence regarding which CBT components are necessary and sufficient for treatment success [15]. The First-line Therapies Initiative has reported preliminary results for ALI intervention, where pre-post measures show decrease in anxiety symptoms in children and adolescents after ALI intervention [47], but so far there is no evidence of its effectiveness. Now that the development phase of ALI has ended and it is being nationally disseminated, future studies should explore the effectiveness of the intervention - the need which was also presented by some of the interviewees.

Examining effectiveness requires consideration of implementation fidelity, i.e. if the intervention is delivered as designed [48,49]. Indices of implementation fidelity are needed to determine whether client improvement or lack thereof is a function of the failure of the intervention or of its application [48]. As the ALI description presented in the results show, there is currently no established fidelity assessment. Therefore, in the future, consideration should be given to developing a fidelity measure for ALI.

There is some evidence that the use of interventions with a previous evidence base in new contexts might be more efficient than developing new interventions [27]. New interventions need first to be developed, then tested for their efficacy and effectiveness, and finally assessed for their readiness for broad dissemination and implementation [50,51], which is highly resource consuming.

One option for developing ALI could have been adapting CK to student welfare as it was already being trained in Finland. CK is a branded product, i.e. protected by copyright which limits the possibility of adaptation [27]. At the same time the restrictions on who could be trained for CK were tightened so that the intervention was no longer an option for wider dissemination in student welfare services [52]. Therefore, a relevant option for developing ALI would have been to implement and adapt another EB intervention, such as the targeted school-based 5-session CBT (Vaag) [53] that was recently developed in Norway and has shown promising evidence, or some other intervention representing a different treatment modality than CBT.

There was no indication from the interviewees if options for intervention development, such as implementing and adapting another EB intervention instead of creating a new one, were considered, although the data did reveal instances of critical assessment regarding the need for a new intervention.

STRENGTHS AND LIMITATIONS

One of the strengths of this study lies in the diverse professional backgrounds of the interviewees, who held varying roles in the development of ALI. The use of the GUIDED items structured the interviews and served as the theoretical basis for content analysis, enabling the identification of uncertainties and developmental gaps that might not have emerged through purely inductive qualitative research approaches. An open-ended question, developed outside the theory-driven content analysis framework, also allowed interviewees to raise additional perspectives they considered relevant to the development of ALI. An additional strength is the detailed description of the ALI intervention following the TIDieR [41], which enhances transparency in often poor and heterogeneous reporting of interventions in the research literature. While the small sample size, six professionals, can be seen as a limitation, it also reflects the limited number of core professionals involved in the development of ALI. However, the data were enriched through supplementary document analysis. One limitation of the study is that the interview data were collected retrospectively, and participants responded based on their recollection. In addition, conducting in-person, semi-structured interviews may have enabled deeper exploration of participants' meaning-making and more nuanced reflections on the research topic than the study would have captured with some other methodological approach (e.g. questionnaire).

CONCLUSIONS

ALI was developed purposefully and in collaboration with student welfare professionals targeting strong contextual fit. It is likely that using guidance to support ALI development would have made the process more structured as well as better documented. Using research-based guidance in intervention development is recommended. Now that the development phase of ALI is completed, it is crucial to assess its effectiveness in student welfare setting. In the future, when new structured psychosocial interventions are needed to promote mental health of children and adolescents, the choice between developing a new intervention and adapting an existing EB intervention should be carefully considered.

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Supplementary Material

Supplementary data are available at Psychiatria Fennica online.

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ADAPTING INTERVENTIONS FOR SUSTAINABLE IMPLEMENTATION IN NEW CONTEXTS: CONSIDERATIONS FROM A STUDYON ENHANCING COLLABORATION BETWEEN PSYCHIATRIC CARE AND OCCUPATIONAL HEALTH SPECIALISTS

ABSTRACT

Background: *The Coordinated Return to Work model, originally developed for an orthopaedic context, has been adapted for use in mental health settings. The model aims to enhance the collaboration between specialized psychiatric care and occupational health services. Its objective is to facilitate the return to work of employees with mental disorders by adopting a systemic approach that strengthens collaboration between public and private social and healthcare actors.* ***Objectives:*** *A previous implementation study investigated the facilitators and barriers to implementing the model. In this discussion paper, we contextualize the findings of that study within the latest literature on evaluating and adapting complex interventions.* ***Materials and Methods:*** *The implementation study findings serve as our primary data. We address the questions posed by Skivington et al. in their latest iteration of the framework for evaluating complex health interventions. These responses are intended to guide future research by determining whether further development, feasibility or evaluation studies are required.* ***Results:*** *Several challenges hindered the model's implementation, including timing issues related to the new context and the qualitative differences between the original and adapted settings. Further feasibility analysis is recommended to address the practical, socio-cultural, and organizational challenges encountered during the implementation process.* ***Conclusions:*** *When considering the implementation of a model in a new context, knowledge about its effectiveness should not overshadow other vital factors. Decision makers must understand the key context-specific mechanisms and mediators that influence outcomes, from adaptation to impact. Sustainable adaptation demands thorough planning and adequate resources to ensure effective implementation.*

KEYWORDS: WORK ABILITY, IMPLEMENTATION RESEARCH, COMPLEX INTERVENTIONS, MENTAL HEALTH DISORDERS, OCCUPATIONAL HEALTH SERVICES, PSYCHIATRIC CARE, SICKNESS ABSENCE

INTRODUCTION

Mental disorders are a major public health challenge and a significant cause of work disability in Finland. Various interventions, models and programmes have been established to prevent and treat mental disorders. However, prolonged absences from work due to these illnesses remain a challenge and can lead to a permanent withdrawal from the labour market [1]. One of the most important missions of the occupational health services (OHS) is to maintain work ability and support return to work (RTW) after long absences. Therefore, OHS' role in the RTW process for people with mental disorders is especially important in situations where psychiatrists neither have the knowledge nor the possibility to assess employees' working conditions and their work ability.

Previously, an intervention focusing on RTW after orthopaedic surgery for lumbar discectomy [2] and hip and knee arthroplasty [3] has been successful in reducing the duration of sickness absences and enhancing earlier RTW. The intervention, called the Coordinated Return to Work (CRTW) model, included a timely e-referral-based collaboration between orthopaedic clinics and OHS. [3,4]. Based on those positive experiences, the CRTW model was adapted to enhance the collaboration between specialized psychiatric care and OHS. The aim was

to promote the RTW of employees with mental disorders by taking a systemic stance, in which the collaboration between public and private social and healthcare actors is enhanced. The model also included collaboration with social insurance partners who contributed to the treatment and rehabilitation of employees with mental disorders.

The authors conducted a qualitative implementation study to identify the facilitators and barriers to implementing the newly adapted CRTW model to specialized psychiatry clinics in Finland [7]. The developers and deliverers of the model were interviewed using two theoretical frameworks: the Quality Implementation Framework [5] and the Consolidated Framework for Implementation Research (CFIR) [6]. After the qualitative data analysis, barriers to the implementation of the model were found in three overarching themes: uncertainty about the scope and boundaries of the cooperation in the model, ambiguity about the size of the target group and the existing socio-cultural and self-stigma related to mental illness. These themes highlighted the importance of focusing on the context when adapting models and studying their implementation processes [7].

Moore et al. [8] created the ADAPT study guidance in 2020 to provide the first overarching guidance on adapting and evaluating interventions in new contexts. Although there has been a vast amount of randomized controlled trials (RCT) and other studies on the effectiveness of interventions, little information is available for policymakers and practitioners to base their decisions on whether the given interventions are appropriate to their specific context and what kind of adaptation to any potential interesting intervention might be needed.

In this article, we examine the results of the CRTW model implementation study [7] in light of new perspectives that emphasize the importance of context and adaptation in implementing complex interventions, such as enhancing collaboration between actors active in the implementation process [9–13]. We discuss the most recent framework for evaluating and developing complex interventions [14] and the ADAPT guidance, which aims to increase understanding of the processes involved in making and planning adaptations [8,15]. These are discussed in relation to the implementation study results of the new CRTW mental health model.

As there are competing priorities between adapting interventions for effectiveness and adapting them for sustainable implementation, modifying one aspect might affect the other [9]. Although some interventions transfer well across different contexts [10], others might face challenges. Implementing an evidence-based intervention exactly in the form and content as it was when its effectiveness was examined might not always produce equally good effects in other contexts. That is the main reason for the need for at least some levels of adaptation. However, the main idea is that the core elements of the intervention should not be changed.

ACHIEVING A SOCIALLY SIGNIFICANT IMPACT: EFFECTIVE INTERVENTION, STRATEGIC IMPLEMENTATION AND ENABLING CONTEXT

Evidence-based medicine protocols refer to making treatment decisions based on the best available scientific evidence, clinical expertise and the individual needs and preferences of the patient. However, even if an intervention has been previously proven effective, the targeted outcomes may not be achieved if the intervention is not implemented properly, and if the context is not suitable for executing the intervention [17]. This important fact was further articulated in the work of Skivington et al. [14] when they refined the British Medical Council's framework for evaluating complex interventions originally developed in 2000 [18–21]. Moore et al. [21] highlighted that when evaluating the effectiveness of interventions, three themes should be added to the overall framework usually consisting of RCTs: context, implementation and the mechanisms of impact. Skivington et al. [14] further proposed that in the context of developing and evaluating (new) interventions, sometimes it might be wise to adapt an existing intervention rather than developing a new one [16].

For this purpose, the evidence-informed ADAPT guidance [8,16] was developed, and it did not only suggest that adaptation is a way to further develop an intervention, as Skivington et al. [14] proposed, but also emphasized that adaptation is also a continuous process necessary to sustain implementation over time as context evolves. Scientific knowledge is needed about the implementation and context-relatedness of interventions, in addition to evidence of its effectiveness. Our analysis of the newly adapted CRTW model is informed by these development trajectories in evaluating the effectiveness of complex public health interventions.

The transition from the orthopaedic CRTW model [4] to the adapted CRTW model for mental healthcare, considering mental health issues in the working life, highlights the critical need for context-specific adaptation of the intervention. Key considerations in the adaptation process are presented, and the role of contextual factors are explored, drawing on both empirical data and prior research.

DATA AND METHOD

In this discussion paper, we examined the results of the implementation study [7] of the new adapted CRTW model in relation to the new ADAPT guidance [8,16] and the British Medical Council evaluation guidelines of complex public health interventions [14,18–21]. The empirical data in the qualitative implementation study consisted of five group interviews totalling 17 participants (psychiatrists, occupational health physicians and professionals) [7]. The interviews were analysed using CFIR [6].

In this discussion paper, we followed Skivington et al. [14] who highlighted that evaluating complex interventions should use various research methodologies (see also [22]) and go beyond evaluating if intervention works or not in relation to its aims and measured outcomes. They emphasized that it is also important to ask whether there are other, possibly unintended consequences and what the value of the intervention is in relation to the needed resources. In addition, it is important to know how it works – especially in different contexts, how it contributes to a systemic change, and how the research evidence can contribute to real-world decision making [14].

Skivington et al. [14] divided research on complex interventions into four phases: 1) development or identification of an intervention, 2) assessment of the feasibility of the intervention and evaluation design, 3) evaluation of the intervention, and 4) impact of the implementation. In each phase, the following six questions should be asked, according to Skivington et al. [14], to guide whether the research can proceed to the next phase:

- How does the intervention interact with its context?
- What is the underpinning programme theory?
- How can diverse stakeholder perspectives be included in the research?
- What are the key uncertainties?
- How can the intervention be refined?
- What are the comparative resource and outcome consequences of the intervention?

Our focus is on the adaptation process of the new CRTW model and determining whether additional information is needed regarding the feasibility of the intervention in this new context before moving forward with its implementation and evaluation. The questions proposed by Skivington et al. guided our interpretation of the findings from the CRTW model's implementation study.

Two authors (MH, PJP) initially drafted the responses based on the results of the implementation study. The responses were then reviewed, edited and approved by the other authors until a consensus was reached. The ADAPT guidance is discussed, especially in relation to its emphasis on adapting interventions for a new context.

RESULTS

In *Table 1*, we present the responses to the questions posed by Skivington et al. [14] in their new guidance for developing and evaluating complex public health interventions.

The adapted CRTW model was developed to enhance cooperation between specialized psychiatric care and occupational health services to facilitate the RTW of patients with mental health issues. While both psychiatrists and physicians supported the aims of the intervention, several challenges hindered the implementation. For example, only a few referrals were made by psychiatrists to the OHS. The availability of the e-referral system faced delays, and the organization of specialized public psychiatric care services differed across regions, while undergoing significant structural change. Specialized psychiatric care is organized in more diverse ways than somatic healthcare, on which the model was based, and the socio-cultural context, including stigma, added further complexity to the implementation.

Given these challenges, further analysis of the feasibility of the intervention is recommended to address the practical, socio-cultural and organizational issues encountered during the implementation process. By conducting more feasibility studies, the adaptation of the intervention would be based on knowledge about the healthcare environment and the necessary adjustments would be identified, potentially leading to more successful implementation outcomes in the future.

Table 1. Assessing CRTW Model Adaptation in Specialized Mental Healthcare in Finland.

Questions posed by Skivington et al. [14]	The adapted new Coordinated Return to Work (CRTW) model (data from [7])
How did the intervention interact with its context?	Aspects that worked well: • Psychiatrists shared the aims and objectives of the intervention, ensuring and supporting their patients' inclusion in working life. • Psychiatrists hoped for, as promised through the intervention, a reduction in workload related to disability certificates. Aspects that worked poorly: • Fewer patients were referred to occupational health services according to the intervention (CRTW) than expected. Sick leave due to mental health reasons had increased sharply in Finland, but despite this, working-age patients in specialized psychiatric care were rarely at work or had a job contract. • There were difficulties in the (public) psychiatric care with obtaining contact information for referring patients to (private) occupational healthcare services. Some patients didn't consent to a referral to their occupational healthcare. • Referring was harder than planned in the intervention because the installation of the e-referral system was delayed or lacking.
Underpinning programme theory	The intervention aimed to reduce the duration of sick leave following specialized psychiatric care by fostering collaboration with occupational healthcare. The task of occupational healthcare was to design early return to work support measures for the individual in collaboration with the workplace and with the help of benefits and services from the social insurance system. No modifications were made to the underpinning programme theory of the intervention.
How were diverse stakeholder perspectives included in the research?	As the new CRTW model was designed for professionals in psychiatric units and occupational healthcare, these groups formed the target population for the implementation study. Consequently, no employers or patients were interviewed. Psychiatrists were satisfied with the information they received about the model but dissatisfied with the slow progress of the e-referral system. Although the physician developers stated that they were well briefed on the model and shared its basic idea, the adaptation could still have been planned better in advance. This was important since the context changed in relation to stigma, an extensive mental health service system, which was organized differently by region and was in the middle of a structural change.

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Questions posed by Skivington et al. [14]	The adapted new Coordinated Return to Work (CRTW) model (data from [7])
Key uncertainties	Specialized psychiatric care was organized in a more diverse way than the somatic healthcare on which the original model was based. Unlike in somatic healthcare, with processes like surgery, there were several operating models, actors and mutually different models in different wellbeing regions in psychiatric care. A key socio-cultural contextual factor that differed from the implementation of the previous somatic model of this intervention was the negative social stigma attached to mental health problems. The self-stigma of a patient or stigma experienced in health or OH services or at work could completely prevent collaborative cooperation from starting. Stigma can act as a significant inhibiting factor, while inclusive operating culture and practices can act as mechanisms to support return to work. Despite persistent efforts, in the midst of nationwide restructuring changes in social and healthcare, the electronic referral practice was delayed or did not emerge at all in all examined wellbeing counties. The operating system was complex and its major and minor changes affected collaboration opportunities on both sides. The organization of public specialized psychiatric care services varied between regions and was undergoing a major structural change. There were many private occupational healthcare service delivery points, and service delivery was based on fixed-term contracts with employers leading to potential changes after the fixed term. The intervention model is well suited to a stable environment where key actors are permanent. As there was an ongoing turnover of both the psychiatrists and OH physicians during the implementation study, partly because of varying service providers with different contracts, the context was not as enabling as it could have been to enhance sustainable implementation.
How was the intervention refined?	The adaptation of the intervention concerned both the collaboration context and its actors and the focus group. The initial intervention was targeted at orthopaedic care settings and patients. The tailored intervention was aimed at fostering collaboration between public psychiatric special healthcare and private occupational healthcare, and to working-age people with mental disorders covered by occupational healthcare agreements. Also detailed implementation instructions for specialized psychiatric care were formulated in the refined intervention.
What were the comparative resource and outcome consequences of the intervention?	The intervention aimed at reducing unnecessarily long sick leaves to reduce financial costs for employers. It is also known that only 50% of individuals return to work after receiving sickness allowances due to depression when the leave lasts more than six months. Without the intervention, work ability assessments occur in psychiatric special care for those patients covered by an occupational healthcare agreement, when they could take place in occupational healthcare. This unnecessarily uses resources from psychiatrists. A possible alternative intervention could be, for example, monitoring sickness absence by the Occupational health services (OHS). The Finnish Occupational Health Care and Health Insurance Act obliges the employer to inform the occupational healthcare services if employee's sick leave continues for more than a month, either continuously or in shorter periods. The aim of this act is to support early and timely work ability when illness or recovery requires a longer sickness absence period. The employer, employee and occupational healthcare service are encouraged to investigate the situation of the sick employee and consider work arrangements to support the return to work. The defined check points are now 30 days, 60 days, 90 days, 150 days and 230 days, and it is known that the level of successful implementation of this so-called 30-60-90 rule varies. Employers who themselves invest in work ability management are also active in supporting Return to work (RTW) and job retention with OHS.

DISCUSSION

It clearly was an important social innovation to use and modify the existing CRTW intervention, which has been shown to reduce the duration of sick leave in orthopaedic patients [2–4]. However, preparing the intervention for the new context could have been better, as noted in the material based on group interviews. This is an especially important finding as the context has been identified previously in implementation research literature to have a major effect on the targeted outcomes [8–13,21,23].

To our knowledge, two key changes were made to the original intervention: 1) the updated guidance for psychiatric clinics on the use of e-referrals, and 2) a therapeutic relationship was maintained if needed between psychiatrists and patients after the referral, unlike in the original intervention where the relationship did not continue. These changes were co-developed with physicians, who were considered key stakeholders in the change process. When considering the necessary adaptations for the new CRTW process, the roles of each stakeholder in specialized care and occupational healthcare were clearly defined. In one instance, when implementing the initial model, the process involved approximately 10 different stakeholders and nearly 20 distinct actions [24]. This example demonstrates the context-sensitive nature of the CRTW intervention [16] and highlights the complexity of its implementation processes [22].

Addressing mental disorders in Finnish mental health services involves various actors across different sectors, making the service system more complex compared to the orthopaedic context [25,26]. Additionally, employees returning to work with or after mental health disorders are facing socio-cultural issues, especially the problems caused by stigma (including self-stigma), and in the future it must be addressed [27,28]. These context-related mechanisms and themes altogether posed significant challenges to the implementation of the new CRTW model [7].

When examining the implementation of complex interventions such as the new CRTW model, conventional programme logic might not fully grasp the significance of dynamic systems in the context of the implemented intervention [29]. RCT designs are meant for investigating possible causal effects of interventions by using control groups, but their external validity is low because the role of context in achieving the targeted outcomes is missing.

After recognizing individual barriers and facilitators to the implementation of the new CRTW model for mental health in the implementation study [7], several insights emerged, suggesting that dynamic mechanisms influenced successful implementation. Six context-related mechanisms were identified and analysed. Among these, one concerns the competence and resources of OHS professionals in supporting the RTW of employees with mental health disorders. It is particularly relevant when shifting the focus from the earlier CRTW model to the new mental disorder-related model. Working with patients living with severe mental health issues differs qualitatively from working with patients with orthopaedic issues. Particularly, addressing themes of stigma, self-stigma, ongoing psychiatric care and understanding the broader sphere of mental health actors, not to mention the complexity of the theme of mental disorders itself, challenge the implementation of the initial orthopaedic model in the context of mental health. Additionally, attitudes and beliefs related to mental health problems need to be considered, given that the model was part of a return to work path for patients. These issues should be considered before the implementation plans made to address them.

According to recent understanding [8,15], this also pertains to the broader theme of whether adaptation is understood as process or not. Most of the interventions are adapted during implementation, but this does not have to be the case. More focus could be given to actively preparing and sustaining adaptation. In 2012, Meyers et al. developed the Quality Implementation Framework (QIF) [5], drawing from 25 existing implementation frameworks. While they did not focus on adaptation like Moore et al. later did, they similarly highlighted the importance of the planning phase of the implementation process. Meyers et al. [5] emphasized implementation as a process with distinct preparation and sustainment phases, as QIF proposed a four-phase model for successful implementation: situational analysis, preparation, actual implementation and sustainability. Detailed planning phase for the adaptation should be included in the implementation process so that it is feasible and acceptable to the new target population and thus produces targeted outcomes [30].

The new CRTW model for mental health relies on e-referral practice in its essential part. The idea was to speed up the collaboration between psychiatric care and OHS by sending the patient faster than before to the work ability assessment by using e-referral [2,4]. The timely transfer of information between specialized healthcare and occupational healthcare has been identified as a critical factor supporting collaboration [31]. Digital health tools have become more common, and they clearly have the potential to speed up processes. However, the use of these tools in large, complex health systems composed of different actors remains comparatively limited [32].

While digital health tools can work and improve processes themselves, the challenge lies in their adoption, implementation and operationalization, significantly restricting potential

improvements in healthcare services [32]. Collaborative visioning, as well as analysing and reviewing the phases of the innovation cycle and the corresponding investments are needed [33] from various sectors, including hospitals, IT platform providers, the Finnish wellbeing counties, occupational healthcare providers and rehabilitation service providers.

The initial implementation study results highlighted a need to ensure the functionality of all innovation components and the correct timing of implementation [7]. The planned e-referral practices were not ready in all areas where the implementation was supposed to happen. Understanding the crucial context-related mechanisms and mediators from adaptation to impact is essential for decision makers when considering whether to implement a new evidence-based intervention. When interventions are seen as events in systems [29], the effects of a new evidence-informed intervention are dependent on the system histories and the starting points in time. If e-referral practices were fully implemented before the start of the implementation of the new CRTW model, the effects may have been different. Implementation science altogether seems to be shifting from assessing the success of individual adaptations to understanding adaptations and their impact [34].

Timely implementation is crucial, as it plays a significant role in the adaptation of interventions. If interventions are developed over 1-2 years, then their feasibility is tested over 2-3 years, and lastly, RCTs are conducted to test their effectiveness; almost a decade can pass in this process. During this time, the context can change significantly from the initial development of an intervention. This further emphasizes the importance of understanding adaptation as an ongoing process [35]. Interventions need to adapt to the continuous changes in context, and in population health intervention research there is a need to systematically incorporate considerations of context at all stages of development and evaluation [11]. Overall, our responses to Skivington et al. [14] questions suggest that more emphasis should be placed on the conscious planning of the adaptation when changing the context of implementation.

From the perspectives of social significance and policy makers, selecting a new context was essential: The most common reason for receiving sickness allowance in Finland in 2024 was due to mental disorders. Approximately 9–10% of the working population aged 16–67 receive mental disorder-related sickness allowance annually. In recent years, the prevalence of receiving sickness allowance due to mental disorders has increased. However, the growth in sickness absence appears to have stalled for the time being. Of the compensated sickness allowance days, the mental health disorder category was slightly over one third (36%) in 2024. [36]

It seemed that the weaknesses in adaptation may have contributed to the fact that there were so few suitable patients when the new CRTW model was implemented. Careful and more systematic planning and conducting of the adaptation process could have helped the implementation, although it would have been resource intensive. During the planning phase of adaptation, it would have been beneficial for successful implementation if mental healthcare pathways and actors had been analysed and described regionally. It would have been important, given the large structural changes in Finnish social and healthcare during the past years, to refine the description at least for the regions involved.

The guidance for evaluating complex interventions has been developed to a point where not only the evaluation but also the simultaneous development of interventions is highlighted in a systemic manner, emphasizing the adoption of existing interventions, rather than only developing new ones [14]. Likewise, we examined and discussed the newly adapted CRTW model as an existing intervention being tested in a new mental health context. We were not able to evaluate the perspectives of all relevant stakeholders, such as patients, workplaces and social insurance. In the scoping review of Corbiere et al. [37], the plethora of stakeholders involved in RTW of employees on sick leave due to common mental disorders was highlighted. However, since the CRTW model under our investigation was precisely about changing and developing the collaboration between public healthcare specialists and OHS specialists, we focused on these two key stakeholders.

Adapting population health interventions for new contexts creates tension for decision makers to balance between the resource-intensive option to implement a new evidence-based intervention or to go with more practical decisions to implement an intervention that has already been implemented in the country. This real-world challenge can hinder the effective translation of research into practice [38]. One potential solution is to identify and preserve the core elements of the evidence-based intervention during adaptation and not to alter these essential components. For this approach to succeed, researchers need to be actively involved in the project to comprehend the core elements and their boundaries fully. In the case of the new CRTW model, not all professionals implementing it fully understood the boundaries of the intervention [7]. This may be due to the collaborative-development nature of the intervention, which can be somewhat abstract, or due to the fact the regional and local context was significantly different from what was expected in the implementation of the intervention. However, some level of adaptation is always necessary when implementing population health interventions. By implementing evidence-

based interventions that maintain their core elements rather than striving for perfect versions, acceptability, feasibility and scalability in low-resource settings are enhanced [39].

Effective implementation in mental healthcare, such as integrating psychiatric and occupational health services, demands long-term planning, collaboration, stigma management and systemic development rather than reliance on a single project or evidence base. O' Cathain et al. [22] and Skivington et al. [14] emphasize the need for interdisciplinary, multi-method approaches and prioritizing research that has the highest potential to impact health outcomes. To promote collaboration, it is important to know regional and local partners and improve digital referral practices from specialized healthcare to occupational health services. In sum, this means understanding sustainable adaptation and detailed pre-planning of it.

CONCLUSION

This discussion paper, which describes an implementation study carried out in mental healthcare in Finland, underscores the critical role of adaptation and context in successful intervention outcomes. The recent implementation research literature emphasizes similar viewpoints. Implementation and adaptation of a CRTW model to a new context was examined in relation to this emphasis. Changing the context of an intervention requires careful planning and sufficient resources for effective adaptation. Over-reliance on knowledge about the intervention's effectiveness in one context might overshadow the importance of sustainable adaptation to other contexts.

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A COMPETENCE FRAMEWORK FOR TRAINING COGNITIVE BEHAVIOURAL THERAPY WITH CHILDREN AND ADOLESCENTS: INTEGRATION OF EXISTING MODELS AND COMPARISON WITH NATIONAL TRAINING PROGRAMMES IN FINLAND

ABSTRACT

Mental disorders are common in childhood and adolescence, but access to psychological interventions remains limited. Expanding this access requires training a workforce competent in methods aligned with the needs of service users and the possibilities of service providers. Competence-based education can improve the transparency, consistency and effectiveness of psychotherapy training programmes. Competence frameworks are used to systematically articulate the goals of training and the expected knowledge and skills of the trainee. Cognitive behavioural therapies (CBTs) are the most widely recommended treatments for common internalizing and externalizing disorders. The study develops a competence framework for CBT with children and adolescents by integrating established frameworks, to provide a more comprehensive presentation of expected competence. The presented framework covers 91 competences across six domains: core competences for work with children and adolescents, generic therapeutic competences, assessment and planning, CBT competences/techniques, metacompetences and problem-specific competences. To test the practical applicability of the developed framework, its alignment with the contents of nationwide CBT training programmes for children and adolescents was evaluated. Results showed that 88% (CBT for children) and 81% (CBT for adolescents) of competences were fully covered, with smaller proportions partially addressed or omitted. The competence framework provides a novel tool for presenting, comparing, and evaluating CBT training programme contents internationally. This can be used to support both workforce competence building and scientific research on CBT methods.

KEYWORDS: COGNITIVE BEHAVIOURAL THERAPY (CBT), CHILD AND ADOLESCENT MENTAL HEALTH, COMPETENCE-BASED EDUCATION, PSYCHOTHERAPY, STEPPED CARE

INTRODUCTION

Mental health symptoms and disorders are highly prevalent in childhood and adolescence (1). Cognitive behavioural therapies (CBTs) represent the most widely studied and implemented treatments for both internalizing and externalizing disorders (2–4). However, in the mental health service system, a significant mismatch often exists between the demand for and supply of treatment, as much as 55.8% of children and adolescents with a mental health disorder in high-income countries do not receive any treatment (5). This highlights a systemic issue: even the most effective treatment models cannot improve coverage if they fail to reach the children and adolescents who need them.

A key strategy to tackle this mismatch is to expand timely access to evidence-based psychological interventions, including CBT, across different service settings, by ensuring that professionals are sufficiently trained and competent to deliver these services. Aligning training programmes with the needs of the service system and the standards of evidence-based treatment is essential to this strategy, as it promotes both the quality and scalability of services by ensuring a sufficiently large workforce competent in these treatments. Thus, it is important to describe the competence structure of implemented CBT training programmes in a transparent manner to enable comparability across training, service delivery models, and ultimately, treatment outcomes between countries. In this

paper, competence refers to the overall ability to practice CBT effectively, while competences denote specific, demonstrable skills and capacities within defined areas of practice.

Expanding access to psychological interventions across various service settings often means that the interventions provided in each setting must take into account the context in which they are delivered - for example, the existing workforce, working methods and legal and financial principles. This creates the need for a versatile selection of context-appropriate interventions with varying levels of intensity and complexity.

Stepped care approaches are increasingly used and studied as a solution to optimize cost-effectiveness and access to timely treatment in publicly funded healthcare systems (6–8). In stepped care, the available psychological interventions are offered according to a hierarchy where treatment approaches in higher steps require more resources and are targeted to more severe cases, and lower steps involve less intensive interventions aimed at individuals with milder symptoms. Low-intensity interventions include, for example, guided self-help approaches and higher steps more conventional face-to-face interventions (9). Stepped care approaches have shown comparable clinical outcomes and improved cost-effectiveness in the treatment of child and adolescent anxiety compared to standard treatment (10–13). In practice, most stepped care models are "modified", meaning that they are combined with some form of clinical staging, assessment and stratification protocols. This allows determining the most appropriate treatment based on each individual's needs. The determining of appropriate first-line treatment needs to consider factors reflecting symptom severity, daily functioning and contextual needs (e.g. age and developmental state, socioeconomic context) (14,15). For example, in England the i-THRIVE model for children and adolescents allows children and adolescents to access components of different service domains, such as "Getting Advice", "Getting Risk Support" and "Getting More Help", tailored to individual and evolving needs, rather than progressing sequentially through steps (16).

In Finland, a modified stepped care model has been developed and implemented under the First-Line Therapies model ("Terapiat etulinjaan -toimintamalli") since 2020. The model covers all ages, but with different contents and specifications for children, adolescents and adults. Responsibility for organizing mental health services in Finland is divided into 23 regional entities (Wellbeing services counties) each with considerable autonomy. Thus, the First-Line Therapies model does not stipulate which interventions are mandatory, but it facilitates those with strongest evidence base and applicability, and provides nationwide training programmes for professionals in these interventions adapted for the Finnish healthcare system. In particular, CBT for children and adolescents is one such intervention that has been widely implemented across the public healthcare system within the First-Line Therapies model (17). These associated training programmes are described later in this paper.

When providing nationwide training programmes, both scalability and quality must be taken into account. To improve the scalability of training programmes, e-pedagogics is being increasingly utilized (18). Adopting a competence-based approach is a common strategy for establishing and sustaining the quality of training programmes. Competence-based education is an outcome-focused and learner-centred approach that emphasizes the mastery of specific skills and knowledge (competences) over time spent in training (19,20). In the context of psychological interventions and psychotherapy, competence-based education has been proposed as a solution to improve the consistency, transparency and effectiveness of training (21,22).

Competence frameworks have been developed to cover core working methods with specific clientele, generic therapeutic competences, CBT-specific competences and problem-specific competences (21). For adult populations, these domains are typically presented within an integrated framework. However, to our knowledge, for work with children and adolescents a fully comparable integrated framework for CBT does not yet exist. Carrying out CBT varies when applied to children, adolescents and adults despite some overlap, and different CBT techniques are emphasized in different types of problems (23). Psychological interventions, and especially the associated training programmes, always require some degree of national adaptation to be implementable in practice. Translation of the training and treatment materials is obviously required, but legal, practical, economic and sometimes cultural differences also need to be considered. Thus, it is important to provide a comprehensive map of competences covering both the generic and specific CBT competences for children and adolescents, following existing frameworks to enable more comprehensive international comparisons and co-development of training programmes.

Competence frameworks maintained by the University College London (UCL) have been formally adopted as the basis for National Occupational Standards in the UK. These include detailed frameworks for multiple specific therapeutic approaches – primarily for adult populations – including CBT (24). Following the principles laid out by Roth and Pilling (2008), the UCL CBT competence framework is presented through five domains: generic competences, basic CBT competences,

specific CBT competences, problem-specific competences and metacompetences (25). Additionally, a separate framework for core and generic therapeutic competences for psychological interventions in Child and Adolescent Mental Health Services is also available within the UCL system (26). For CBT with children and adolescents, a competence framework following the original work by Roth and Pilling has been described by Sburlati and colleagues (27).

AIMS

This article addresses a gap in the literature by presenting an integrated competence framework for CBT with children and adolescents, combining established models of core, generic therapeutic, CBT-specific and problem-specific competences. Existing frameworks typically focus on either adult population, general psychotherapy skills, core competences for child and adolescent work or elements of CBT. However, a comprehensive framework that integrates these dimensions specifically for child and adolescent CBT is lacking. Furthermore, the existing criteria do not include problem-specific competences for children and adolescents. This article presents a more comprehensive point of reference for CBT professionals and offers a tool for communicating required and delivered competences to stakeholders and policymakers. It also exemplifies the potential use of this framework by examining the content of a nationwide CBT training programme in Finland in comparison to the identified competences. In sum, the paper aims to contribute to ongoing international efforts to improve transparency, consistency and quality in therapist training.

METHODS

SYNTHETIZING EXISTING COMPETENCE FRAMEWORKS

The synthesis is carried out within the following existing frameworks: A) the UCL framework for Cognitive and Behavioural Therapy (adults, CBT domains, metacompetences) (25), B) the UCL framework for Psychological Interventions in Child and Adolescent Mental Health Services (children and adolescents, core competences) (26), C) the framework by Sburlati and colleagues (generic therapeutic and specific CBT competences with children and adolescents) (27), and D) a recent review of problem-specific CBT models for children and adolescents (28). The review of problem-specific CBT models involved a thorough review of literature to date, consultation with national and international experts and a review of applied interventions and efficacy in practice. Each of the competence frameworks included in this synthesis contributes distinct elements not fully captured by the others, despite considerable overlap.

The synthesis process followed these steps: 1) Competences listed by Sburlati and colleagues (C) were compared against the UCL framework for Psychological Interventions in Child and Adolescent Mental Health Services (B) to identify areas of overlap and divergence, 2) In cases of overlap, the more precise and detailed description of the competences was selected, 3) All competences that were unique to either framework were included in the final version, 4) CBT-specific competences were incorporated from Sburlati and colleagues, 5) Metacompetences from the UCL framework for Cognitive and Behavioural Therapy (A) were incorporated, 6) Problem-specific CBT models (D) were incorporated, and 7) The overall structure of the framework was organized visually according to the schematic competence map in the UCL framework for Cognitive and Behavioural Therapy (A).

MAPPING THE ALIGNMENT OF A NATIONWIDE CBT TRAINING PROGRAMME WITH THE INTEGRATED COMPETENCE FRAMEWORK

The training content of the nationwide CBT training programmes (CBT for children and CBT for adolescents) (17) were evaluated in relation to the synthesized competence framework by supervising trainers (authors SL and HL). Descriptions of the content and structure of the training programmes are provided in the Appendix. The evaluators worked independently and resolved disagreements through discussion. Following the same method from the mapping of the adult competences (29), the evaluators categorized the competences in three classes as follows: 1) the training programme provides sufficient coverage of the competence, 2) the training partially covers the competence, and 3) the training does not address the competence, or it is outside the scope of the training programme.

RESULTS

The synthesized competence framework included in total 91 competences which were divided under the following six domains: 1) Core competences for work with children and adolescents (12 competences), 2) Generic therapeutic competences (11 competences), 3) Assessment & planning

(8 competences), 4) CBT competences, techniques and metacompetences (50 competences), and 5) Problem-specific competences (10 competences). The number and distribution of competences under each domain and subdomain is presented in *Table 1*.

There was 88% agreement between the two evaluators and the remaining discrepancies were resolved through discussion. The nationwide CBT training programme for children fully covered 88% of the identified competences, partially covered 5%, and did not cover 7%. The corresponding percentages for CBT training for adolescents were 81%, 12% and 7%, respectively. The training did not include education in psychopharmacology, nor did it address the competences required for coordinating collaboration or task allocation across different agencies or professionals. Training in group-based interventions was absent from the CBT training programme for children. Among specific CBT techniques, response prevention was not included in the training for adolescents, and applied tension was missing from both curricula. Furthermore, the training lacked disorder-specific competences in the treatment of body dysmorphic disorder and trauma-related (including PTSD) disorders as well as OCD (for adolescents). The synthesized competence framework as well as the mapping of the nationwide CBT training programmes can be viewed in *Figure 1*.

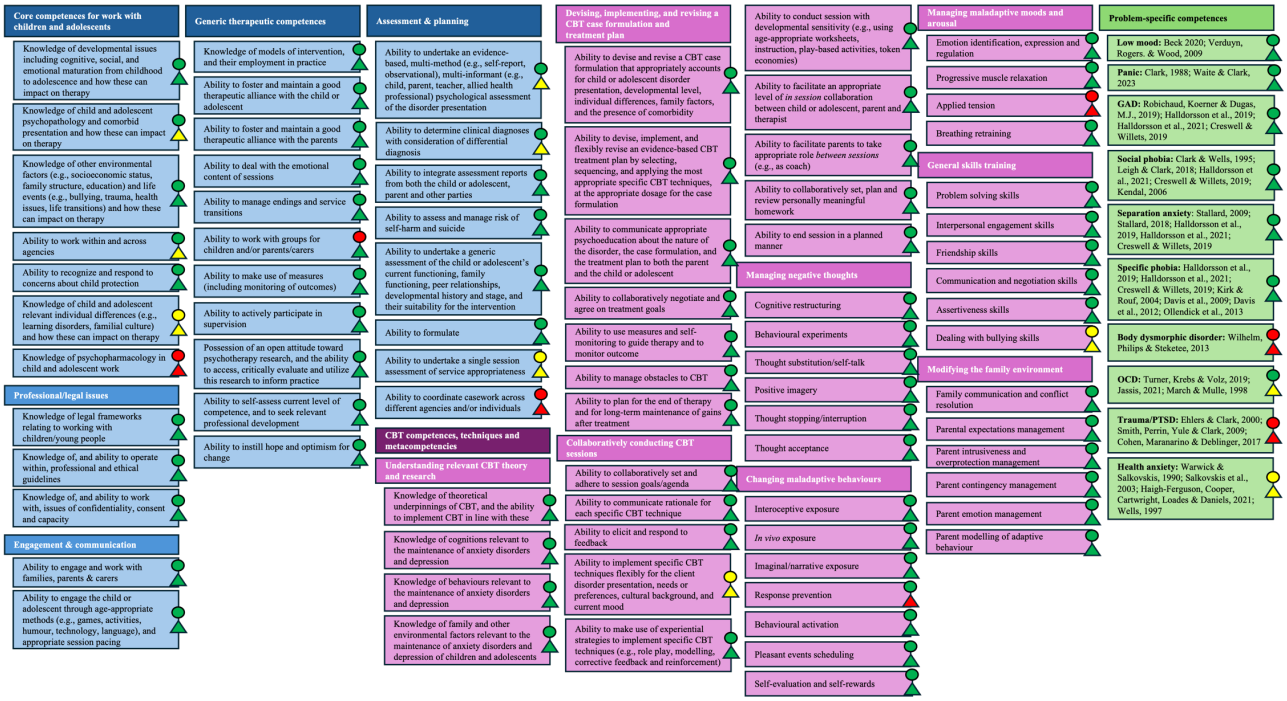
Table 1. Distribution of Cognitive behavioural therapy (CBT) therapist competences for working with children and adolescents across domains and subdomains. Each subdomain competence within a subdomain is also included in the parent domain.

Competence domain/subdomain	Number of competences (% of all competences)
Core competences for work with children and adolescents	**12** (13%)
Professional/legal issues	3
Engagement & communication	2
Generic therapeutic competences	**11** (12%)
Assessment & planning	**8** (9%)
CBT competences, techniques and metacompetences	**50** (55 %)
Understanding relevant CBT theory and research	4
Devising, implementing and revising CBT case formulation and treatment plan	7
Collaboratively conducting CBT sessions	10
Managing negative thoughts	6
Changing maladaptive behaviours	7
Managing maladaptive moods and arousal	4
General skills training	6
Modifying the family environment	6
Problem-specific competences	**10** (11%)
TOTAL	**91 (100%)**

Figure 1. Integrated Competence Framework for Cognitive behavioural therapy (CBT) with children and adolescents and its alignment with the nationwide CBT training programmes in Finland.

Green = Training programme provides sufficient coverage of the competences
Yellow = Training programme partially covers the competences
Red = The training does not address the competences, or it is outside the scope of the training programme

Circle = CBT training programme for working with children
Triangle = CBT training programme for working with adolescents



DISCUSSION

In this paper, we describe the development of an integrated competence framework for cognitive behavioural therapy (CBT) with children and adolescents by synthesizing established frameworks to provide a more complete presentation of necessary competences. Additionally, Finnish nationwide CBT training programmes for children and adolescents were assessed identifying competences covered fully, partially or not at all in the training.

The competence framework presented here covers all domains as originally laid out by Roth and Pilling (21). CBT-specific competences account for over half of the competences, while the remainder reflected core working methods with children and adolescents and generic therapeutic skills common to most modalities of psychological interventions. This distribution mirrors a widely discussed position in psychotherapy research, which holds that treatment effectiveness arises from both specific techniques and common factors shared across therapeutic approaches (30,31).

Well-defined and shared competence frameworks are a valuable tool for addressing gaps in the availability of psychological interventions for children and adolescents. Such frameworks facilitate cross-national benchmarking of training programmes, service delivery models and treatment outcomes. They also support communication of training needs and the qualifications of a competent workforce to stakeholders and policymakers. Furthermore, identifying and articulating key competences can also contribute to psychotherapy research as a scientific discipline by highlighting gaps in further knowledge, creating opportunities for the optimization of treatment methods, and establishing common viewpoints across theoretical orientations (22). Finally, established competence frameworks support CBT trainers in curriculum design and help to identify important competences still missing from shared models.

Although the existing competence frameworks and the integrated model presented here appear comprehensive, it nonetheless invites reflection on possible omissions and areas for further development. For example, the competence framework does not specifically address competences related to adapting CBT for service-relevant subgroups of children and adolescents with distinct developmental or contextual needs, such as those with neurodevelopmental problems or from culturally diverse backgrounds. Adding specific descriptions of competences, such as using visual aids and concrete language when working with individuals with intellectual disabilities, could enhance both the competence framework and clinical outcomes (32–34). In addition, problem-specific competences for behavioural problems and conduct disorders could be added in future iterations (35).

In addition to certain thematic developmental needs, challenges remain in the overall presentation of competence frameworks, which may obscure key distinctions or reduce their practical utility. For example, the framework does not indicate which competences should be prioritized, for example, in training settings with limited resources or low intensity training. Further, the competences within the framework vary in their level of abstraction, with some being more concrete and practice-oriented, while others are formulated in more general or abstract terms. As competence-based education defines competence as outcomes of training programmes, individual competences could be reformulated into more concrete and observable learning objectives, for example, in line with Bloom's taxonomy (36). This would aid in delivering training programmes within the pedagogical framework of constructive alignment where learning tasks and assessment methods are purposefully designed to match predetermined learning objectives (37).

A competence-based review of the Finnish nationwide CBT training programmes revealed that several competences are adequately addressed in both child and adolescent CBT training. Some competences (e.g. psychopharmacology) are omitted due to contextual reasons: some competences are included in the basic education programmes of the CBT trainees, as the training model in question is often delivered to professionals who already possess a relevant clinical qualification. However, the review also identified areas in need of further development. One significant gap is the lack of training in addressing the cultural backgrounds of children, adolescents and their families within therapeutic work. This represents an important area for development, particularly as the proportion of children and adolescents with a foreign background in the Finnish population has increased, reaching 11% of the total child and adolescent population by the end of 2022 (38). Furthermore, group-based treatment models for children are currently absent from the training and represent an important area for future development. Evidence suggests that group-based interventions for anxiety and behavioural problems are effective in treating children and adolescents (39,40). Incorporating group-based treatment models into the training curriculum could offer evidence-based and cost-effective treatment options. In the adolescent training programme, the role of developmental context outside the home, particularly the school environment, in adolescent growth and development is not addressed. The importance of these settings as sources of information (e.g. teachers) for adaptation, as well as potential partners in treatment collaboration, is not currently included in the training content. Furthermore, certain disorders are not entirely all included in the training programmes: body dysmorphic disorder, trauma-related treatment, obsessive-compulsive disorder (for adolescents) and health anxiety. Some disorder-specific approaches such as trauma-focused CBT (41) are typically delivered within their own established training programmes. It may therefore be more appropriate to address such disorder-specific methods in specialized training rather than incorporating all elements into a single, broad training framework. The selection of treatment models is informed by clinical need within the publicly funded healthcare system, as well as by the established division of roles and responsibilities related to training and treatment across different parts of the service system (e.g. primary and specialized care). Efforts are currently underway to develop and integrate an OCD treatment model for adolescents into the training programme. In the case of health anxiety, the anxiety treatment model is suggested as a general approach (42).

This study has some limitations. First, it is possible that not all relevant competence frameworks were identified prior to conducting the synthesis. However, we deliberately emphasized the most established and widely used models to ensure a solid foundation. Second, we included only two independent reviewers to review the training content and no external or international experts were involved in the evaluation. These reviewers achieved high accordance, and discrepancies were discussed to consensus.

CONCLUSIONS

The synthesized competence framework provides a comprehensive tool for evaluating the content of CBT training programmes for children and adolescents. This increases transparency and allows for the comparison of training

programmes across countries and service systems. Within a national context, the framework can support communication with stakeholders and policymakers on the criteria and content of treatment, and facilitate in the co-creation and implementation of scalable and cost-effective care models. The nationwide CBT training programmes for children and adolescents in Finland cover most of the identified competences with certain omissions that reflect adaptation to the local service structure and workforce roles.

The competence framework also offers a basis for systematically developing training curricula to meet evolving clinical needs. In the future, it is essential to develop and evaluate assessment methods that align with competence-based education principles and support the evaluation of relevant clinical skills. A wide adoption of structured frameworks like the one presented here may contribute to greater consistency, transparency and equity in the delivery of psychological interventions for children and adolescents across service systems.

Supplementary Material

Supplementary data are available at Psychiatria Fennica online.

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TUULA TAKALO, SAMI RÄSÄNEN, HELINÄ HAKKO, MIKA NIEMELÄ

LEADERSHIP AND ITS FUNCTIONALITY IN THE CROSS-SECTORAL COLLABORATION OF PSYCHOSOCIAL SERVICES FOR CHILDREN AND ADOLESCENTS – OULU COLLECTIVE IMPACT STUDY

ABSTRACT

Background: *The use of institutional social and healthcare services for children and adolescents has increased worldwide, partly due to a fragmented service system with separate practices and strategic goals, e.g. education and social and healthcare. Setting strategic goals to promote cross-sectoral collaboration (CSC) in services for children and families has been seen as a way to reduce institutional psychiatric and child welfare care.* ***Aims:*** *This study analyses leadership and its functionality in implementing Collective Impact (CI)-based CSC work to enhance psychosocial service integration for children and adolescents.* ***Methods:*** *An online survey was conducted among employees and leaders in social and healthcare, daycare, special education and youth work service sectors of the five regional Welfare Service Areas (WSAs) in the City of Oulu, Finland. The research instrument used was the Oulu cross-sectoral Collaboration and Leadership (OCL) scale, which has been validated as having good psychometric properties. The OCL scale is based on the CI approach but also includes leadership as an additional element.* ***Results:*** *Leaders in WSAs, where CI-based CSC work was ongoing, viewed strategic goals as more successful than in WSAs where the CI-based work had not yet started. Employees did not perceive strategic goals in psychosocial integration. Both leaders and employees identified various practical CI-based CSC activities such as a shared follow-up system and the backbone support organization coordinating consultation meetings. The CI-based domains, such as practices that support and follow up, and backbone support structure, were recognized by both employees and leaders. An example of this kind of practice is one-contact service, a common feedback system and consultation meetings coordinated by the backbone support organization. The response rate for the survey was 37.2%.* ***Conclusions:*** *The findings of this study highlight the role of leadership in internalizing the strategic goals of the CI-based CSC implementation process. However, these goals appeared not to be effectively transferred to employees. Therefore, leadership should focus on communication of the strategy and its internalization at all levels to enhance the integration of the psychosocial service system through CI-based CSC.*

KEYWORDS: COLLECTIVE IMPACT, CROSS-SECTORAL COLLABORATION, PSYCHOSOCIAL SERVICES, SERVICE INTEGRATION, LEADERSHIP, SURVEY

INTRODUCTION

During the last decades, the number of children and adolescents ending up in institutional social and healthcare services has increased rapidly [1,2,3]. As a result, the children placed in out of home care form a significant population, estimated at more than 2.7 million worldwide [4]. Concurrently, the rates of diagnosed mental illnesses and the use of psychiatric services among children have increased in Europe and the US [5,6,7,8,9,10]. There is, however, no comprehensive evidence of whether the morbidity rate for mental illnesses has actually increased [2,11,12]. Some explanations for increased rates in the prevalence of psychiatric disorders are associated with better recognition of psychiatric disorders, positive changes in public attitudes towards psychiatry and an increase in help-seeking behaviours [13]. On the other hand, behind the increased use of psychiatric services may also be weaknesses related to the overall functioning of the services targeted

at children and adolescents, particularly those with special needs. For example, services of the education and social and healthcare sectors are reported to be ineffective in supporting children due to fragmented methods of operation, which has for decades been proposed to be one substantial factor behind the increased level of utilization of institutionalized social and healthcare services [14,15,16].

With the aim of getting more efficient and integrated psychosocial support, promoting service collaboration over sectoral boundaries has been the goal of development projects in the social and healthcare and education services internationally [14,17]. The need for cross-sectoral collaboration has long been recognized, and its importance has also been emphasized both in National plan for mental health and substance abuse work 2009–2015 [18] and National mental health policy strategy 2020–2030 [19]. In Finland, collaboration over service sector boundaries is also stated in legislation of education, student welfare and social and healthcare in Finland [20-25]. Several national programmes have aimed to increase integration between services for children and adolescents with mental health and substance abuse problems [2,3]. Despite long-term endeavours, non-integrated psychosocial services are still prevalent, and the use of institutional social and healthcare services in Finland has remained at an internationally high level [2,3,15]. In the city of Oulu, Northern Finland, as reported previously [26], a high level of curative service use was elevated over a decade. When analysing the reasons for increased service use, fragmentation between the services was acknowledged as one of the causes. Similar to the national efforts, the adverse direction of increasing service use was attempted to be prevented in the city of Oulu. However, this was not sufficiently fulfilled, and thus, it was decided to utilize a research-based Collective Impact (CI) approach to integrate services since 2019.

CI is a specific structured approach to collaboration to solve complex social issues throughout the entire service system [25], aiming to reduce service fragmentation [26,28]. The basic idea of CI is that desired change with social and healthcare challenges is more likely attained via intentional mutual collaboration of all relevant stakeholders, instead of isolated actions of distinct organizations and service sectors. In this approach, engagement in a shared goal among all service providers is required. The structure of the CI approach includes the following conditions for its successful promotion between sectors: 1) a common agenda (i.e. a common understanding of the problem and joining forces to solve it through mutually agreed activities), 2) shared measurement system (i.e. having common indicators that monitor the progress and utilizing them to develop the working method in practice process), 3) reinforcing activities (i.e. coordinating separated activities to strengthen mutual cross-sectoral collaboration), 4) continuous communication (i.e. supporting shared understanding, motivation and trust among stakeholders), and 5) backbone support organization (i.e. support from an external collaborating organization formed jointly with service sectors for planning, managing and enhancing the entire process) [27]. These five CI conditions, when all fulfilled simultaneously, provide a route to achievable CSC [27]. The strength and uniqueness of CI-based CSC lie in its structure with clearly defined conditions, which also differentiate it from collaborative work in general [27,29,30,31].

Furthermore, joint leadership (i.e. sharing leadership responsibilities and decision making, and working together to achieve common strategic goals) has been seen as a crucial element for the successful implementation of CI-based CSC work, even though it is not defined as one of the original conditions of CI approach [32-38]. For example, leadership has been recognized as essential for keeping stakeholders aligned with the common agenda, coordinating shared activities and progressing towards achieving the desired outcomes [35,36]. Emphasizing the role of leadership in CI-based CSC aligns with earlier general leadership-related research enhancing integrated social and healthcare [39-45].

While the significance of the role of leadership in the CI-based cross-sectoral collaboration (CSC) work and its implementation has been recognized, there is a lack of research in this area. The current study analyses leadership in the implementation process of the CI-based CSC work which is aimed at enhancing integration of psychosocial services for children and adolescents. We gathered the data for analyses via an online survey utilizing the Oulu cross-sectoral Collaboration and Leadership (OCL) scale [46], which is constructed of the basic elements of the CI approach developed by Kania and Kramer [27], but which also includes leadership as an additional element. The target population of the survey comprised employees and leaders working in public social and healthcare, daycare, special education and youth work services sectors of the City of Oulu. Comparison of the survey results was conducted between Welfare Service Areas (WSAs) which were at three different phases of CI-based CSC implementation work in the year 2021.

MATERIAL AND METHODS

TARGET POPULATION

The target population for the survey consisted of professionals (n=683) who engaged in cross-sectoral collaboration (CSC) work in the service sectors where they were employed in the City of Oulu, Finland. These professionals formed two mutually exclusive occupational status groups: employees (n=590, 86.4%) and leaders with concrete psychosocial support responsibilities (n=93, 13.6%). Participating leaders were eligible for the study due to their position in their organizations, not their leadership training background. They were working in daycare (managers and special education teachers) (n=82, 12.0%), as principals and in the special education sector of basic education (n=293, 42.9%), youth work services (n=32, 4.7%), school student welfare services (n=46, 6.7%) or social and healthcare services for children, adults and families (n=230, 33.7%). According to Statistics Finland, the population of the City of Oulu in the year 2023 was 214,633 persons, 42,824 of whom (20.0%) were below 18 years of age. Furthermore, there were 22,052 families with underage children, representing 41.0% of all families.

The City of Oulu is organized into five regional Welfare Service Areas (WSAs), each including service sectors for social and healthcare, daycare, schools and youth work under the administration of Education and Culture Services. The target population originated from all five WSAs, all which were engaged in CSC work. We formed three different study groups based on the status of the CI implementation phase of each WSA at the time of the survey: 1) CI-ongoing (one WSA where CI-based CSC had been ongoing since 2019) [26], 2) CI-beginning (one WSA where CI-based implementation had been prepared with backbone support organization and by training professionals, but the CI-based CSC had not been initiated in practice), and 3) no-CI (three WSAs where CI-based CSC had not yet started).

RESEARCH MEASURE

We conducted the current study through an online survey utilizing the Oulu Cross-Sectoral Collaboration and Leadership (OCL) scale [46]. It comprises seven domains, six of which align directly with the five conditions of the CI approach [27], and one domain with leadership as an additional domain. We included the leadership domain in the scale because effective leadership is shown to be an essential element for the successful implementation of CI-related work [32,35,36].

The domains and number of items of the domains are as follows: I) Shared operating model (common agenda), 8 items; II) Action-level collaboration model (common agenda), 9 items; III) Follow-up (shared measurement system), 6 items; IV) Supportive practices (reinforcing activities), 6 items; V) Continuous communication (continuous communication), 5 items; VI) Backbone support organization (backbone support organization), 6 items; and VII) Leading (new condition), 7 items. The psychometric properties of the OCL scale showed it to be a promising new research instrument to measure CI-related CSC between social and healthcare, daycare and school services [46]. The Cronbach's alpha was demonstrated to be 0.968 in total scale and varied from 0.875 to 0.929 by domains, indicating good to excellent internal consistency [46].

We conducted the survey using the Webropol survey tool [47]. It was open for respondents during two time periods: April 7th, 2021–May 10th, 2021, and September 24th, 2021–November 17th, 2021. Of a total of 264 professionals who responded to the survey, ten were excluded because they no longer belonged to the target population at the time of survey completion.

The final study sample for analyses included 254 respondents, which covered 37.2% of the whole target population (n=683). The response rate % (in parentheses, the number of respondents out of eligible population) by service sector of study participants was as follows: daycare (40.2%, n=33 out of 82), special basic education (29.0%, n=85 out of 293), youth work services (25.0%, n=8 out of 32), and healthcare and social services including school student welfare services (46.4%, n=128 out of 276).

Of all 254 survey respondents, 82.3% (n=209) were employees and 17.7% (n=45) leaders with concrete psychosocial support responsibilities. A total of 35.4% of all employees (n=590) and 48.4% of leaders (n=93) responded to the survey. The employees were working in daycare (n=19, 9.1%), special and basic education (n=61, 29.2%), youth work services (n=8, 3.8%) and social and health care services (n=119, 57.9%). Correspondingly, the leaders (n=45) were working in daycare (n=14, 31.1%), special and basic education (n=24, 53.3) and healthcare and social services (n=7, 15.6%).

QUANTITATIVE ANALYSIS

The 47 items of the OCL scale evaluated the CI-based CSC work, and we measured its implementation process using a four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). This forced-choice Likert scale with no option

for a neutral response was chosen because it was essential to get respondents to express a clear opinion on each item of the scale [48,49]. We calculated and compared the mean scores for the total OCL scale and its seven domains between study areas which were at different phases of CI-based CSC work.

QUALITATIVE ANALYSIS

The survey with the OCL scale also included one open-field question for comments: "*If you wish, you can comment on the operational models, practices, follow-up monitoring and leading of cross-sectoral collaboration*", offering respondents a possibility to express their perceptions about the CI-based CSC. We analysed these answers using content analysis, which is a systematic method for describing and quantifying research phenomena [50,51]. Content analysis includes both qualitative and quantitative approaches. It is a method for making valid conclusions from qualitative data with the purpose of providing knowledge, new insights, a representation of facts and a practical guide to action [50,52].

Two authors (TT, MN) independently read, analysed and checked a sample of scripts to ensure the consistency of the results of the content analysis. The unit of analysis consisted of perceptions from open responses [51], which were clustered into more abstract categories. A category consisted of content groups formed by perceptions that were united by a common feature [50]. We categorized the perceptions within these main categories and subcategories by grouping them according to their semantic units, which included single words, groups of words or sentences that expressed the same meaning or connotation [50,51]. See Supplementary materials 1 and 2.

STATISTICAL METHODS

The statistical significance of group differences in categorical variables was analysed with the chi-square or Fisher's exact test, and in continuous variables with Student's t-test or Mann-Whitney U-test or the analysis of variance (ANOVA) or Kruskall-Wallis test. In group comparisons, the limit for statistical significance was set at $p \leq 0.05$. The statistical software used in analyses was IBM SPSS Statistics, version 29.

RESULTS

CHARACTERISTICS OF SURVEY PARTICIPANTS

Table 1 shows the characteristics of the survey participants by the implementation phase of the CI-based CSC work in the study area where the respondent was working. The occupational status, length of employment and service sector of the respondents did not differ statistically significantly between three study areas with different phases of CI.

Table 1. Characteristics of the survey participants from study areas with different implementation phases of Collective Impact (CI)-based Cross-Sectoral Collaboration (CSC) work.

		Study areas with different phases of CI			
	Total number of survey participants (n=254)	**CI-ongoing (n=24)**	**CI-beginning (n=81)**	**no-CI (n=149)**	**Group difference p-value***
Occupational group (q11)					0.469
Employee	209 (82.3)	21 (87.5)	69 (85.2)	119 (79.9)	
Leader	45 (17.7)	3 (12.5)	12 (14.8)	30 (20.1)	
Length of employment in current work (q3)					0.508
Less than a year	24 (9.4)	2 (8.3)	6 (7.4)	16 (10.7)	
1-5 years	67 (26.4)	9 (37.5)	24 (29.6)	34 (22.8)	
Over 5 years	163 (64.2)	13 (54.2)	51 (63.0)	99 (66.4)	
Service sector					0.851
Social and Healthcare services **	128 (50.4)	13 (54.2)	42 (51.9)	73 (49.0)	
Daycare/School/Youth work services	126 (49.6)	11 (45.8)	39 (48.1)	76 (51.0)	

* Pearson's Chi-square test or Fisher's Exact test, two-tailed significance
** Social and Healthcare services included child and family welfare clinics and school student welfare services comprising school nurses, school social workers and school psychologists

QUANTITATIVE ANALYSIS

Table 2 shows the results of the comparison of mean (sd) scores of the domains of the OCL scale between the study areas at different phases of the CI-based CSC work, as evaluated by their employees and leaders, separately. Among the employees, a statistically significant difference between the study areas was found in the CI domains for Reinforcing Activities ($p<0.001$), Continuous Communication ($p<0.001$), Shared Measurement ($p=0.003$) and Backbone Support Organization ($p>0.001$). In all these domains, the mean scores were significantly higher in CI-ongoing and CI-beginning groups compared to no-CI group.

Based on the scores of the leaders, the three study areas differed statistically significantly regarding the CI domains for Common Agenda for Strategy Level ($p=0.019$), Reinforcing Activities ($p<0.001$), Shared Measurement ($p=0.018$) and Backbone Support Organization ($p=0.048$). In all these domains, the mean scores were notably higher in CI-ongoing group compared to CI-beginning and no-CI groups.

Table 2. The mean scores of the domains of the OCL scale evaluated by the employees and leaders of the three study areas at different phases of CI-based CSC work.

	Study areas with different phases of CI			
Domains of the OCL scale (CI conditions) *	**CI-ongoing (n=24)**	**CI-beginning (n=81)**	**no-CI (n=149)**	**Group difference p-value***
Employees	**(n=21)**	**(n=69)**	**(n=119)**	
Shared Operation Model (Common agenda)				
Strategy Level	2.8 (0.9)	2.8 (0.8)	2.7 (0.7)	0.965
Action Level	2.8 (0.7)	2.6 (0.7)	2.7 (0.6)	0.545
Practices that support (*Reinforcing Activities)*	2.3 (0.9)	2.4 (0.9)	1.8 (0.6)	<0.001
Shared Communication (*Continuous Communication*)	2.3 (1.0)	2.5 (0.9)	2.0 (0.8)	<0.001
Follow-up (*Shared Measurement*)	2.0 (0.9)	2.1 (0.9)	1.7 (0.6)	0.003
Backbone Support Structure (*Backbone Support Organization*)	2.4 (0.9)	2.6 (0.8)	2.0 (0.6)	<0.001
Leading	2.4 (1.1)	2.6 (0.9)	2.4 (0.7)	0.241
Leaders	**(n=3)**	**(n=12)**	**(n=30)**	
Shared Operation Model (*Common agenda*)				
Strategy Level	3.4 (0.5)	2.6 (0.5)	2.8 (0.4)	0.019
Action Level	2.9 (0.2)	2.4 (0.4)	2.7 (0.4)	0.146
Practices that support (*Reinforcing Activities*)	3.5 (0.4)	1.9 (0.8)	2.0 (0.4)	<0.001
Shared Communication (*Continuous Communication*)	2.9 (0.8)	2.4 (0.6)	2.3 (0.6)	0.196
Follow-up (*Shared Measurement*)	3.0 (0.7)	2.1 (0.6)	2.0 (0.6)	0.018
Backbone Support Structure (*Backbone Support Organization*)	3.1 (0.1)	2.5 (0.6)	2.3 (0.5)	0.048
Leading	3.0 (0.7)	2.8 (0.7)	2.7 (0.7)	0.691

* Measured with the Oulu Cross-Sectoral Collaboration and Leadership (OCL) scale [46]. Higher score indicates greater agreement that requirements for Collective Impact (CI)-based Cross-Sectoral Collaboration (CSC) work were fulfilled. The text in parentheses refers to the original CI conditions defined by Kania & Kramer [27]. Leading is a new condition included in the OCL scale, since it is acknowledged to be an essential element for the successful implementation of CI-related work [32,35,36]

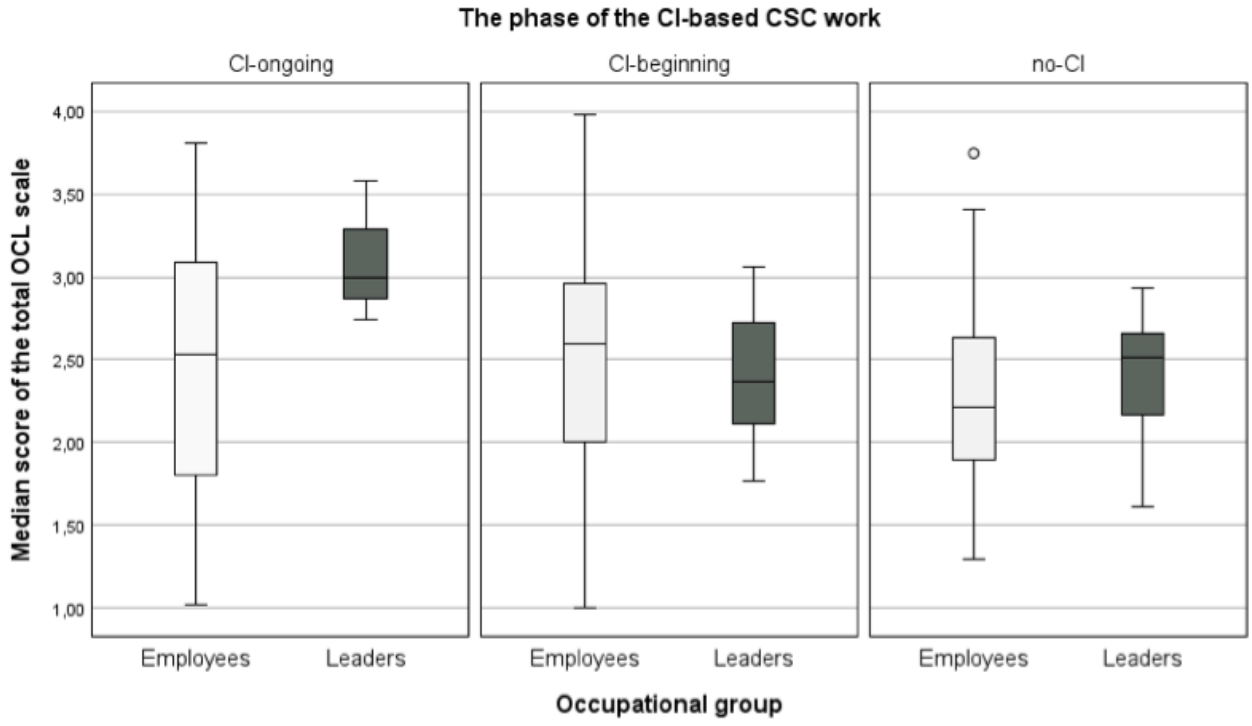
Figure 1 illustrates differences in the total mean score of the OCL scale between employees and leaders, separately for each study area at different phases of CI-based CSC work. The only statistically significant difference between leaders and employees was found in the study area with no-CI, in which median (25th percentile-75thpercentile) scores of the leaders (2.51, 2.17–2.66) were significantly higher compared to the employees (2.21, 1.89–2.63) (Mann-Whitney U-test, p=0.037). No statistically significant difference in total score between leaders and employees was found in study area with CI-ongoing (3.0, 2.87–3.29 vs. 2.53, 1.81–3.09, p=0.230) and with CI-beginning (2.37, 12–2.72 vs. 2.60, 2.00–2.96, p=0.500) groups of the respondents.

QUALITATIVE ANALYSIS

Written feedback on CI-based CSC work was given by 41.0% (n=103) of all survey respondents, the corresponding proportions being 8.7% (n=9) in CI-ongoing, 37.9% (n=39) in CI-beginning and 53.4% (n=55) in no-CI study areas. The content analysis (see Supplementary material 3) revealed 241 different perceptions, and six main categories were identified: 1. Collaboration (39%), 2. Common model (30.7%), 3. Practical activities (12.9%), 4. Leadership (7.1%), 5. Resources (7.1%) and 6. Feedback system (0.8%). These main categories included 2 to 6 subcategories. Of all 241 perceptions, 12.4% (n=30) were from CI-ongoing area, 34.9% (n=84) from CI-beginning area and 52.7% (n=127) from no-CI respondents.

As also seen in Supplementary material 3, the collaboration theme comprised the largest main category within all study areas. Respondents within the CI-ongoing study area reported commitment and responsibility related perceptions (37.5%), while the CI-beginning (22.6%) and no-CI (29.8%) study area reported the quality of collaboration related perceptions. The second largest main category consisted of perceptions concerning a common model (30.7%). In the CI-ongoing study area, perceptions were divided to define a common agenda of CI-based CSC (37.5%) and identify a common operational model (37.5%). In the CI-beginning study area, perceptions dealt with preparation for CI-based CSC (64.3%), and in the no-CI study area, perceptions were related to the lack of a common model of CSC (52.6%). Out of all responses, 7.1% (n=17) were perceptions concerning leadership. This category

Figure 1. The median score of the total Oulu cross-sectoral Collaboration and Leadership (OCL) scale [46] by occupational group and phase of Collective Impact (CI)-based Cross-Sectoral Collaboration (CSC) work of the service sector of the study participants. Higher score indicates greater agreement that the requirements for CI-based CSC work were achieved.



included perceptions on how leaders were perceived to be in contact with employees and maintain interactive relationships in CSC (52.9%, n=9) and how they were fulfilling the leadership role (47.1%, n=8) in the implementation process.

DISCUSSION

In the current study, the functionality of the leadership and work practices of leaders and employees in relation to CI-based cross-sectoral collaboration (CSC) work was evaluated using the Oulu Cross-sectoral Collaboration and Leadership (OCL) scale [46]. The evaluation was carried out in five large welfare service areas (WSAs) in the city of Oulu, which were at three different phases of CI-based CSC implementation (CI-ongoing, CI-beginning and CI not in use) in the year 2021.

As the main finding, the leaders of the WSAs where the CI-based work was ongoing scored higher on indicators for recognition of strategy-level goals set for CI-based CSC work than the leaders from WSAs where CI-based work was either in the beginning or not in use phases. Leaders' better awareness of strategy-level goals in the CI-ongoing phase was understandable because, during the implementation process, the basics and practices of CI-based CSC work were carefully trained and prepared [26]. Further, the local Multi-agent Management Group met on a monthly basis to address leadership-related questions and were provided with leadership-related seminars. Our study supports the notion that with thorough orientation to the shared goals of CI-based work it is possible to influence the understanding and internalizing of the strategy-level goals among the leaders. Our findings emphasize a common understanding of the strategy-level goals in CI-based work among leaders to integrate them as part of the CI implementation process. [27,34,37,53,54].

In our study, contrary to leaders' perceptions on the strategy-level goals of CI-based work, employees' perceptions did not differ between WSAs at different phases of CI implementation. This finding challenges the implementation process in the WSAs, as it may indicate that strategy-level goals did not transfer from the leaders to the employees. This is not a desirable outcome, as previous research highlights that strategic goals should also reach employees in order to achieve successful implementation of CSC work [29,33,44,45,53,57]. However, the lack of knowledge about the strategy cannot be due to it not being processed at all, because training in CI-based CSC work for the employees also includes issues related to strategy. Therefore, leaders should pay specific attention to strengthening their interaction and communication with employees concerning strategic matters and the importance of strategy in implementation work. Current CI literature highlights that implementation operations should be examined at all levels of professionals through the lens of strategy [38,54,55,56] to ensure that all leaders and employees have a shared understanding of the common agenda of the CI-based implementation. Our survey findings suggest that the implementation process should be re-evaluated, focusing specifically on how communication flows from leaders to employees, to ensure that strategic goals are effectively delivered and understood at all levels. Delivering strategic goals effectively from leaders to employees is important not only in CI work but also, for example, in delivering national strategies like National Mental Health Policy Strategy [19].

The leaders of WSAs in the CI-ongoing phase had recognized most comprehensively the basic elements of CI-based CSC work. This was seen as higher scores on all CI and on leadership-related domains compared to leaders from WSAs at the beginning or not yet in use phase. One explanation for this finding may be that the leaders of the CI-ongoing phase might find CI-based CSC work favourable, because during the implementation process special attention was paid to enhancing service delivery and integration of diverse service sectors provided by CI-based CSC. Another explanation might be that leaders commonly have access to and monitor key statistics of service use, and consequently they are likely to recognize, for example, changes in the numbers of institutionalized service use [e.g. 2,3,6,9]. In addition, it is reasonable to assume that the responsibilities of leaders include assessing and reviewing work. This is reflected, for example, in the higher response rate to our survey. However, it is likely that leaders in the CI-ongoing area had a better understanding of how key statistics relate to activities that can be improved through CI-based CSC. As a result, by identifying issues in services, the leaders in the CI-ongoing area may have been more persuaded to implement the CSC model to enhance preventive and integrative child and family services.

Perceptions of leadership in practice, e.g. delivering operating principles of CI-based CSC work to employees or having an active role in supporting employees, did not differ between WSAs at three different phases of CI work among leaders or employees. This is an unexpected finding because earlier CI research literature emphasizes that CI-based leadership is an active process including continuous learning, developing mutual trust, integrating stakeholders into the common process, managing the strategy and adapting into a changing context [37,38]. Thus, it should lead to changes in leadership practices when carrying out CI initiatives. The importance of leadership is highlighted in the CI research literature, as active leadership

has been identified as a key factor in achieving the desired change in CI initiatives [33,36,37,38]. Furthermore, in our study, leadership domain-related findings indicated that while leaders identified CI conditions differently across CI phases, strategy-level goals and practices that support their leadership were perceived similarly by both employees and the leaders themselves. This may suggest that leadership as an active process in implementing CI-based work in the City of Oulu has not yet been optimally realized or internalized. In addition, leaders may not yet have adopted an active and contextually adaptive role in leading the CI process, which has been seen as crucial for the long-term success of CI-based work [36,38]. This may be because the implementation process was deficient in terms of supporting leadership adequately. On the other hand, since the CI implementation in WSAs was still in its early stages at the time of the survey, leadership-related issues had not yet been the focus of collaborative development during the implementation process. However, it is obvious that while implementing CI-based CSC, it is crucial, at a very early phase of the process, to pay attention to the functioning of the joint leadership between employees and leaders. In this way, the cross-sectoral collaboration of psychosocial services for children and adolescents can be effective and reduce fragmentation in the service system.

Our findings showed that CI-based domains, such as practices that support and follow up, and backbone support structure, were appropriately recognized by both employees and leaders. An example of practices of this kind are one-contact service, a common feedback system and consultation meetings coordinated by the backbone support organization. These findings are in line with previous CI research literature showing that when stakeholders recognize concrete CI-based actions it indicates that the CI-based process is moving towards jointly set practical goals [29,33,35]. In our study, these observations related to everyday practices were supported by the responses to the open question addressing practical activities. As an example, in our study, employees from the WSAs in the CI-ongoing and CI-beginning phases had experience of having continuous communication-related actions between stakeholders more often than those from WSAs at CI not in use phase. According to previous literature, without shared communication, a common cross-sectoral process does not work. Communication is proposed to construct a dynamic relationship between different stakeholders and between employees and leaders [33,35,36,44,57].

Surprisingly, in the current study the leaders themselves did not report differences in the continuous communication domain in CI study areas. When interpreting these findings, it is, however, important to consider that the study areas comprising WSAs being at different implementation phases of CI-based work. In the WSA at CI-ongoing phase, the CI-based CSC work had been in practice for approximately nine months, while in the CI-beginning phase, the implementation of the model was just started at the time of the survey [46]. At the time of the survey, the CI model implementation was realized strongly by the backbone support organization in CI-ongoing and CI-beginning phases [26]. Consequently, it may be that the continuous communication process had not yet been actualized between leaders and employees, although it might have been sound between leaders and the backbone support organization. Some support for this interpretation can be seen in our findings that both employees and leaders reported that they had recognized well the concrete actions of the backbone support organization. Earlier research has highlighted the role of backbone support organizations coordinating and enhancing the implementation process [58,59,60]. However, it is evident that in CI-based CSC work leaders are in a crucial role to establish a shared understanding of the common agenda and purpose of the collaborative actions together with the employees. Therefore, it is important to ensure continuous communication between employees and leaders to achieve a common understanding of the purpose of the CI-based CSC implementation. On the other hand, handling this essential shared communication cannot be left solely to the external backbone organization; in order to be successful, it requires the mutual participation of all employees and leaders.

The previous CI literature reports that achieving the desired change concerning the whole service system requires that the following four stages must be accomplished: 1) five CI conditions must be fulfilled, 2) early changes in action level must be implemented, e.g. increasing partnership and collaboration or expanding awareness and coverage in different sectors, 3) system changes in the core organizations and institutions must be implemented, i.e. systematically carrying out the agreed practices in a new way, and 4) population-level changes in relation to the ultimate goal must be achieved [35,36]. When interpreting and mirroring our findings in relation to the abovementioned four stages, both leaders and employees of WSAs perceived that the implementation of the CI conditions in which they had been instructed and trained had been fulfilled. Furthermore, early changes can already be observed, especially on action level [36]. Instead, this study revealed that the evaluations of the leadership domain did not differ between the CI study areas. Regardless of why leadership did not change after the CI-based implementation, it is evident that successful CI initiative requires active, committed and place-based problem-solving leadership in

order to achieve a desired and long-lasting change in the whole psychosocial service system [37,38,55]. It is notable that this study, using the validated OCL scale [46], provided updated information on the current state of the CI implementation process related to joint leadership. In earlier literature, this has been emphasized by recognizing early signs when implementing CI-based CSC [36]. However, in the future, it will be important to evaluate the results of the current implementation process using other quantitative and qualitative measures as well. Leadership in CI-based CSC work is a special topic that warrants further studies with longitudinal research setups.

STRENGTHS AND LIMITATIONS

The strength of this study was that the research instrument used was developed for the purposes of the current study. The Oulu Cross-sectoral Collaboration and Leadership (OCL) scale was developed based on five conditions of the CI approach by Kania and Kramer [27][25], but it also includes leadership as an additional element. The OCL scale was developed because there was no structured research instrument to evaluate leadership as part of the CI-based implementation of cross-sectoral collaboration (CSC) among psychosocial services for children and adolescents. The OCL scale has shown to have high internal consistency and good psychometric properties, suggesting it to be a promising tool for CI research [46].

The strength of the study is that the survey respondents represented well all different professional groups working in public social and healthcare, daycare, special education and youth work service sectors. In addition, the response rate of 37% for the survey can be considered good for this kind of web-based survey for the targeted population. Another strength of this study is also that all respondents already had some experience of concrete CSC work, so they were able to evaluate their accumulated experiences of everyday work. The response rates of the leaders, however, were distributed unevenly between service sectors, with emphasis of responses from leaders in the special education service sector. Leaders from social and healthcare were excluded from the target group of the study, because our study was focused on leaders whose duties also included concrete psychosocial support responsibilities of child- and family-related work in their service sector.

In future research, it could also be worthwhile to include leaders from higher organizational levels, since they have overall responsibility for the work of the service sectors. This would make it possible to assess how the strategic goals of the CI-based implementation process permeate all levels of the organization, i.e. from highest management level to employee level. The CI-based CSC strategy should permeate all levels of the organization's administration [36].

Additionally, 40% of the respondents provided comments in the open question of the survey, which can be considered as a strength of the study. Qualitative data makes it possible to achieve a deeper perception of professionals' experiences [50, 52] than summary statistics based on quantitative data. These perceptions together with a good response rate also offered valuable information for the further development of the OCL research instrument [46].

CONCLUSIONS

Our study findings show that in the CI-based CSC implementation work, leaders in the CI-ongoing phase were more successful in achieving strategic goals of cross-sectoral collaboration compared to leaders in areas where CI-based CSC implementation had not yet started. The findings of our study highlight the critical role of leadership in enhancing a common agenda and collaboration in CI-based CSC work. The leaders must pay more attention to communication of strategy and its internalization at all levels. There is a need for further research of leadership role in CI-based cross-sectoral collaboration, with the goal of enhancing integrated psychosocial services for children and their families.

Ethics approval and consent to participate

The data collection method was an anonymous online survey, and participation in the survey was voluntary. The survey did not include any personal information that could identify respondents, and, thus, approval from an ethics committee was not required. The study has obtained research permits from the City of Oulu's Department of Education and Cultural Services (OUKA/6217/07.01.04.02/2020), Department of Health and Social Services (OUKA/6539/07.01.04.02/2020) and Northern Ostrobothnia Hospital District (PPSHP 247/2020).

Availability of data and material

Data available on request due to privacy and ethical restrictions.

Competing interests

The authors declare that they have no conflicts of interest.

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Authors' contributions

All authors planned and performed the conception and design of the study. TT and MN developed an initial survey, and TT performed the data collection with the OCL scale. HH was responsible for statistical analyses, including reporting the results based on these analyses. TT and MN were responsible for qualitative data analyses. All authors performed interpretation of the results based on the quantitative and qualitative data analyses. TT and MN wrote the first draft of the article. SR revised the manuscript and guided the process throughout the study. All authors participated in critical drafting of the article and approved the final version to be submitted.

Supplementary Material

Supplementary data are available at Psychiatria Fennica online.

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PIRJO LINDFORS

LETTER TO THE EDITOR: THE ROLE OF NUTRITIONAL THERAPY AND NUTRIENTS IN THE TREATMENT OF MENTAL DISORDERS – A FUNCTIONAL MEDICINE PERSPECTIVE

DEAR EDITOR,

Mental disorders represent an increasingly complex public health challenge. While psychopharmacology and psychotherapy remain the cornerstones of treatment, these approaches often leave significant residual symptoms or fail to achieve full remission. Over the past two decades, I have witnessed a growing need for complementary strategies that address not only the symptoms, but also the underlying biochemical imbalances that can contribute to psychiatric conditions. Functional medicine offers a framework for such an approach. It is a systems-based, individualized model of care that uses laboratory testing, genetic analysis and targeted nutritional interventions to address root causes. Although more discussed and applied in other medical fields, its integration into psychiatry remains limited—particularly in Finland—despite an expanding body of evidence supporting its use as an adjunct to conventional treatment.

INTRODUCTION

The European Council has stated that all EU citizens are entitled to quality nutritional care (1), a principle supported by the WHO, ESPEN (2) and the Finnish National Nutrition Council. Micronutrient deficiencies remain common even in developed countries (3), affecting high-risk groups such as the elderly, people with obesity or low income, those with malabsorption disorders, smokers, heavy alcohol users and many patients with mental disorders (4). Stress, restrictive diets, medications and poor dental health further compromise nutritional status. In our Finnish study, 82% of patients with chronic pain and depression had nutrient deficiencies, and all had at least suboptimal levels (5).

Malnutrition disrupts body composition and physiological functions, impairs recovery and cannot be corrected by medication alone. Nutritional therapy—combining dietary changes with individualized supplementation—can accelerate recovery, improve quality of life and prevent chronic disease cost-effectively (2,6-8). Optimizing nutritional status should be prioritized alongside other therapeutic interventions (1-2,6-8). The WHO classifies nutritional disorders as a distinct disease group in the ICD-10. Among dietary approaches for depression, the Mediterranean diet has the strongest evidence (9-10), followed by the MIND diet and plant-based wholefood diets. Nutritional interventions are most effective when integrated with other pillars of lifestyle medicine, including physical activity, stress management, sleep optimization, substance abstinence and social connection (11).

WHY NUTRITION MATTERS FOR THE BRAIN

The human brain is metabolically demanding, requiring a constant supply of specific nutrients for optimal neurotransmitter production, energy metabolism and structural integrity. Even subclinical deficiencies—especially when combined with genetic vulnerabilities—can have profound effects on mood, cognition and resilience to stress. (6-8,12-13)

While general dietary advice is valuable for overall health, it rarely identifies or corrects individual nutrient deficiencies. Laboratory testing can reveal specific shortfalls in vitamins, minerals, fatty acids or amino acids, even when standard blood work appears “normal.” Moreover, genetic variants can impair nutrient utilization, increasing requirements beyond population averages. (6-8)

KEY NUTRIENTS IN MENTAL HEALTH

1. VITAMINS – NEUROTRANSMITTERS, ENERGY METABOLISM AND ANTIOXIDANT DEFENCE

Vitamins play a crucial role in supporting brain function and mental health (6-8,12-14). They are essential for neurotransmitter synthesis, methylation, energy metabolism and antioxidant defence (6-8,12-14). Subclinical deficiencies may increase the risk of mental health disorders, particularly when genetic variants (SNPs) impair metabolism (6,8,16-19). Pharmacological doses are often (e.g. when SNPs) required for therapeutic effect (8,17-19).

The most relevant vitamins are B3, B6, B9, B12 and D (6-8,12-15,19). Vitamin B3 (niacin) is a precursor to NAD, nicotinamide adenine dinucleotide (oxidized form) and NADH (reduced form), which is vital for mitochondrial energy production and neuronal function (6-8). Its deficiency has been associated with dementia, depression, bipolar disorder, schizophrenia and pellagra (6-8).

B6, B9 (folate) and B12 are essential for methylation and neurotransmitter synthesis; deficiencies are linked to depression, anxiety, sleep disorders and dementia (6-8,12-15). Vitamin D influences serotonin receptor activity and acts as a neurosteroid (6,13,19). Low levels are linked to depression, and calcitriol (1,25D) acts as a gene regulator (6,8,12-15,19).

2. MINERALS AS COFACTORS

Minerals are critical cofactors in neurochemical reactions (6-8,12-13). Deficiencies may disrupt neurotransmitter balance, energy metabolism and neural function (6-8,12-13,19). Magnesium, zinc and iron are among the most relevant minerals for mental health (6-8,12-13).

Magnesium participates in over 600 enzymatic reactions, modulates NMDA (N-methyl-D-aspartate) receptor activity, and has calming effects and supports stress resilience (6-8,12-13,19). Magnesium is often deficient in individuals with depression, anxiety and sleep disturbances (6-8,12,13,19).

Zinc is essential for synaptic plasticity and BDNF expression (13). Low zinc is linked with depression, anxiety, schizophrenia, autism and cognitive dysfunction (6,8,12-14,19).

Iron is required for dopamine and serotonin synthesis (6,14). Even without anaemia, iron deficiency may impair mood (6,8,12-13,19). Measuring functional markers, such as magnesium and zinc in red blood cells and transferrin saturation for iron, provides a more accurate assessment than relying solely on serum values (6,19).

3. AMINO ACIDS AND NEUROTRANSMITTERS

Amino acids are building blocks of neurotransmitters, and deficiencies can lead to significant mood disorders (12,19).

Key compounds include tryptophan, tyrosine, glycine, taurine, glutamine, SAMe (S-adenosyl methionine) and L-carnitine (12,13).

Tryptophan, a serotonin precursor, is associated with depression, insomnia and irritability when deficient (12,13). B6, magnesium and vitamin C are necessary cofactors (6). Tyrosine is a dopamine and norepinephrine precursor, and low dopamine is associated with apathy, inattention and withdrawal (8,12).

Glycine and taurine act as precursors for GABA and glutathione and have calming, neuroprotective effects (6,8,14). Glutamine supports gut barrier integrity and GABA synthesis, benefiting both intestinal and central nervous system function (6,8,19).

SAMe and L-carnitine are involved in methylation, mitochondrial energy and detoxification, and may relieve depressive symptoms (12,14,19). L-carnitine also supports serotonin receptor function (19).

4. OMEGA-3 FATTY ACIDS – EPA AND DHA

The brain's lipid-rich structure depends heavily on docosahexaenoic acid (DHA), which maintains membrane fluidity and neuronal integrity (6,8,20). Eicosapentaenoic acid (EPA) has potent anti-inflammatory properties and plays a key role in mood regulation (6,8,20). Strongest evidence exists for depression, some for perinatal/postnatal depression, and weak evidence for bipolar disease and ADHD. The 60/40 ratio of EPA/DHA is suggested by some studies but not definitively established as optimal for all these disorders (10,20). An optimal omega-3 to omega-6 ratio is essential, as the typical Western pattern of high omega-6 promotes neuroinflammation (4,6,8,10,20).

GENETIC POLYMORPHISMS AND MENTAL HEALTH

Single nucleotide polymorphisms (SNPs) may alter enzyme and protein function (6,8,19).

Certain SNPs affect nutrient metabolism and predispose to mental disorders (6,8,16-19).

Two of the most studied, and found in over 50% of Caucasians (6,21), are COMT (catechol-O-methyltransferase) and MTHFR (methylene tetrahydrofolate reductase) (16-17).

COMT Val158Met (rs4680) alters the breakdown of dopamine, epinephrine and norepinephrine in the prefrontal cortex (8,19, wikipedia). The Val/Val genotype degrades

catecholamines faster, potentially reducing dopamine and increasing anxiety, depression and amotivation (8,19, wikipedia). By contrast, the Met/Met genotype leads to slower degradation and reduced GABA, increasing vulnerability to stress, insomnia and mood disorders, and in some studies to violence and suicide in schizophrenia (8,16,19, wikipedia).

Tailored nutrition can diminish mental symptoms: Fast metabolizers may benefit from dopamine precursors (e.g. tyrosine, iron, B6, vitamin C), while slow metabolizers may need magnesium, zinc, SAMe and methylation support: B2, B6, 5-MTHF (active folate), methylcobalamin (active B12) (6-8,19,21).

MTHFR C677T (rs1801133) and A1298C (rs1801131) impact folate metabolism and methylation (17). These common polymorphisms have been associated with several psychiatric disorders, including major depression, schizophrenia, bipolar disorder, and, to a lesser extent, autism spectrum disorders and cognitive decline (17-19). Support includes 5-MTHF (not folic acid), methylcobalamin, B2, B6 and betaine (TMG) (6-8,18,19,21).

Laboratory markers to guide treatment include homocysteine, B12, folate, magnesium, zinc; or SNP testing (COMT, MTHFR) (6–8,18,19).

CLINICAL INTEGRATION

In my own practice, integrating functional and conventional approaches has transformed treatment outcomes, particularly in complex, treatment-resistant cases. Laboratory-guided nutritional interventions can complement or even replace pharmacotherapy, often reducing side effects, improving symptom control and enhancing patient quality of life.

A typical functional assessment includes evaluating nutrient status, inflammation markers, oxidative stress, and—when indicated—gut and genetic testing (8,19). Interventions are then tailored to the individual, addressing deficiencies, optimizing biochemical pathways, and restoring gut health when needed (6-8,19). This is not an alternative to psychiatric care but a complementary, evidence-informed strategy that aligns well with precision medicine principles (1-2,6-8,19).

A CALL TO THE PSYCHIATRIC COMMUNITY

Given the high burden of mental disorders and the limitations of current treatments, it is time to expand our clinical toolkit (12–14).

Nutritional therapy—particularly when guided by laboratory and genetic testing—offers a low-risk (6–8,15,19,22-27), potentially high-impact avenue for improving outcomes (9,10,12–15,18, 20,22-26).

The mechanisms are biologically plausible, the interventions are generally safe, (6-8, 19, 22-28) and the potential benefits extend beyond symptom relief to overall health and resilience (6–8,12–15,19, 22,24–26). The most common side effects are mild gastrointestinal symptoms. Excessive intake of vitamin B6 may cause neurological adverse effects, including sensory neuropathy (7).

Emerging evidence also suggests that integrative and functional medicine approaches are not necessarily more expensive but may be cost-effective compared to standard care by reducing symptom burden, lowering long-term medication and healthcare utilization, and improving quality of life (29-30). More research is needed.

My 21 years of experience in medical nutrition care, including the past 9 years integrating functional and conventional approaches, and working with approximately 800 patients (50% in 2 central hospitals and 50% in private clinics) with mental health problems, have convinced me of the value and cost-effectiveness of this model. I invite my colleagues in psychiatry to consider the role of targeted nutritional strategies—not as a replacement for established treatments, but as a complementary pathway to help more patients achieve recovery.

Sincerely,

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