



Changes in behavioural and emotional well-being of children participating in the Icehearts programme: A feasibility pilot study with 4-year follow-up

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ABSTRACT

Background: Organized sport is shown to be a promising tool for promoting mental health and positive youth development (PYD) among socially vulnerable children and young people. Icehearts is a Finnish sport-based positive youth development programme targeted at children and adolescents with a higher risk of social marginalization and mental health problems. It provides socially vulnerable children with a mentoring relationship that lasts 12 years through childhood and adolescence.

Objective: The aim of this study was to investigate the changes in behavioural and emotional well-being of participating children at 4-year follow-up.

Methods: Data for the feasibility pilot study were collected from parents and teachers of programme participants ($n = 65$) at baseline (age 7) and at a 4-year follow-up using Strengths and Difficulties Questionnaires. A community sample of peers was used as a reference group ($n = 75$).

Results: Improvement in prosocial behaviour but no statistically significant changes in different areas of internalising or externalising problems, as assessed by the teachers, were found among programme participants. According to the assessments by the parents, no statistically significant changes among programme participants were found. Among the peers in the reference group, a statistically significant decrease in conduct and emotional problems and an increase in prosocial behaviour were observed.

Conclusion: The Icehearts programme may have potential in promoting prosocial behaviour among socially vulnerable children. However, the programme may not be able to reduce emotional and behavioural problems in all children. Further research is needed on how to best support children in need for psychiatric or child welfare services.

Introduction

Globally, it is estimated that 14 percent of 10 to 19-year-olds experience mental health conditions (WHO, 2021). The salutogenetic orientation of mental health highlights the importance of focusing on promotive activities, which aim to build strength, competencies, and resources, rather than solely focusing on mental health problems and preventing disorders (Barry and Jenkins, 2007). For young people as a target group, this means that mental health promotion activities should aim to equip young people with life and coping skills, emotional support, and resources needed to overcome adversity and fulfil their potential (Barry et al., 2013). This promotive approach is also emphasized

within positive youth development (PYD) programmes (Damon, 2004).

PYD is a comprehensive framework that aims to nurture the strengths, skills, and assets of young people to help them reach their full potential, in contrast to traditional deficit-based approaches that focus solely on addressing problems and risk factors in youth (Catalano et al., 2002). This approach recognizes the importance of fostering positive relationships, providing opportunities for skill development, and creating supportive environments for young people to thrive. PYD programmes are designed to provide young people with the necessary resources, skills, and support systems to navigate challenges, make positive choices, and become successful, responsible, and contributing members of society (Alvadaro et al., 2017). Furthermore, this approach

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highlights the importance of comprehensive support as many mental health problems, risky behaviour and academic achievement are known to be highly correlated and to predict one another (Fly, 2002).

Sports are frequently regarded as a mechanism for promoting PYD (Holt, 2016; Holt et al., 2017; Jones et al., 2020; Bruner et al., 2023) by improving life skills and social, psychological and emotional resources (Fuller et al., 2013; Ho et al., 2017; Hermens et al., 2017). Sport-based PYD programmes commonly use a particular sport to facilitate learning and life skill development in youth (Perkins and Noam, 2007). They offer young people opportunities to become involved with peers in a prosocial context, interact with adult role models, and receive social support (Eccles et al., 2003). Sport-based PYD programmes are in the literature also referred as sport for social development programmes (Anderson-Butscher, 2019) where development is seen as any individual, health, social and economic benefits. The intentional use of sport and physical activity is seen as a tool to bring about positive change in the lives of people and communities. A systematic review and meta-analysis by Bruner et al. (2023) including 35 studies on sport-based PYD programmes, found small to medium effects of this kind of interventions on competence, confidence, and life skills outcomes among programme participants.

Sports is viewed as a potentially effective tool for PYD, particularly among socially vulnerable children and young people (Hermens et al., 2017; Haudenhuyse et al., 2014). Vulnerability among children and adolescents is commonly understood as heightened risk for adverse outcomes. In the literature, also terms such as deprived, underserved, marginalized, at-risk, excluded, disaffected, problem, disadvantaged, or lower class are commonly used. Social vulnerability occurs when “the disadvantage conveyed by poor social conditions determines the degree to which one’s life and livelihood are at risk from a particular and identifiable event in health, nature, or society” (Mah et al., 2023, 1). Thus, social vulnerability is often associated with a lack of resources, support, or access to opportunities, making it difficult for these individuals or groups to cope with, respond to, or recover from adverse situations (Haudenhuyse et al., 2014; Bailey, 2007). Sport-based programmes have been suggested to have potential, particularly in supporting the life skill development of socially vulnerable youth (Hermens et al., 2017).

Regarding PYD and mental health promotion, there is a growing consensus that to maximise the effects, there is a need to develop tailored approaches rather than using a one-size-fits-all approach (Petersen et al., 2023). For example, Gwyther et al. (2019) stated in their review that gender-specific programmes could be more effective compared to gender-neutral programmes. A recent review by Petersen et al. (2024) evaluated interventions targeted at the promotion of mental health and wellbeing in organised sporting context and found that only few interventions were actually targeted at young males. They found that sports-based interventions targeted particularly at males affected positive change in mental health literacy, but they found only limited evidence that sport-based interventions facilitate positive mental health.

Icehearts is a sport-based PYD programme targeted at socially vulnerable children and adolescents developed in Finland (<https://www.icehearts.fi/brief-in-english>, Smolej, 2017). The core aim of the programme is to provide vulnerable children – especially boys – with one long-term mentoring relationship that lasts through childhood and adolescence, for a total of 12 years. The target group of the programme is socially vulnerable children and adolescents, who, at the age of six, have been identified by pre-school personnel, social workers and/or parents to be at risk of social marginalisation. Common causes of social vulnerability include a single-parent family background, frequent changes in family structure, problem behaviour, and challenges in interacting with others (Appelqvist-Schmidlechner et al., 2017). The rationale of the programme is to prevent challenges in the school and the school drop-out at an early stage, at the very start of schooling, and to prevent child’s placement into foster care. The programme specifically

focuses on boys as, according to a Finnish child welfare service study, up to 67 % of 7- to 12-year-old children taken into care were boys and two-thirds of all mental health assessment and treatment sessions in this age group were attended by boys (Forsell, 2022). The programme is embedded within a sports team, which serves as a social environment where children, in addition to accessing physical activity, have the possibility to experience a trustworthy relationship with the mentor leading the team, learn social skills, make friends, and experience a sense of belonging. The key goals of the programme are the promotion of resilience and life competencies, recognizing positive behaviours, and providing opportunities for prosocial involvement. Each Icehearts team (commonly with a size of 20–25 children) is led by a mentor (a professional trained in youth work/education/social work with a background in sports), who provides sports activities and support at school, after school and at home for a period of 12 years. During primary school (1st–6th grades, beginning at the age of 7), the focus is on 1) physical activity and after school activities, 2) support with school work, 3) individual support and 4) social work including family support. During the first 3–4 years, the children are provided with a variety of after-school sports activities and they collectively choose which team sport they wish to focus on. After primary school (from the age of 13 until the age of 18), the focus is – besides organized sports in a chosen sport – on tailored psychosocial support. Team sport is not an inherent aim of the approach but rather a tool for securing the involvement of deprived children. The mentor provides the children of the team and their families comprehensive and long-term support whenever and wherever needed. The core of the programme is the trustworthy relationship between mentor and the children in the team and the long-term support provided by the mentor.

Icehearts programme has been running in Finland since 1996 and currently implemented as an European Union Best Practice programme in other EU countries within Icehearts Europe project (www.icehearts.eu). In Finland, there are currently about 70 Icehearts teams across Finland involving almost 1000 children and adolescents in the programme. According to previous studies on Icehearts, the programme has shown to have a positive impact on participants’ physical competence, child-adult relationships, peer relations, social skills, self-esteem, and mental health, assessed by the Icehearts mentors at a one-year follow-up (Appelqvist-Schmidlechner et al., 2017). Furthermore, in a qualitative study based on focus groups, parents reported observing several mental health benefits in their children due to the opportunity to participate in organised sports provided by the programme. These benefits were related to increased self-esteem and self-confidence, as well as improved emotional self-regulation, prosocial behaviour and mental well-being (Appelqvist-Schmidlechner et al., 2021). Furthermore, based on qualitative focus group data, school staff (Kekkonen et al., 2018) and parents of participating children (Kekkonen et al., 2022) also seemed to benefit from the programme. However, more knowledge is needed on the longer-term impacts and benefits of the programme among children involved with the programme, also using quantitative data.

The aim of the present study is to examine the changes in mental health of participating children at 4-year follow-up. Mental health was investigated from the perspective of behavioural and emotional problems and prosocial behaviour. Based on previous studies, it could be hypothesised that a reduction of behavioural and emotional problems as well as an increase of prosocial behaviour would be observed.

Methods

Study design and data collection

The present study is based on the Icehearts Longitudinal Study (ILS, Appelqvist-Schmidlechner et al., 2017) in five Icehearts teams in three different municipalities in Southern Finland. The aim of the ILS is to follow the children from five teams and their well-being throughout the entire intervention (12 years) and to evaluate the benefits and perceived

effects of the intervention using quantitative and qualitative methods. All children (all boys) starting in the Icehearts teams ($N = 49$) at the age of seven in the beginning of school year in 2015 were invited to participate in the study. Of them, 46 (94 %) agreed to participate in the study. During the following school year, as the team was growing, 19 new team members expressed their willingness to participate in the study. Thus, the sample of programme participants used in this feasibility pilot study consisted of 65 boys participating in the Icehearts programme. A community sample among peers with same age and sex as a reference group was recruited among the peers who were not involved with the programme ($n = 75$, all boys). The purpose of the reference group was to facilitate the interpretation of possible changes in the well-being of programme participants. The peers in the reference group were recruited in the same school and in another school (control school) in the same municipality. Both the baseline data in 2015, and the follow-up data in 2019 for both groups were gathered among teachers and parents. The data collection among the parents was conducted with the help of Icehearts mentors and school teachers who were informed and trained for the data collection by the researchers. Control schools of the reference group (schools without being involved in the programme) were offered a small package of various sports equipment as a taken of appreciation for their participation in the study at the baseline. No incentives were available at the follow-up data collection. The consent form and information sheet about the study for the parents of study participants were available in Finnish, English, Arabic, and Somali, but the questionnaire was only available in Finnish. Parents had the option to use the assistance of Icehearts mentor or an interpreter when completing the questionnaire, if needed. The questionnaires were returned to the

researchers per post or with the help of Icehearts mentors using sealed envelopes. Participating in the study was voluntary and could be interrupted at any point. Written informed constant was received from the parents of all study participants.

Measures

Mental health in terms of emotional and behavioural well-being was measured with the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997), reported by the parents and teachers. There are separate questionnaires for both parents and teachers. SDQ is a 25-item scale addressing emotional symptoms, conduct problems, hyperactivity, peer problems, and prosocial behaviour. It is a widely used instrument for assessing the psychological well-being of children and adolescents and has been suggested to be a reliable and useable method for identifying mental health problems in health checks of 4–9 years old children (Borg, 2015). Each item in the questionnaire is scored on a 3-point scale with 0 = not true, 1 = somewhat true or 2 = certainly true. Higher scores indicate greater problems, except for prosocial behaviour, where a higher score indicates more positive behaviour. The subscales can be categorised into three dimensions: internal symptoms (emotional symptoms, peer problems), external symptoms (conduct problems, hyperactivity) and prosocial behaviour. The total difficulties score (range 0–40) is a combination of internal and external symptoms and can be obtained by summing the scores of the subscales of internal and external symptoms. The scale has been suggested to measure symptoms in a comparable manner across different developmental stages over the ages from 7 to 16 years (Speyer et al., 2023; Thompson et al., 2021; Janitza

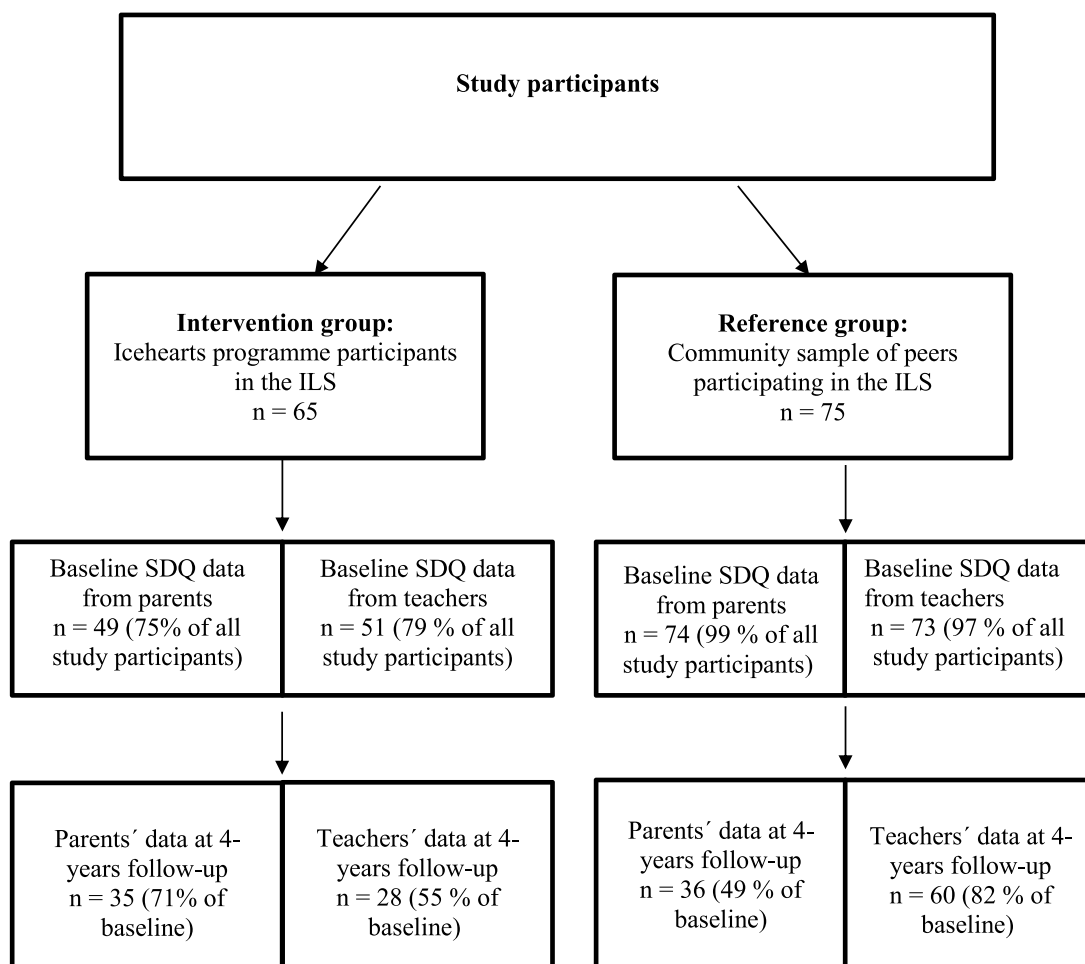


Fig. 1. Flow-chart of the study.

et al., 2020). The SDQ subscales on conduct problems, peer problems and prosocial behaviour have showed to be valid across age without the need to use age-specific norms (Janitza et al., 2020).

Besides SDQ data, demographic background information (age, education, profession of parents, family structure, native language, family income) of participating children was gathered from parents.

The ethical approval for the Icehearts Longitudinal Study was granted by the ethical committee of Finnish Institute for Health and Welfare in 2015 (4/2015, § 692 - §694).

Study sample

SDQ data were received at baseline for 49 programme participants and for 74 peers from parents and for 51 programme participants and for 73 peers from teachers (Fig. 1). After the baseline data collection, seven programme participants moved to another city and four interrupted their participation in the programme due to another reasons (most commonly due to lack of interest in sport). Of the respondents at the baseline, the SDQ questionnaire was received at the 4-year follow-up for 35 programme participants (71 %) and for 36 peers (49 %) from the parents and for 28 programme participants (55 %) and 60 peers (82 %) from the teachers. According to the missing data analysis, the group of those study participants, who did not have data from both checkpoints did not differ from the sample used for the analysis in socioeconomic background variables (employment status, education of parents, living conditions, financial situation of the family). However, the non-respondents at the follow-up had – according to the SDQ total sum

score – more emotional and behavioural problems at baseline ($p < .003$).

Analysis

Descriptive statistics were used to describe the characteristics of the study sample at baseline. Chi-squared and Mann-Whitney U tests were used to investigate the differences between the intervention and reference groups at baseline. Missing data in the SDQ responses were replaced with means if the data included at least 3 out of 5 values in each subscale. As the SDQ data did not follow normal distribution, the Wilcoxon signed rank test was used to examine the changes in the children’s behaviour and emotional life during the follow-up. The Cohen’s r was used as a measure of the effect size. Besides the SDQ total difficulties score, SDQ subscales of prosocial behaviour, hyperactivity as well as emotional, conduct and peer problems were examined. Further, also the subscales of externalizing (including hyperactivity and conduct problems) and internalizing (including emotional and peer problems) problems were used for the analysis. A community sample of peers in the same schools and in three control schools in the same cities was used as a reference group to gain insight into the expected changes in SDQ data over time in the general population. As the intervention and reference groups differed significantly from each other in the outcome and in the background variables, statistical testing for changes during the follow-up was conducted only within the groups, thus, separately in each group. The aim was to obtain comparative data on changes over time in the SDQ variable among children with the same age and sex, even though they differed in their background from the programme

Table 1
Characteristics of the study sample ($n = 140$).

	Icehearts programme participants % ($n = 46-49$)	Community sample of peers % ($n = 72-75$)	p
Parent filling in the questionnaire			
Mother / stepmother	88	89	
Father / stepfather	12	11	Ns.
Employment status of the parent			
Employed	52	60	
Student	2	9	
At home mother/father	13	9	
Unemployed	17	11	
Retired	2	-	
Other situation	15	11	Ns
Basic education of the parent			
Compulsory school	68	40	
High school	32	60	.008
Vocational education of the parent			
Vocational school	61	46	
College	11	19	
University	4	28	
Other	7	3	
No vocational education	17	4	.002
Financial situation of the family			
Money is sufficient for our needs, and there’s even some left over	2	15	
We have enough money for our needs	35	46	
We have to cut back on spending to some extent			
We have to cut back on spending significantly but we manage	52	30	
We can’t get by on our income	9	8	
	2	1	.036
Living conditions of the child			
With both parents	33	81	
Mainly with mother	53	13	
Mainly with father	4	1	
By turns with mother and father	8	4	<0.001
Language in the family			
Finnish	87	96	
Other language	13	4	Ns.
	Mean (Std.Dev.)	Mean (Std.Dev.)	
SDQ total difficulties score at baseline assessed by the parents	12.63 (6.50)	8.21 (4.71)	<0.001
SDQ total difficulties score at baseline assessed by the teachers	14.91 (7.09)	7.33 (6.44)	<0.001

participants.

The results are described as frequency distributions and medians of the scores obtained from the SDQ questionnaire. The statistically significance level was set to $p < .05$. Further, changes over time were also observed using descriptive variables, dividing the programme participants into three categories based on the raw sum and total scores at baseline and follow-up as well as the calculated changes in SDQ scores: change for the worse, change for the better and no changes during the follow-up. All statistical analyses were carried out using IBM SPSS Statistics 29.0 for Windows 10 version.

Results

Based on the Chi-squared and Mann-Whitney U tests, there were major differences between the Icehearts programme participants and their peers with same age and sex. Children participating in the Icehearts programme were more commonly living with a single parent. One-third (33 %) of them lived with both parents, whereas the majority (81 %) of peers not involved in the programme reported living in a nuclear family with both a mother and a father ($p < .001$). Parents of the Icehearts participants had a lower level of basic ($p = .008$) and vocational education ($p = .002$) as well as more challenges with the financial situation ($p = .036$) compared with the parents of peers in the reference group. Emotional and behavioural difficulties were significantly more common among Icehearts participants compared with their peers, assessed both by the parents and teachers ($p < .001$) (Table 1).

The means of SDQ cores in each subscale at baseline and the 4-year follow-up of all study participants are presented in Table 2. For the final analysis regarding potential changes in SDQ scores during the follow-up, only those study participants with data from both checkpoints were included.

Changes in SDQ scores based on parents' assessments

Based on Wilcoxon signed rank test, no statistically significant changes were found in any SDQ subscales in the intervention group, indicating no statistically significant changes during the 4-year follow-up (Table 3). In the reference group, the analysis showed a statistically significant decrease in conduct problems ($p < .038$) and in the

subscale of externalizing problems ($p < .048$), indicating fewer problems at follow-up compared with the baseline situation with a medium effect size (0.35 and 0.33).

The three-category variable formed to describe the direction of changes in SDQ score over time showed that for the majority of participants in the programme, the situation had rather worsened than improved in all sub scales during the follow-up, except for the subscale of prosocial behaviour (Fig. 2). The total difficulties score had changed for the worse in 54 percent of the programme participants assessed by the parents. About one third (34 %) seemed to have an improvement in the situation regarding the total difficulties score. However, almost half of the programme participants (49 %) appeared to have improved their prosocial behaviour assessed by the parents, whereas one third (34 %) of the programme participants showed a worse situation at the follow-up.

Changes in SDQ scores based on teachers' assessments

Based on teachers' assessments, the Wilcoxon signed rank test showed a statistically significant improvement in the prosocial behaviour subscale among programme participants ($p < .011$, Table 4). The effect size, Cohen's r , was 0.48, indicating a medium effect. Similarly, a positive trend in prosocial behaviour was observed in the reference group ($p < .044$, effect size 0.26), as well as a decrease in emotional problems ($p < .045$, effect size 0.26). Among programme participants, no significant changes were found regarding emotional and behavioural problems.

Based on the three-category variable, the behavioural and emotional well-being of programme participants had changed more commonly for the better than for the worse in several SDQ subscales according to the teachers' assessments (Fig. 3.). Prosocial behaviour seemed to be improved among 71 percent of the programme participants and more than half of the programme participants (57 %) seemed to have better scores in the SDQ total difficulties, indicating fewer problems in behavioural and emotional well-being. However, the situation had changed for the worse among about half of the programme participants in conduct problems (46 %), emotional problems (54 %) and internalising problems (46 %) as assessed by the teachers.

Table 2

SDQ scores at baseline and at 4-year follow-up among programme participants and peers in the reference group in the entire study sample ($n = 140$).

	Icehearts programme participants Mean (Std.Dev.)		Community sample of peers Mean (Std.Dev.)	
	Baseline ($n = 49-50$)	Follow-up ($n = 48$)	Baseline ($n = 74$)	Follow-up ($n = 36$)
Assessments from the parents				
Emotional problems	1.94 (1.90)	2.01 (2.06)	1.18 (1.23)	1.00 (1.12)
Conduct problems	3.39 (2.65)	3.28 (2.52)	1.73 (1.64)	1.31 (1.58)
Hyperactivity	5.27 (3.04)	5.21 (2.77)	3.58 (2.45)	3.11 (2.79)
Peer problems	2.06 (1.70)	2.02 (1.58)	1.71 (1.43)	1.58 (1.50)
Prosocial behaviour	6.21 (2.36)	6.60 (2.15)	6.95 (2.00)	7.42 (2.16)
Internalizing problems	4.04 (3.03)	4.51 (3.50)	2.90 (2.22)	2.58 (1.96)
Externalizing problems	8.59 (5.26)	8.48 (4.91)	5.31 (3.66)	4.42 (3.88)
Total difficulties score	12.63 (6.50)	12.99 (7.09)	8.21 (4.71)	7.00 (4.62)
	Baseline ($n = 51$)	Follow-up ($n = 37$)	Baseline ($n = 73$)	Follow-up ($n = 61$)
Assessments from the teachers				
Emotional problems	2.50 (2.52)	2.76 (2.20)	1.07 (1.63)	0.64 (1.16)
Conduct problems	3.42 (2.74)	2.95 (2.47)	1.11 (1.82)	1.03 (1.40)
Hyperactivity	6.51 (3.07)	5.18 (2.99)	3.63 (3.40)	3.20 (2.83)
Peer problems	2.49 (2.04)	1.97 (1.79)	1.52 (1.65)	1.20 (1.62)
Prosocial behaviour	4.56 (2.52)	5.51 (2.63)	5.92 (2.52)	6.70 (2.51)
Internalizing problems	4.99 (3.59)	4.73 (2.98)	2.59 (2.76)	1.84 (2.38)
Externalizing problems	9.93 (5.15)	8.13 (4.96)	4.74 (4.68)	4.24 (3.86)
Total difficulties score	14.91 (7.09)	12.86 (6.32)	7.33 (6.44)	6.07 (5.33)

Table 3

Behaviour and emotional well-being among study participants based on Strengths and Difficulties Questionnaire (SDQ) scores assessed by the parents at the baseline and 4-year-follow-up.

	Programme participants (n = 35)				Community sample of peers (n = 36)			
	Baseline Median [Q1;Q3]	Follow-up Median [Q1;Q3]	p	Effect size	Baseline Median [Q1;Q3]	Follow-up Median [Q1;Q3]	p	Effect size
Emotional problems	1 [0;3]	2 [1;3]	0.306	0.173	1 [0;1]	1 [0;2]	0.840	0.034
Conduct problems	3 [2;5]	3 [2;6]	0.948	0.011	1 [1;3]	1 [0;2]	0.038 ^a	0.345
Hyperactivity	5 [3;8]	6 [3;8]	0.146	0.246	3 [1;5]	2 [1;5]	0.141	0.246
Peer problems	1 [1;4]	2 [1;3]	0.148	0.245	1.13 [1;3]	1 [1;2]	0.442	0.128
Prosocial behaviour	6 [5;8]	6 [5;8]	0.431	0.133	6.5 [5;9]	7.5 [6;9]	0.180	0.223
Externalising problems	8 [5;14]	8 [5;14]	0.313	0.171	4.5 [2;8]	3 [1;7]	0.048 ^a	0.330
Internalising problems	3 [2;5]	4 [2;7]	0.102	0.276	2 [1;4]	2 [1;3]	0.574	0.094
Total difficulties score	11 [8;16]	12 [9;19]	0.099	0.279	8 [5;11]	5 [4;10]	0.061	0.313

^a statistically significant $p < .05$
Q1;Q3 the lower and upper quartile.

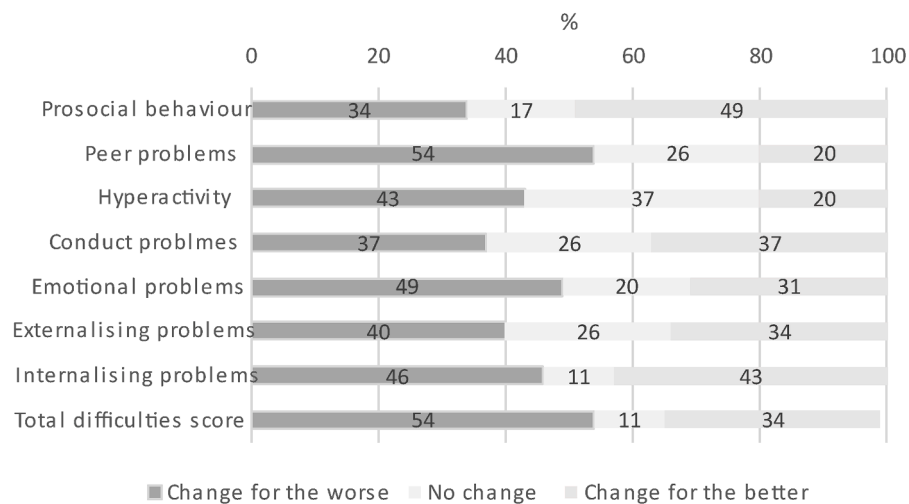


Fig. 2. Changes in behaviour and emotional wellbeing based on Strengths and Difficulties Questionnaire (SDQ) among programme participants assessed by the parents (n = 35).

Table 4

Behaviour and emotional well-being among study participants based on Strengths and Difficulties Questionnaire (SDQ) scores assessed by the teachers at the baseline and 4-year-follow-up.

	Programme participants (n = 28)				Community sample of peers (n = 60)			
	Baseline Median [Q1; Q3]	Follow-up Median [Q1; Q3]	p	Effect size	Baseline Median [Q1; Q3]	Follow-up Median [Q1; Q3]	p	Effect size
Emotional problems	2 [0;4]	3 [1;5]	0.153	0.270	0 [0;2]	0 [0;1]	0.045 ^a	0.259
Conduct problems	2.5 [1;4]	3 [1;5]	0.258	0.214	0 [0;1]	0 [0;2]	0.949	0.008
Hyperactivity	6.5 [5;9]	5.5 [3;8]	0.124	0.290	2 [1;6]	3 [0;5]	0.576	0.072
Peer problems	1.5 [1;3]	1 [1;4]	0.196	0.244	1 [0;2]	1 [0;2]	0.312	0.130
Prosocial behaviour	5 [3;7]	6.5 [4;8]	0.011 ^a	0.481	6 [5;8]	7 [5;9]	0.044 ^a	0.261
Externalising problems	8.5 [7;12]	7.5 [5;13]	0.685	0.077	3 [1;8]	3 [0;7]	0.674	0.053
Internalising problems	4 [2;7]	5 [3;8]	0.465	0.138	1 [1;4]	1 [0;3]	0.062	0.241
Total difficulties score	14.5 [10;19]	12 [9;19]	0.933	0.016	5.5 [2;10]	5 [1;10]	0.203	0.164

^a statistically significant $p < .05$
Q1;Q3 the lower and upper quartile.

Discussion

The present study aimed at investigating changes in emotional and behavioural well-being among children participating in the sport-based Icehearts programme targeted at vulnerable children and adolescents at 4-year-follow-up. The study showed that improvements could be observed among programme participants only in the subscale of prosocial behaviour, indicating improvements in this area assessed by the

teachers, but not by the parents. As the median of the prosocial behaviour sum score improved from 5, which indicates borderline behaviour to 6.5 indicating normal behaviour, can this positive change be interpreted as clinically significant. No statistically significant changes were observed in different areas of internationalising or externalising problems among programme participants. A community sample of peers in schools in the same municipality was used as a reference group to gain insight into a normal or expected trend related to SDQ scores over time

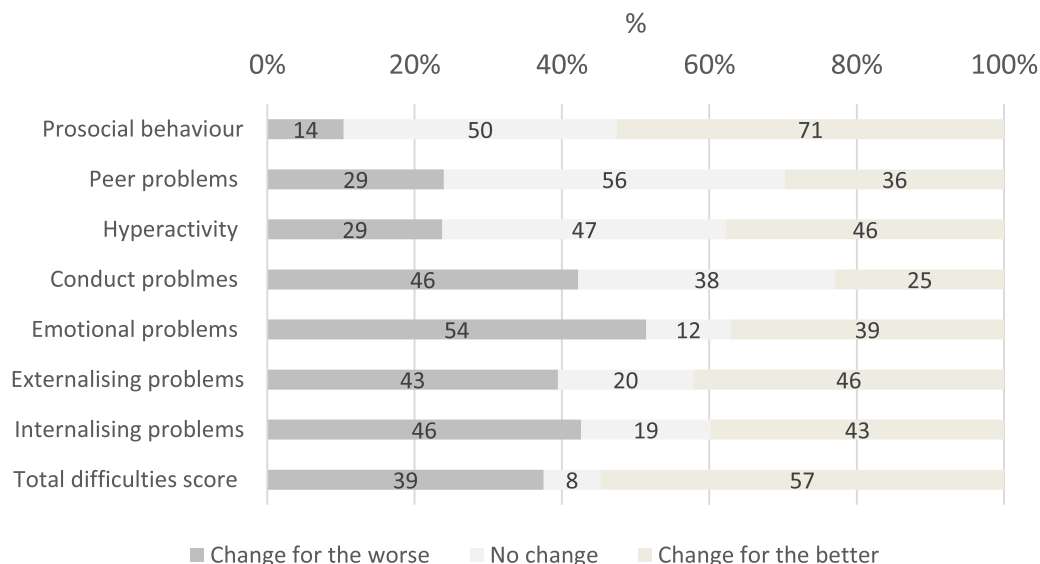


Fig. 3. Changes in behaviour and emotional well-being based on Strengths and Difficulties Questionnaire (SDQ) among programme participants assessed by the parents ($n = 28$).

in the general population. In the reference group, the analysis showed improvements in conduct and externalising problems assessed by the parents and emotional problems and prosocial behaviour assessed by the teachers at 4-years follow-up.

Due to a lack of a proper control condition, the present study does not provide evidence of a causal connection between the programme and SDQ changes over time. Also the community sample of peers showed a positive trend over time in the subscale of prosocial behaviour, indicating increased prosocial behaviour as a normal trend in this age phase. However, the findings highlighted the potential of Icehearts programme to support prosocial behaviour among programme participants. This finding is in line with a previous qualitative study on Icehearts that found – from the perspective of the parents – that organized physical activity provided by the Icehearts programme had a positive impact – among other aspects of mental well-being – on the prosocial behaviour of the participating children (Appelqvist-Schmidlechner et al. 2022). In this qualitative focus group study, the parents reported that they had noticed enhanced social skills in the children's behaviour when interacting with other people. The parents described their children to become more sedate, polite, and respectful, and getting along better with other people compared to the past. The positive development in prosocial behaviour – commonly defined as acts that are intended to benefit others (Dovidio and Banfield, 2015) – might result from being a member of a group with a positive goal, and having a permanent, positive mentoring relationship with a trustworthy adult. Icehearts mentor serves as a positive role model providing support and guidance in all social situations including conflicts with peers. According to the focus group study on Icehearts by Kekkonen et al. (2022), the parents of Icehearts participants reported the central role of Icehearts mentor in resolving fights and conflicts with peers in the school.

Even if the present study does not allow evidence of causality, the potential of the Icehearts programme in promoting prosocial behaviour can be discussed. One of the core aims of Icehearts, as well as many other PYD programmes (Catalano et al., 2004), is to strengthen social skills, and prosocial values and behaviour in a supportive environment. Furthermore, previous research has indicated that participating in organized sports, in itself, may be beneficial for prosocial behaviour (Eime et al., 2013). Engagement in leisure-time physical activity has been indicated to have a positive association with prosocial behaviour, especially in males (Appelqvist-Schmidlechner et al., 2023; Wan et al., 2021; Di Bartolomeo and Papa, 2019). The cross-sectional studies by Wan et al. (2021) and Appelqvist-Schmidlechner et al. (2023) found that

higher levels of leisure-time physical activity were associated with a higher likelihood of prosocial behaviour among high school students and young men. Di Bartolomeo and Papa (2019) evaluated the impact of a short-term physical activity intervention on prosocial behaviour in a randomized controlled trial and found that physical activity enhances trust and trustworthiness, and the effects did not seem to be temporary. Leisure time physical activity has been suggested to promote individual collective participation and interaction, increasing empathy and trust between people and thereby enhancing individual prosocial behaviour (Bahmani et al., 2020). Especially, team sport has been seen to support prosocial behaviours, by creating a sense of belonging among team members and creating a social identity (Andersen et al., 2019; Wan et al., 2021). Belonging to a sport group or team may provide a positive environment to experience interactions with peers and to learn and train social skills, which may be reflected in improved prosocial behaviour.

In contrast to the peers in the reference group, neither externalising nor internalising problems of children involved with the programme decreased during the follow-up. On the contrary, the trend showed an increase in emotional and behavioural problems during the follow-up period, even if not statistically significant. Among peers in the reference group, the findings showed a decrease in conduct and emotional problems over the four years, which is – based on the literature – the expected trend. According to Costello et al. (2011), during the development from childhood to adolescence, the nature and prevalence of mental problems changes, with disruptive behaviour decreasing. The finding of the present study showing no decrease in behavioural difficulties among programme participants may be explained by several factors. The participants of the Icehearts programme have diverse vulnerabilities (Appelqvist-Schmidlechner et al., 2017) and many adverse life events and circumstances might have occurred in the life of participating children that could not be controlled in the present study. Some of the programme participants may have faced such severe challenges and circumstances that there is a need for more tailored mental health or psychiatric services in order to achieve a reduction of external or internal symptoms observed in these children. The program neither can nor is intended to provide treatment or therapy for those struggling with mental health issues. Instead, mentors are tasked with advocating for the children and, when necessary, guiding them towards the necessary support and services, such as psychiatric or child welfare services. On the other hand, the negative trend in terms of emotional and behavioural problems may have been even stronger without the support provided by the Icehearts mentor. More knowledge and insight from the

perspective of programme participants and with longitudinal qualitative methods are needed to understand the life course and the role of the Icehearts programme for the children involved in the programme.

As expected, the study showed differences in SDQ scores between teachers and parents. Differences in SDQ scores measured by teachers and parents are well recognized (Boman et al., 2016). Boman et al. (2016) suggest that the differences in parent and teacher SDQ ratings could be partially related to parents' socioeconomic and cultural characteristics. One potential explanation may also be the different environment (school vs. home) that explain the different assessments on child's behaviour. Teachers have more opportunities to observe the child in interaction with other children and adults daily, which makes assessing prosocial behaviour or peer problems easier compared to parents. However, as the children might behave differently in the school and at home, it is therefore worthwhile obtaining assessments both from the teachers and parents. Some children, for example, might hide their emotional problems in the school and only show them at home in a safe environment.

Limitations, strengths and future directions

The present study provides valuable information about the potential of Icehearts programme in promoting mental health of vulnerable children. A follow-up period as long as four years is quite rare in studies on children in this target group, thus expanding our understanding of changes in the well-being during the crucial early school years. The study utilized the Strengths and Difficulties Questionnaire (SDQ), which has been validated as a reliable measure in longitudinal studies (Speyer et al., 2023; Thompson et al., 2021; Janitza et al., 2020). However, there are also limitations related to this study that are important to acknowledge. First, the intervention and reference group in a form of community sample of peers were not comparable due to major differences in SDQ scores and the background variables. Consequently, the study design without a proper control condition does not allow causal attributions. Thus, the study does not provide answer to the question of whether the changes in SDQ scores over time were caused by the Icehearts programme. Secondly, the sample size of the study was relatively small and due to loss to follow-up and missing data. There might be several reasons for relatively high attrition rate, such as child moving to another city, discontinuation of participation in the programme, language barriers of parents with an immigrant background, the teachers' busy schedules and staff turnover, and the reference group parents' lack of interest in filling in the questionnaire as the own child was not involved in the programme. According to the missing data analysis, those children without follow-up data had more emotional and behavioural problems at the baseline than the children with data at both time points. It is difficult to say, how and in which direction this difference has affected the findings. Further, due to relatively small sample size, the study had to rely mainly on simple descriptive statistical methods. Thirdly, all questionnaires used in the study were in Finnish, and parents with an immigrant background may have faced difficulties in filling in the questionnaire. Challenges in completing the questionnaire most likely also decreased the response rate at the follow-up and increased the amount of missing data.

There is a need to gain deeper insight into the life course of programme participants and the life events affecting their emotional and behavioural well-being. A longitudinal qualitative approach could be a proper way to better understand the changes in mental well-being among programme participants across the lifespan and the role of Icehearts mentors in providing support for the mental health and positive youth development of participating children during their life course.

Conclusions

The findings showed an improvement in prosocial behaviour but no changes in emotional or behavioural problems among children

participating in the Icehearts programme at 4-year follow-up. The findings are supported by previous research findings on the Icehearts programme. However, the study does not allow for causal attributions; thus, it does not answer the question of whether these changes are caused by the Icehearts programme. Nonetheless, the study highlights the potential of the Icehearts programme in promoting prosocial behaviour among socially vulnerable children, but challenges in reduction of emotional and behavioural problems. Children with more severe emotional and behavioural challenges and difficult living circumstances may need, besides the Icehearts programme, support provided by mental health, psychiatric, and child welfare services. More evidence and feedback are needed from the perspective of the programme participants themselves.

CRedit authorship contribution statement

Kaija Appelqvist-Schmidlechner: Writing – original draft, Supervision, Project administration, Methodology, Conceptualization. **Mervi Haavanlammi:** Writing – review & editing, Formal analysis, Data curation. **Reija Autio:** Writing – review & editing, Formal analysis. **Marjatta Kekkonen:** Writing – review & editing, Supervision, Methodology, Conceptualization. **Sari Fröjd:** Writing – review & editing, Supervision.

Declaration of competing interest

The authors report there are no competing interests to declare.

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