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Daily physical activity in Finnish adolescents with long-term illnesses or disabilities: psychosocial associations with participation in sports club.

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ABSTRACT

Background: Physical activity (PA) in adolescence with long-term illnesses or disabilities (LTID) is a public health concern. One way of increasing PA is through participation in sports clubs. Since sports clubs are organised and regular, there are expected to be differences in motivation for physical activity between adolescents that are members and non-members. The purpose of this study is to assess the impact of psychosocial factors on sports club membership and daily PA.
Methods: Finnish adolescents with self-reported LTID (n=1006) took part in the WHO collaborative Health Behaviour in School-aged Children (HBSC) study in 2002 and 2010. Daily self-reported moderate to vigorous PA (MVPA) was the outcome variable. Psychosocial variables included intention for future PA, self-perceptions and educational aspirations. Age and sports club membership was included in binary logistic regression analyses. Analyses were done separately for boys and girls.
Results: Adolescents with LTID who were sports club members were two times more likely to be active daily than non-members. However, for girls, there was no significant difference between members and non-members. Moreover, definite intention for future PA, higher self-perceptions and educational aspirations to other education or training than general upper secondary school were significant predictors.
Conclusions: Adolescents with LTID need encouragement to be active daily. One possible way to achieve this is through sports club participation. Implementing adaptive motivating techniques in sports clubs is especially important for girls in clubs. More research is needed on the associations of daily MVPA with different educational aspirations for adolescents with LTID.

Key words: intention, self-perceptions, organised sports, HBSC Study, vocational education, vocational training

INTRODUCTION

Physical activity (PA) for adolescents with long term illnesses or disabilities (LTID) is an important health related behaviour because it has been demonstrated to reduce the onset of secondary conditions [1], improve mental health [2], advance skills used in self-care as an adult [3], as well as provide opportunities to integrate with their social environment [4]. Much of these benefits can be gained through the adherence of the World Health Organization's (WHO) recommendation of at least 60 minutes per day of moderate to vigorous physical activity (MVPA) during adolescence [5]. More Finnish adolescents have been reported to meet these recommendations than other adolescence elsewhere in Europe and Canada [6]. While the situation seems to be the best in Finland, information about the situation for adolescents with LTID is scarce. Previous studies have reported worrying differences in PA levels in children with LTID as they can be up to four and a half times less physically active than their peers without LTID [7]. The amount of reported PA can range substantially, depending upon the type and the severity of a health condition that can be considered as LTID [8-10].

Earlier studies have reported that adolescents who have the capability to go to the general schooling system, but still report to have LTID, can have similar levels of PA as their peers without LTID [11]. In addition, with this subpopulation group, there are differences in PA levels depending on the reported condition [12). Due to these differences, studies that focus on interventions, relationships and recommendations have often been based on specific types of LTID [9, 10]. Individual interventions also need to take into consideration the psychosocial factors in order to be successful, particularly in adolescents [13, 14]. This has been argued to be useful for focusing on individual needs required to promote PA. However, individual studies lack the potential to measure prevalence changes over time and the potential for generalizability [15]. The reasons for this could be related to the sampling of a minority population, incomparable results from different data collection methods, as well as difficulties in collecting uniform data across a number of different categories of LTID [16]. As more adolescents with LTID have the opportunity to be included into activities designed for the general population, a clearer understanding of moderating behaviours for PA that may provide health promoting strategies on a whole is needed.

In general, the opportunities for PA in adolescents include physical education classes, school recess time as well as organised and unorganised sports participation [17, 18]. There are some substantial grounds for investigating the components of organised sports participation, also referred to as sports clubs. Firstly, compared with compulsory physical education, not all adolescents take part in sports clubs. Data obtained between 2002 and 2014 revealed a steady rate of 45% of adolescents with LTID who take part in sports clubs, with one out of five of these adolescents reported to meet the PA recommendations [19].

Secondly, studies have also shown that in general, adolescents that take part in sports clubs are more likely to be active as an adult [20], take part in more PA [21, 22], demonstrate improved mental health [23] when compared with peers that are not part of sports clubs. Furthermore, sports club participation allows adolescents to benefit from social health [24]. However, less is known about whether these findings are applicable for adolescents with LTID. A model for physical activities for people with disabilities (PAD) [25] has been suggested and was created through a systematic literature review based on the World Health Organization's International Classification of Functioning, Disability and Health (ICF) [26]. In both frameworks, results from studies indicate that the ICF personal factors are important facilitators and barriers to PA. These personal factors include intention for future PA, self-perceptions such as perceived fitness, competence and body image, as well as social attitudes. They are addressed as psychosocial factors for the remainder of this paper. Studies that can look at these variables together in a single study design across adolescents with LTID are scarce.

Another reason for studying the associations with sports club membership is to separate adolescents due to the activities they take part in. The ICF lists taking part in sports activities as an important indicator for normal functioning [26]. In general, adolescents attend sports clubs primarily with the main purpose for improving sport ability and positive youth development [13]. The activities in organised sports settings are fixed, structured and predominantly led by coaches that have undergone some basic training [27]. Coaches need to organise these activities as a whole, often with the sacrifice of accounting for large individual differences [28]. As such, there is a risk that adolescents with reported LTID experience difficulties when executing some of the tasks [29]. This has a direct influence on the adolescent's own self-perceptions. The coach takes over the role from the parents to motivate the adolescents to take part in physical activities [30]. This contrasts the intrinsic motivation attributes of individuals that do physical activities but are not members of sports clubs [31].

There has been encouragement for adolescents with LTID to take part in PA successfully without the need for structured settings [32]. In both settings, adolescents can respond to the feelings towards PA by directing their focus on the intention for future PA. Studies from the general population have suggested individuals may find it easier to take up PA as adults through participation during adolescence in organised sports in combination with experiences of positive self-perceptions [33]. These aspects are reported in the PAD model, but lack empirical testing. Individuals without the habit of being part of sports club may later prefer other activities. Hence it is important to know what future intentions adolescents have towards PA as this construct can inform how autonomous motives

combine social norms, attitudes and control of physical activity behaviours [34]. Based on these studies from the general population, studying intention for future PA may be an important predictor for the likelihood of secondary conditions such as cardiovascular disease and diabetes in adolescents with LTID. As well as intention for future PA, attitudes such as educational aspirations have been found to be associated with PA levels in the general adolescent population [35]. In Finland, the majority of pupils make a choice between vocational education and general upper secondary school routes after basic education at 16 years old [36]. In addition, educational aspirations have been treated as an early indicator for perceived social economic status [37], which may influence the overall judgement of self-worth [38]. However, in relation to PA and sports club membership in adolescents with LTID, these psychosocial factors have not been well documented in the literature.

The purpose of this study is to assess the impact of psychosocial factors (specifically, intention for future PA, self-perceptions and educational aspirations) on sports club membership and daily physical activity. Due to different patterns of PA between boys and girls [39-41], this study purpose will also separate boys and girls.

There are two main hypotheses for this study. The first hypothesis stems from the ICF activities component, whereby it is expected that sports club members participate in more physical activity than non-members [28]. The second hypothesis is related to the PAD model [25], whereby increased physical activity is associated with definite intention for future PA, higher self-perceptions and aspirations towards general upper secondary schools.

METHODS

Participants and Procedures

Under the Salamanca Agreement [42], more adolescents with long-term illnesses or disabilities (LTID) are part of general education systems. This has allowed meaningful research from surveys like the WHO Collaborative Health Behaviours in School-aged Children (HBSC) study to collect data across national representative samples and study patterns of behaviours from these contexts [43] without the loss of segregated data [44]. The HBSC study is cross-sectional through the use of self-report surveys of adolescents (ages 11, 13, 15) in Europe and North America. In Finland, only general schools were invited to participate in the study. Sampling of the research data were based on regional stratum and at the size of the school through proportion pupil size. At the school level, random sampling took place to select the class. In combination with regional level stratification, the entire sample was intended to be a national representative data set. In order to achieve adequate sample sizes for adolescents with LTID, data have been aggregated from data collection in 2002 and 2010. Data from 2006 and 2014 studies used different items related to reporting of LTID and could not be used for analysis.

Overall, the number of schools involved in this study was 277 in 2002 and 341 in 2010. Questionnaires with the same investigated items were completed in the spring of 2002 and 2010 from around the country of Finland. The pupils' response rate from the entire samples for 2002 was 92% and for 2010 was 94% with a HBSC sample of 7241 students. Data from 11 years old were not included since they were not asked questions about LTID. Responses were completed anonymously and no personal identifiers could be traced back to the individual. Once the researcher received and scanned the completed surveys, individual responses were checked. The data file was then cleaned according to the HBSC study protocol which remained the same for both the 2002 and 2010 data collection. The study was approved by the Finnish National Board of Education.

INSTRUMENTS AND VARIABLES

Long term illnesses or disabilities

The chronic conditions short questionnaire was used to determine selected participants. The brief questionnaire was used in the UK census in 1991 [45] and has been partly included in the HBSC study since 2002. Only participants that had responded 'yes' to the following question were included, "Do you have a long-term illness, disability or medical condition, as stated by a doctor (do not include learning disabilities)."

Moderate to Vigorous Physical activity (MVPA)

Physical activity was measured using a self-reported single item. The question combined intensity (moderate to vigorous), duration (at least 60 minutes) and frequency (scale response of number of days) [46]. A widely used introductory text to describe intensity of PA preceded the question of "over the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day?" with responses ranging from 0 to 7 days [47]. This widely used item has been tested [46] for reliability and validity in Finland [48] as well as in other countries [49-50]. Although there have been some studies that recommend caution among the results of self-reported data [51], this particular item has been reported to provide moderate results when administered with adolescents who had been tracked with objective devices and it is particularly appealing when making comparisons with studies [52]. In accordance with the PA recommendations for health [5], PA was dichotomised into groups of "daily" and "not daily" MVPA.

EXPLANATORY VARIABLES

Intention for future physical activities

Intention for future PA was measured through a single item, which corresponded to instructions, from the manual to create questions for measuring future behavioural intention [53]. The direct translation of the question from Finnish is, "Do you think you will participate in sports or other physical activities when you are 20 years old?" Responses ranged from 1, Definitely yes, 2, Probably yes, 3, Probably no, and 4, Definitely no. Dichotomous groups (binary) were comprised of definite [1] and uncertain intentions [2 - 4].

Educational Aspirations

In Finland, compulsory basic education ends at age 16 and more than 90% proceed to continue in either general upper secondary or vocational education through the age of 19 [54]. Educational aspirations were measured through the following question, "What do you think you will do when you finish compulsory basic education?". Categorical responses included "General upper secondary school", "vocational school/training", "apprenticeship", "double examination (both general upper secondary and vocational)", "get a job", "be unemployed", and "don't know". Groups were dichotomised into those who try to go to "general upper secondary school" and those with "other" aspirations.

Self-Perceptions

Self-perceptions were measured from three single items of perceptions of physical competence, physical fitness and body image. Using scoring procedure from previous studies, individuals with high competence, fitness and body image were grouped into a group of higher self-perceptions, and all other perception scores were grouped as lower self-perceptions (Table 1). These measures have been reported to be valid and reliable for adolescents aged 13 to 18 years [55].

Sports club membership

Membership of a sports club was measured by a single question "Are you a member of a sports club"? Responses were "No", "Yes and I am training in a sports club", "Yes but I do not participate in training". To fulfil both "doing" and "engaging" dimensions of participation [56], the following groups were set; those who indicated being a member of a sports club and participate in training were coded as a "sports club member". The other group of non-active individuals and not a member were renamed "non-members". This variable is the objective of the analysis.

Statistical methods

Descriptive statistics of means and standard deviation were calculated for study characteristics. Separate chi-square test of independence was used to compare differences between boys and girls in sports club, daily PA, intention for future PA, self-perceptions, educational aspirations and year of data collection. In addition, another chi-square test was conducted between members and non-members of sports club, daily PA, intention for future PA, self-perceptions, educational aspirations and year of data collection. Binary logistic regression analysis was used to estimate the association among sports club membership, daily PA participation and psychosocial factors. Categories were fixed so that odds are positively directed for reporting positive odds ratio. Analyses were first performed with the entire sample and subsequently stratified by gender since there have been reports that boys and girls have different factors related to sports club membership [41]. Overall analyses were adjusted for age and year of data. Data analysis was performed using SPSS 22. The level of significance was set at 0.05.

RESULTS

The sample population represents a prevalence of 18.0% in 2002 and 13.7% in 2010 of adolescents with LTID. Under half (40%) of the sample were sports club members and there were slightly more girls (56.6%) than boys. This did not statistically influence the distribution of the sample ($x^2(1) = 1.15$, $p = 0.28$). The descriptive statistics of sample are shown in Table 2. More boys were active daily, had high self-perceptions and aspired to other education systems than to the general upper secondary school.

In Table 3, sports club members reported more days of MVPA (mean=4.9 days, SD=1.8) and more (22% vs 9%) were physically active daily than non-members (mean=3.3 days, SD=1.9). Sports club members were more likely to have higher self-perceptions (42% vs 17%), definite intention for future PA (75% vs 37%), as well as aspire to general upper secondary school (78% vs 61%).

The results of the binary logistic regression analysis for the association among organised sports membership, daily MVPA and psychosocial factors are presented in Table 4. For the total sample, members of sports clubs were twice more likely to be active daily (p=0.002) than non-members. Adolescents had over twice higher odds if they had higher self-perceptions and three times higher odds if they had definite intention for future PA. Furthermore, adolescents with aspirations towards other

TABLE 1. Explanatory instruments used and how they were grouped into dichotomous groups.

		CODING	
INSTRUMENT	**RESPONSES**	0	1
Self-perceptions			
How fit do you think you are?	Not fit at all (1) – Very fit (4)	1 , 2	3 , 4
How good are you at sports compared to others the same age as yourself?	Among the best (1) – Below average (4)	3 , 4	1 , 2
Do you find yourself..?	Too thin (1) – Too fat (5)	1 , 2 , 4 , 5	3
Intention for future Physical Activity			
Do you think that you will go in for sports or other physical activities when you are 20 years old?	Definitely yes (1) – Definitely no (4)	2 , 3 , 4	1
Educational aspirations			
What do you think you will do when you finish compulsory basic education?	General Upper Secondary School (1), Vocational school/training (2), Apprenticeship (3), Double Examination (4) Get a job (5), Be unemployed (6), don't Know (7)	2 , 3 , 4, 5 , 6, 7	1
Sports club member			
Are you a member of a sports club?	No (1), Yes and I am training in a sports club (2), Yes, but I don't participate in training (3)	1 , 3	2

Note. Self-perceptions scores were grouped based coding of three variables on physical activity self-perceptions. The reference category (lower self-perceptions) was calculated given the condition that at least one of the self-perception items was low. Fulfilling the criteria of all 1's in the self-perceptions was coded as higher self-perceptions. All other variables were dummy coded with the reference category referring to an absent of the event

educational systems after compulsory school had higher odds (p=0.013) for daily PA participation.

Boys results were almost represented the same as the overall sample, however, the odds were higher, and for example, definite intention for future PA was almost 4 times more likely to participate in daily PA. For girls, younger age (p=0.015) and definite intention for future PA (p=0.004) were significantly associated with daily PA. Sports club membership was not significant (p=0.055).

DISCUSSION

In this study, the results suggest sports club members are more active than non-members. Adolescents with long term illnesses or disabilities (LTID) who are sports club members are likely to use these activities towards a target of daily moderate to vigorous physical activity (MVPA), however only a quarter of members reported to do this. Furthermore, after controlling age, as well as year of data collection, reporting daily MVPA was associated with sports club membership and psychosocial factors including intention for future PA, self-perceptions and educational aspirations.

In our first hypothesis we expected that sports club members participate in more PA than non-members. The results from the study reveal girls with LTID and sports club members were not significantly more likely to participate in daily MVPA. The average number of days was however significantly different in girls members than non-members. In Finland, there has been an increase in girl sports club membership from a third to almost a half between 2002 and 2014, which is still fewer than the constant rate of around half the boys who are sports club members [19]. Sports clubs for adolescents tend to have a competitive nature and this might be less of an incentive for adolescents with LTID. A lack of opportunities for the right activity for adolescents with LTID [57] has been reported to be a barrier for sports participation. This can be a reason for fewer girls to take part in sports club as girls may choose to take part in other leisure time activities such as self-improvement, skill-based, social, or recreation [58]. These activities may take up important time so that the adolescent could be physically active for at least 60 minutes per day.

Our second hypothesis which was increases in physical activity are associated with definite intention for future PA, aspirations towards general upper secondary schools and higher self-perceptions, was also partly demonstrated. The overall result is consistent with the previous studies that were present in the physical activity for people with disabilities (PAD) model [59]. Intention for future PA is confirmed to be a central component in relation to daily MVPA [25]. Unlike the other studies that were reviewed by Bloeman and colleagues [59], this measure of intention for future PA was based on predictions when the adolescent will be 20 years old. This could be five to seven years in the future and there may be questionable validity to the measure. However, one of the main fallacies of the construct of intention is that an intention for

TABLE 2. Descriptive characteristics of participants by gender and chi-square Test of independence.

	TOTAL (n=1006) %	BOYS (n=437) %	GIRLS (n=569) %	χ^2	p
Sports Club				1.15	0.284
Non Member	60.2	58.4	61.7		
Member	39.8	41.6	38.3		
Age				1.19	0.275
13	48.6	50.6	47.1		
15	51.4	49.4	52.9		
Data Collection				0.95	0.330
2002	52.5	54.2	51.1		
2010	47.5	45.8	48.9		
MVPA				13.32	<0.001
Not Daily	84.2	79.4	87.9		
Daily	15.8	20.6	12.1		
Intention for future PA				<0.001	0.994
Uncertain	47.8	47.8	47.8		
Definite	52.2	52.2	52.2		
Self-perceptions				23.42	<0.001
Low	73.2	65.4	79.1		
High	26.8	34.6	20.9		
Educational aspiration				14.66	<0.001
Other	37.3	43.9	32.2		
General Upper	62.7	56.1	67.8		

something can happen long before the behaviour or just moments before [60]. Therefore it was not surprising to see how the tendency of this psychosocial construct behaves in the same way as in other studies related to PA. This is particularly important for adolescents who currently have LTID and may need to be active throughout their lives to reduce the onset of secondary conditions such as cardio vascular disease, diabetes, various respiratory diseases and osteoarthritis [61].

Intentions are often comprised of attitudes towards certain behaviours [62]. In this study, attitudes of individuals were measured by educational aspirations, because there are strong associations between higher academic track aspirations and increased physical activity [35]. However, the results in this study were the opposite, where aspirations towards other types of educational track were associated with daily MVPA. This could be related to some of the activities that adolescents with LTID have had to face. For example, since the onset of LTID, adolescents may have had to miss classes due to appointment times with the physician, days off sick, or attend other training for daily living [63]. These absences may contribute towards a preferred educational track of other studies and training. However, this does not explain the significance of this finding and more results are needed to examine the relationship between vocational school or training aspirations and physical activity in adolescents with LTID [14].

In addition to sports club membership, there was no significant association between self-perception in girls and daily MVPA. Studies from the general population have indicated that adolescent girls tend to have lower self-perceptions and are more sensitive to these perceptions than boys [64], therefore it might be hard to distinguish differences when dichotomising the perceptions into high and low groups. In the context of this study, self-perceptions included attributes of perceived fitness, competence and body image [55] and these have been demonstrated to be important psychological constructs that increases motivation to participate in physical activities [65]. In the sports club setting, the coach is an important authority figure that structures the activity session, manages the tasks that occur and motivates the participants [24]. Targeted interventions where the coach leads a mastery motivational climate and autonomous-supportive behaviours have been shown to increase self-perceptions [13]. However, for the coach to be successful at this, specialised training is required for important motivating methods and awareness of contraindications in populations with LTID [10].

TABLE 3. Psychosocial variables between members and non-members of sports clubs.

	NON-MEMBERS (n=606) %	MEMBERS (n=400) %	χ^2	p-value
MVPA			51.86	<0.001
Not Daily	90.9	74.0		
Daily	9.1	26.0		
Age			19.85	<0.001
13	42.9	57.3		
15	57.1	42.8		
Data Collection			4.23	0.040
2002	55.1	48.5		
2010	44.9	51.5		
Intention for future PA			141.55	<0.001
Uncertain	63.0	24.8		
Definite	37.0	75.3		
Self-perceptions			72.70	<0.001
Low	82.8	58.5		
High	17.2	41.5		
Educational aspiration			25.77	<0.001
Other	38.7	22.5		
General Upper	61.3	77.5		

TABLE 4. Multivariate positive Odds Ratio and confidence intervals for daily physical activity.

	TOTAL		GIRLS		BOYS	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Sports club member	2. 00	1.33-3.00**	1.76	0.99-3.14	2.21	1.24-3.96*
Non-member	1.00		1.00		1.00	
13 year old	2.07	1.41-3.02***	1.96	1.14-3.36*	2.28	1.31-3.95**
15 year old	1.00		1.00		1.00	
2010 Data	1.93	1.33-2.80**	1.68	0.98-2.90	2.34	1.38-3.98**
2002 Data	1.00		1.00		1.00	
Definite intention	3.00	1.92-4.68***	2.56	1.35-4.85**	3.78	2.01-7.11***
Uncertain intention	1.00		1.00		1.00	
High self-perceptions	2.07	1.41-3.02***	1.65	0.93-2.95	2.33	1.38-4.02**
Low self-perceptions	1.00		1.00		1.00	
Other educational aspiration	1.63	1.11-2.41**	1.30	0.73-2.33	1.78	1.03-3.09*
General upper secondary	1.00		1.00		1.00	

*OR: Odds Ratio. 95% CI: 95% Confidence Interval * p <0.05, ** p<0.01, *** p<0.001*

Considering that the majority of adolescents sports club coaches have a minimal coach qualification [27], training often neglects ways to instruct in an inclusive setting. If this training was provided it would enable more adolescents with LTID to participate [66]. Ever since getting more adolescent girls into clubs has become more effective, the sports clubs themselves may be lacking the necessary skills to keep the girls there [24] and further, adolescents that take up sports and have negative experiences, may find it harder to take up sports again [67]. Sports club

participation is a partial contributor to the overall daily PA. As such, it is encouraging to see that our results reveal that there are other ways, particularly for girls with LTID to take part in MVPA daily from outside the sports club context.

Limitations

There are limitations to consider when interpreting our findings. Data was collected in a cross-sectional study design, which eliminates the possibility to infer causality among the variables. Participants used self-report measures and there might be some bias towards desirable responses and recall error [52]. There may have been some measures that have not been empirically validated, yet the study instruments have been accepted throughout an international study design with the consortium of researchers in multiple scientific domains. Therefore additional benefit of self-report has been the ability to capture the perceptions of adolescents themselves rather than reporting through proxy [44]. Another useful insight would have been the nature of sports clubs, as this would help target some barriers regarding choice of activities. Finally, this study looked only at the individual psychosocial factors and to strengthen the findings, future studies may benefit from utilising other biological and social determinants of PA.

CONCLUSIONS

The gender differences in daily MVPA may be partly explained by participating in sports clubs. For Finnish adolescents with LTID, there was a positive association from taking part in sports clubs for boys, while this is not as clear for girls. However, of the psychosocial factors measured only definite intention for future PA was associated with daily PA after controlling age for boys and girls. Therefore, interventions for increasing PA through motivational techniques should consider the importance of being physically active later in life. It seems to be important for boys to get into sports clubs as a way to meet physical activity recommendations, however sports clubs need to be ready for inclusion of adolescents with LTID.

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