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Impact of a six-month empowerment-based exercise intervention programme in non-physically active adolescent Swedish girls

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Abstract

Objective: This study evaluated changes in self-efficacy in non-physically active adolescent girls (13–19 years old) who participated in a six-month, empowerment-based exercise intervention programme (EIP).
Design: The study used a pre- and post-test randomized group design and included one pre- and one post-test (at six months) and non-physically active adolescent girls (N = 110) were assigned to an intervention group (n = 54) or a comparison group (n = 56).
Setting: Two upper secondary schools and five secondary schools, located in the low socio-economic areas of two communities in southern Sweden were involved in the study.
Method: The Swedish version of a 10-item General Self-efficacy Scale (GSES) and the Social Barriers to Exercise Self-efficacy Questionnaire (SPBESQ) were used. In addition, BMI and results from a physical fitness test were measured. For statistical analysis, the Mann-Whitney U-test and the Wilcoxon's matched-pairs signed-rank test were used.
Results: Analysis showed a statistically significant difference in GSES scores (p = 0.037) between the groups after the EIP was implemented. Girls in the intervention group had increased their levels of general perceived self-efficacy (p = 0.004). Both groups increased their level of physical fitness (intervention, p = 0.06 and control, p = 0.013). BMI increased in the control group (p = 0.031).
Conclusions: The EIP had an impact on adolescent girls' general perceived self-efficacy and can be regarded as an outcome of empowerment that indicates the development of the adolescent girls' ability to effectively deal with a variety of stressful situations in general.

Keywords

empowerment, exercise, girls, intervention, self-efficacy

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Regular physical activity is an important public health issue for adolescents due to its positive influence on health and well-being[1,2]. Early development of physical activity habits, in particular regular exercise[3] and participation in organized competitive youth sports[4], seems to be a predictor of adolescent and adult physical activity. Despite this evidence, a large number of adolescent girls in industrialized countries fail to follow national physical activity guidelines. Studies have revealed that physical activity during adolescence decreases with age[5], especially among girls[6,7]. Low socio-economic status[8,9] has been found consistently to be a significant determinant of physical inactivity in adolescents as well as in adults[10]. Interventions aimed at increasing the level of physical activity are necessary, among other things, to reduce the problem of obesity and enhance psychosocial benefits[11]. In Sweden, the government has provided financial support to the Swedish Sport Confederation to promote all forms of physical exercise and sport. A stipulation of the financial aid is that target groups must include 'at-risk' adolescents. However, a dilemma is that elitism and competitiveness in many sport clubs tend not to attract non-physically active young females; this problem has led to a need for alternative forms of sport that reaches more people[12]. Therefore, it has become necessary that non-physically active young females be allowed to take part in sports clubs on their own terms to meet their personal needs and stimulate their interest[12]. Perceived self-efficacy has been found to be a significant predictor of one's intent to be physically active[13] and adhere to an exercise regimen[14]. Some studies on physical activity or exercise interventions have reported a significant correlation between improvements in fitness or higher physical activity and increased levels of perceived self-efficacy[15,16]. Conversely, other studies failed to find significant changes in perceived exercise self-efficacy or in the confidence of adolescent girls in their ability to overcome barriers to physical activity[17,18]. Relatively few community-based programmes outside schools have been implemented. Recommendations for such programmes are to focus on specific target groups (for example, non-physically active girls) and deliver content that addresses the target group's specific needs, interests and preferences[19]. The aim of this study was to evaluate a six-month, empowerment-based exercise intervention programme on self-efficacy for non-physically active adolescent girls.

Theoretical framework

The intervention in this study was based on health promotion using a bottom-up approach and the concept of empowerment[20,21]. This refers to the fact that the programme design stage used a participatory planning approach, during which participants' interests and concerns were central to the process. The programme targeted adolescent girls from neighbourhoods of lower socio-economic status. Another programme goal was to increase participants' self-control and mastery of adopting new behaviours; for this purpose, an additional theoretical aspect of health promotion, the concept of self-efficacy was used in this study[22]. The purpose of this focus was to strengthen the ability of non-physically active adolescent girls to address novel tasks, such as adopting a physically active lifestyle. The concept of perceived self-efficacy stipulates that confidence in one's personal ability has an impact on the direction, intensity and persistence with which actions are performed. The most effective way to create a strong, perceived self-efficacy is by gaining experiences of mastery. Three additional ways to do this are by modelling mastery, using verbal persuasion and achieving improved physiological states[23]. According to Bandura[23], strategies to increase self-efficacy should be directed towards specific tasks or domains; this refers to the fact that a person can have varying degrees of beliefs about themselves in different domains or particular situations of functioning. Other researchers[24] believe that perceived

self-efficacy can also be identified at a more general level of functioning. A framework of generalized perceived self-efficacy can explain the broad range of human behaviours and coping strategies in less specific contexts and why individuals may feel more confident generally but still feel a lack of confidence in a specific task.

Exercise intervention programme

The Halland District Sport Federation in Sweden implemented a six-month, voluntary exercise intervention programme (EIP) for non-physically active adolescent girls. The EIP was implemented in two municipalities, from early autumn 2002 to mid-spring 2003, and took place during the participants' leisure time.

The EIP was based on an empowerment process aimed at increasing participants' awareness of their own interests and needs, thereby enabling them to play an active part in the programme development. Another goal of the empowerment process was to strengthen the participants' perceived self-efficacy. They were invited to participate in different sports and exercise activities twice weekly, during which they could learn to master activities they selected without feeling ashamed of their body or level of ability. The physical activities were structured to emphasize learning new skills, mastery and enjoyment, rather than focusing on physiological change, performance, competition or seriousness found in typical sport-club settings. This aspect of the programme aimed to provide participants with *mastery experience*. The EIP was organized to allow girls to participate, observe and compare their performance with other non-physically active girls of approximately the same age. Interacting with other girls in a similar situation who they could observe succeed with various forms of exercise helped deliver the message 'If they can do it, so can I'. This element of the programme allowed for *modelling mastery* by participants. The leaders provided encouragement and positive persuasion; this important component provided *verbal persuasion*. Finally, the activities were performed at a level that participants could manage, thus addressing the *physiological states* aspect of the programme.

The EIP was structured to foster a sense of self-control and pride concerning one's body, because these factors are considered important mechanisms that underpin the effects of exercise on physical self-perception. An earlier study of the EIP showed that addressing these elements led to a significantly reduced anxiety regarding physical self-perception and social physique[25].

The EIP consisted of four groups, each with its own exercise leader. Sports clubs located in the municipalities were invited to collaborate; and two coordinators, one from each community, were responsible for the coordination between the sports clubs and exercise leaders. Four exercise leaders (two of whom were the coordinators as well) were responsible for the exercise and discussion sessions and also assisted the coaches in sports clubs. The exercise leaders were coached by a steering group and met three times over the course of the programme to discuss the EIP. During these meetings, advice and experiences were shared, and the intervention was discussed to ensure that exercise leaders were managing the EIP in similar, supportive manners. The EIP sessions were offered twice weekly for 26 weeks (six months), and included (a) exercise (45 minutes at a moderate level) and (b) discussion (15 minutes). During the discussion time, topics such as healthy lifestyles (including healthy dietary and physical activity behaviours) were addressed. If the participants did not attend the EIP for four consecutive sessions (i.e., two weeks), they were contacted by phone to inquire as to why they had not participated and offer a reminder that they were welcome to return.

Methods

Study design

The study used a pre- and post-test randomized group design[26]. One pre-test was administered at the start of the programme, and one post-test was given at six months.

Participants

The study was randomized after stratification of the study population by socio-economic status of the area, number of pupils and grade-level in the schools of the two municipalities to ensure a homogeneous sample. The randomization process allowed for peers from the same school to be allocated to the same group; this randomization strategy served two purposes. First, the randomization itself helped avoid contamination between participants in the intervention and control groups; second, allowing peers to be grouped together helped increase motivation and adherence in the intervention group via the creation of a safe social environment of familiar people. The school nurses and physical education teachers contacted the students and offered them the opportunity to participate in the study. In total, 180 adolescent girls (aged 13–19 years) accepted the invitation to participate in the study and attended the information meeting. Figure 1 shows the flow diagram of participant recruitment and involvement.

Ethical considerations

The principals of the schools and the Halland District Sport Federation approved this study, which was conducted in accordance with the ethical guidelines of the Swedish Council for Research in the Humanities and Social Sciences[27]. The schools agreed that the participants be randomly assigned to intervention or control groups. Written and oral information was provided explaining that participation was voluntary, that data would be treated confidentially and that participants were free to withdraw at any time. As most participants were less than 18 years of age, both they and their parents were informed about the study; and written consent to participate was obtained from parents and participants.

Procedures

Research assistants administered questionnaires and conducted physical fitness tests with groups of two to four participants in a test room. The research assistants gave participants oral instructions for how to complete the questionnaire; they were also available to answer questions during completion of the forms.

Physical tests

To calculate body mass index (BMI), weight and height were recorded. Åstrand's[28] sub-maximal work test with the bicycle ergometer was used in accordance with standard procedures to predict sub-maximal oxygen uptake as a measure of physical fitness.

Self-efficacy

The Support and Social Barriers to Exercise Self-efficacy Questionnaire (SSBESQ) was constructed to address the content of the intervention and identify specific behavioural changes (Table 1).

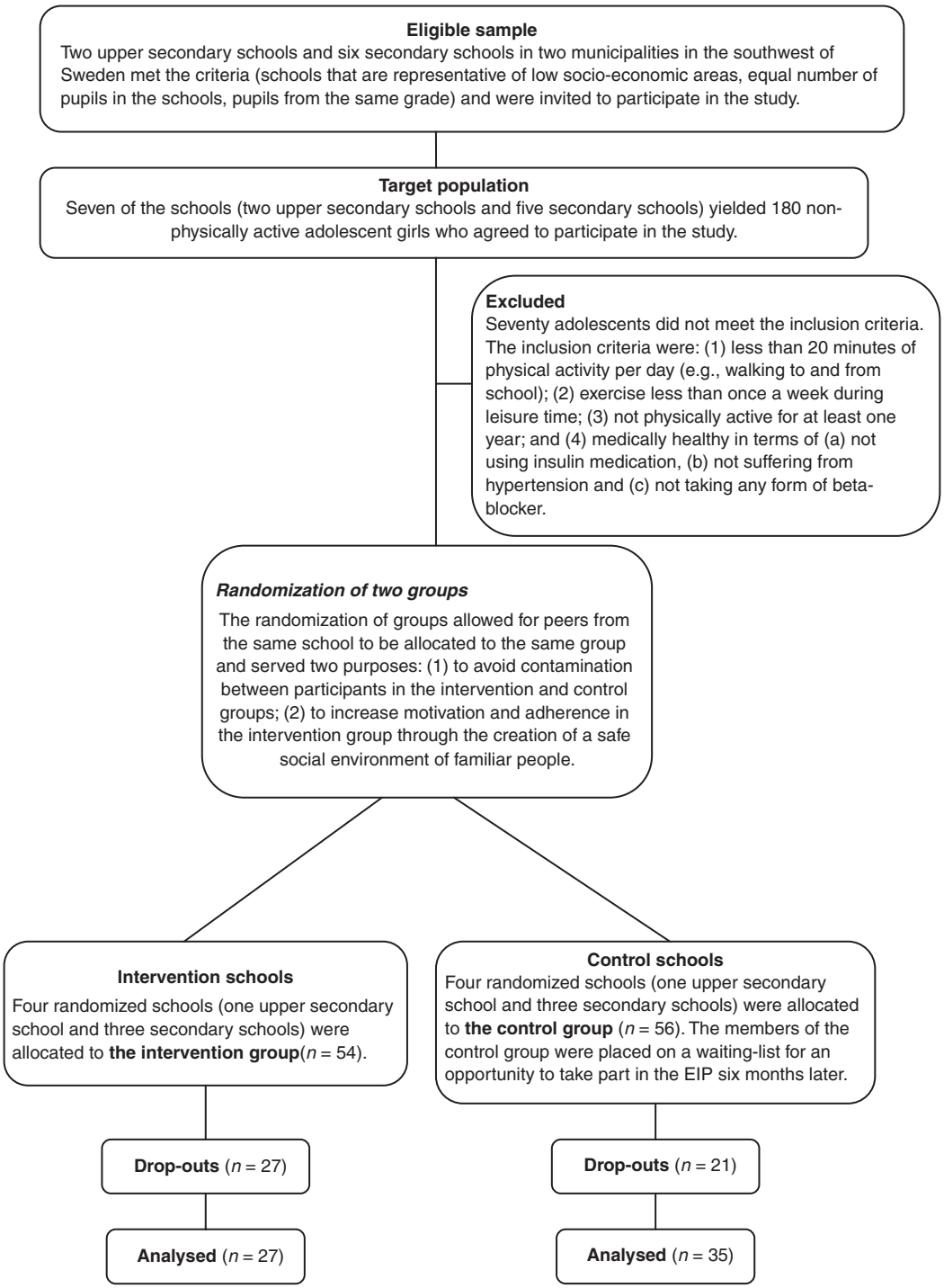

Figure 1. Participant study flow diagram

Table 1. Items and scales used to measure the effect of the EIP, the construct validity and internal consistency reliability. Tests were conducted by means of explorative factor analysis and Cronbach's alpha

Scale	Subscale	Description	Source	Range (No. of items)	Cronbach's alpha
GSES		The questions are intended to provide a general overview of personal competence and the ability to perform in a variety of stressful situations. For example, 'Thanks to my resourcefulness, I know how to handle unforeseen situations'.	Existing scale[24]	10	0.89
SSBESQ			Constructed	10	0.91
	Support barriers	Questions are intended to assess exercise barriers to self-efficacy or the degree to which one believes she possessed the ability to overcome barriers of support to participating in exercise. 'I dare exercise even if …' 1) I don't have an exercise leader that can show/teach me how to do the exercise 2) I don't have an supporting exercise leader 3) I don't get help from someone else		3	0.85
	Social barriers	Questions intended to assess exercise barriers self-efficacy or the degree one believes she possessed the ability to overcome social barriers to exercise participation. 'I dare exercise even if …' 1) I don't see that anyone else can do it 2) I don't have a friend with me 3) I must go exercise by myself 4) I make a mistake sometimes 5) I am not accustomed to exercise 6) I could not cope with everything at once (e.g. take the right step aerobics) 7) Someone laughs at me		7	0.90

The instrument used a 6-point Likert scale and response choices ranged from 1 'not true' to 6 'absolutely true'. The Swedish version of the 10-item General Self-Efficacy Scale (GSES), developed by Koskinen-Hagman, Schwartzer and Jerusalem[29], was added. The original version of the instrument used a 4-point Likert scale, but a pilot test demonstrated that the 4-point scale was too limited to detect variations in participants' responses. Hence, the scale was extended to a 6-point Likert scale (Table 1).

Statistical procedure and analysis

Descriptive statistics were used to describe the characteristics and distribution of variables. For statistical evaluation, non-parametric tests were used via the ordinal scale. Specifically, the Mann-Whitney U-test was used for comparisons between the groups at baseline and after the intervention; and the Wilcoxon's matched-pairs signed-rank test was employed for comparisons within groups. The significance level was set at 0.05.

Results

Baseline data

Of the 110 participants, 62 (57 per cent) completed both the pre- and post test questionnaires. The average age was 15.3 years (SD = 1.9) in the intervention group and 15.5 years (SD = 1.1) in the control group. The analysis revealed no significant differences between groups with respect to age, BMI, physical fitness level, parents' educational level, type and location of residence (area of apartment blocks or private houses), parents' exercise habits, previous membership and participation in sports clubs, previous exercise experience and GSES or SSBESQ scores at baseline. Moreover, no pre-test differences in any of the GSES or SSBESQ variables were found between drop-outs and participants who completed the intervention. The majority of participants (70 per cent) reported previous participation in a sports club, and 45 per cent had a history of regular exercise. Most participants gave several reasons as to why they wanted to start exercising; 65 per cent indicated that they wanted to 'get into shape', 17 per cent wanted to 'feel good', 15 per cent wanted to 'get a stronger body', 14 per cent wanted to obtain 'a more beautiful body' and 14 per cent wanted to 'lose weight'.

Analysis between groups

After the intervention, the analysis showed a statistically-significant difference between the groups for the GSES score ($p = 0.037$) (Table 2). However, the SSBESQ score, BMI and physical fitness level had not changed significantly after the intervention.

Within-group analysis

Pre- and post-comparisons of GSES and SSBESQ scores within each group were performed (Table 3). We found that members of the intervention group had increased their general perceived self-efficacy ($p = 0.004$), while that of the control group had not changed. None of the group members changed their perceived confidence to cope with barriers to participating in exercise. Both groups increased their physical fitness levels (intervention, $p = 0.06$ and control, $p = 0.013$). The BMI in the intervention group was maintained and BMI was increased in the control group ($p = 0.031$).

Table 2. Differences in general self-efficacy (GSES), specific self-efficacy (SSBESQ), BMI and physical fitness level *between* participants in the intervention (IG) and control groups (CG)

	n	IG	*n*	CG	*p*-value	*n*	IG	*n*	CG	*p*-value
		median (IQR)		median (IQR)			median (IQR)		median (IQR)	
GSES	55	32.0 (11.0–54.0)	53	32.0 (14.0–47.0)	0.309	27	28.0 (15.0–48.0)	36	35.0 (16.0–48.00)	0.037
SSBESQ										
Support	56	9.0 (3.0–18.0)	54	8.0 (3.0–16.0)	0.134	27	8.0 (3.0–17.0)	36	7.0 (3.0–18.0)	0.391
Social	56	22.0 (7.0–35.0)	54	18.5 (7.0–37.0)	0.114	27	19.0 (7.0–36.0)	36	19.0 (8.0–31.0)	0.564
BMI	56	22.3 (13.8–39.0)	54	22.2 (18.3–34.5)	0.582	27	21.9 (14.3–37.2)	35	23.2 (16.1–32.0)	0.696
Physical fitness[a]	55	37.0 (20.0–67.0)	53	38.0 (17.0–52.0)	0.481	27	38.0 (19.0–86.0)	32	42.0 (22.0–69.0)	0.675

Mann-Whitney U-test was used for comparison between IG and CG. A lower score indicates a higher perceived GSES and SSBES Q. A higher score indicates a higher BMI and physical fitness level.

[a]Submaximal oxygen uptake test score.

Table 3. General self-efficacy (GSES), specific self-efficacy (SSBESQ), BMI and physical fitness: Comparisons *within* the intervention (IG) and control groups (CG)

	N	Improvement *(n)*	Impairment *(n)*	Ties *(n)*	*p*-value
IG					
GSES1-GSES2	27	21	5	1	0.004
SSBESQ1-SSBESQ2					
Support	27	16	9	2	0.570
Social	27	17	10	0	0.168
BMI	27	16	10	1	0.551
Physical fitness	27	19	6	2	0.006
CG					
GSES1-GSES2	35	16	16	3	0.793
SSBESQ1-SSBESQ2					
Support	36	18	13	5	0.608
Social	36	18	15	3	0.168
BMI	35	10	25	0	0.031
Physical fitness[a]	32	21	10	1	0.013

Wilcoxon's matched-pairs signed-ranks test was used for comparison within the IG and CG.
[a]Sub-maximal oxygen uptake test score.

Discussion

Result issues

The main finding of this study was that engaging in the EIP had a statistically-significant effect on general perceived self-efficacy on the intervention group. There was no change in the control group. These results indicate that the adolescent girls gained the following after the EIP: a greater degree of belief in their ability to tackle novel tasks and cope with adversity in a broad range of stressful or challenging encounters across various domains of functioning[24]. They also learned to set higher goals and stay focused on reaching them[24]. This result may be important with respect to their success in continuing to be physically active, but it may also have relevance for other areas in life in which they wish to cope better. This result can also be regarded as an empowerment outcome because it applies to the adolescent girls' development of control and mastery over various domains[21]. Studies from several countries[30] have found a significant correlation between general perceived self-efficacy and the positive effect of life satisfaction, in particular among Norwegian adolescents[31], who do not differ culturally from Swedish adolescents. The increased level of general perceived self-efficacy detected among the participants in this study may also have served to increase their life satisfaction. However, it is difficult to state with certainty what contributed to the participants' higher degree of general perceived self-efficacy. One explanation is found in the components of the EIP that aimed to strengthen the girls' confidence to be physically active, such as the mastery experience, modelling mastery, verbal persuasion and the physiological states. Another possibility is that their work in the development stage of the EIP contributed to increased awareness about the participants' own interests and needs regarding exercise. Nonetheless, the possibility that factors other than the EIP influenced the results should also be considered.

Based on the theory of perceived self-efficacy[23], we assumed that the intervention group would perceive more confidence to cope with barriers to participating in exercise; however, none of the groups increased their perceived confidence to cope with barriers to participating in exercise. This

result is somewhat similar to that determined in other studies that failed to identify significant changes in perceived self-efficacy after an exercise intervention[18,19]. One possible explanation is that the EIP design was not optimal in terms of enabling the participants to perceive trust in engaging in exercise despite barriers. Additionally, the barriers examined in this study may have resulted in different outcomes if the questions were formulated as follows: 'I am able to exercise despite…' rather than 'I dare to exercise despite…'.

Participants in both groups increased their physical fitness levels, and we can assume that the control group was influenced to some degree by the physiological testing procedure and thus were encouraged to start exercising without further intervention. BMI remained unchanged in the intervention group, whereas BMI increased in the control group. One possibility is that discussion sessions that addressed healthy dietary during the EIP encouraged healthier eating behaviour in the intervention group. However, we saw no differences in BMI between the groups after the EIP.

In conclusion, the results of our study show that the EIP had an impact on adolescent girls' general perceived self-efficacy. This particular result can be considered as an empowering effect because participants reported an increased, stable sense of personal ability to deal effectively with a variety of stressful situations in general. Other effects of the EIP were the significant changes within the intervention group in terms of physical fitness level. The BMI in the intervention group was stable, in contrast to that in the control group, which increased. However, the EIP did not impact adolescent girls' perceptions of their confidence to cope with barriers to participating in exercise. Therefore, further studies are needed that focus on non-physically active girls' personal experiences. Such studies could acquire deeper knowledge of what aspects of an exercise programme lead to helping one to overcome barriers and adhere to regular exercise. Another important element to explore with respect to non-physically active girls' personal experiences is to acquire a better understanding of general perceived self-efficacy in relation to exercise.

Methodological issues

Our investigation has both strengths and limitations. The strengths include the use of a randomized research design. This design provides more reliable scientific evidence about exercise because it attempts to eliminate false causality and bias. Conversely, it should be noted that exercise contexts are difficult to manipulate[32]. The present study used a volunteer sample drawn from lower socioeconomic areas and may not be representative of non-physically active adolescent girls in general. Additionally, people who intend to start exercising are more willing to adopt a new behaviour and reject risky behaviour to a greater extent than those who do not have those intentions[33]. The girls who remained in the programme may have been more motivated and determined to exercise compared to those who dropped out. The high drop-out rate is clearly a limitation of the study because a reduced number of participants can result in skewed results. Nonetheless, analysis of the drop-outs revealed no pre-test differences between the drop-outs and the participants who remained at the post-test. The low number of participants who completed the programme may result in problems with the power of the study. An analysis of the most common reason for dropping out of the study was that friends also dropped out.

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