

Participation in Physical Activity Contributes to Adolescents' Physical Activity Attitudes and Quality of Life Related to Their Body Image

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Abstract

Physical activity (PA) habit decreases and Body Image (BI) becomes important during adolescence. This paper focuses on determining two things: whether the level of participation in PA contributes to adolescents' PA attitudes and their quality of life-related body image and to examine whether there is a difference. The study utilized the cross-sectional design. 1281 individuals in the middle adolescence period participated in the study. Participants were between 15 and 17 years. International Physical Activity Questionnaire Short Form (IPAQ-SF), Cognitive Behavioral Physical Activity Questionnaire (CBPAQ), and Body Image Quality of Life Inventory (BIQLI) were used as data collection tools. According to the study findings, there were significant differences in the BIQLI total, interaction with the opposite sex, and influence behavior/attitude between those who engaged in regular or irregular PA and those who did not engage in PA at all. Difference in the effect on self-efficacy and daily life sub-dimension was found between those who engaged in regular PA and those who did not. Outcome expectation and self-regulation items of those who engaged in PA were higher than for those who did not. Since adolescents are expected to engage in regular or irregular PA, personal barriers in front of them must be removed. It is therefore important to support their attitudes, which positively affects their PA, because participation in PA contributes positively to their PA and BI-related quality of life.

Keywords: Adolescence, Physical Activity, Body Image, Quality of Life

Introduction

Physical activity (PA) is the basic determinant of physical, physiological, mental, and social health in adolescence (Aubert et al., 2018). Although the World Health Organization (WHO) recommends moderate physical activity for adolescents, which means at least 60 minutes per day to prevent chronic diseases such as cardiovascular diseases and obesity (WHO, 2010; 2018), 75-81% of adolescents aged 11-17 do not follow this recommendation (Herting & Chu, 2017; Seidu et al., 2020; Guthold, Stevens, Riley, & Bull, 2020). PA participation levels decline from childhood (9 years old) to middle adolescence, while sharper declines are observed by the age of 15 (Cairney, Veldhuizen, Kwan, Hay, & Faught, 2014; Bacil et al., 2015). In the middle adolescence period between the ages of 15-17, the level of PA decreases and at the age of 16-17 they become individuals with low PA levels (Chen, Haase, & Fox, 2007; Duarte et al., 2020). The reason for

this decline may be that the individual tries to get used to his/her changing body and seeks a personality that covers his body (Şahin & Çöven-Özçelik, 2016). This is because adolescents give great importance to body image (BI) during this period (Singh, Mahato, Singh, Thapa, & Gartland, 2019) and BI affects their quality of life (Christie & Viner, 2005).

BI is a multi-factorial structure that includes the perceptual dimension (how he/she sees himself/herself), the emotional dimension (the way he/she feels), the cognitive dimension (the thought of body view), and the behavioral dimension (emotion-based behaviors) (Gardner, 2011; Voelker, Reel, & Greenleaf, 2015). When body dissatisfaction occurs, people become depressed (Stice, 2002), and depression leads to social isolation (Tran et al., 2019). Thus, it is important to identify factors that may affect BI of adolescents (Pelegrini et al., 2014; Singh, Mahato, Singh, Thapa, & Gartland, 2019) whose concern about it is increased. PA is one of the factors that influence BI. Although BI is reported to be affected by physical inactivity (Harriger & Thompson, 2012), BI dissatisfaction of the individuals who engage in PA (Gibson et al., 2019) led to this confusion. Therefore, physical inactivity increases in middle adolescence but regular PA can be an important predictor of health in many ways (Rica, Bocalini, Miranda, Valenti, & Gama, 2018). Even during this period, the level of PA can regulate the perception of quality of life associated with BI and this can change PA behavior in the following years.

It becomes a little more complicated when BI is considered in terms of regular PA behavior because the concept of physical excellence of those who do regular PA can change due to the need for success. BI perception of the athletes who try to reach their ideal BI may be impaired and it may lead to disorder in the quality of life (Kristjánsdóttir, Sigurðardóttir, Jónsdóttir, Þorsteinsdóttir, & Saavedra, 2019). The body needed to achieve good performance, especially in a particular sports branch, may not match the aesthetic standard of society. This can pave the way for an athlete's dissatisfaction with BI (Goltz, Stenzel, & Schneider, 2013). Although athletes express their BI dissatisfaction under pressure (Kristjánsdóttir, Sigurðardóttir, Jónsdóttir, Þorsteinsdóttir, & Saavedra, 2019), it can change even in a single season (Neves et al., 2017). According to their control periods, athletes report less BI dissatisfaction (Karrer et al., 2020). Thus, this indicates that the perception of BI may vary according to the conditions studied among those who engage in regular PA.

As seen in the different results of the studies, the relationship between PA and BI is complex. Many studies have focused on the positive results of PA associated with BI (Laudańska-Krzemińska, Krzysztosek, Naczka, & Gajewska, 2020) and how PA-based interventions could improve BI (Martínez-Sánchez, Martínez-García, Martínez-García, & Munguía-Izquierdo, 2020). Although some of the researches have focused on the positive relationship between BI and PA in men and women, the role of gender has remained unclear (Slater & Tiggemann, 2011). While one study found a high effect in favor of women (Hausenblas & Fallon 2006), another study did not reveal the same result (Sundgot-Borgen et al., 2021). Since these different results are associated with PA or BI-related cases, the mechanisms of cross-gender differentiation are still not fully decipherable.

The World Health Organization (WHO) reports that by 2030, the level of physical inactivity should be reduced by 15%. This can be achieved by making adolescents gain the habit of engaging in PA (Bull et al., 2020). For this reason, PA attitudes must be known. It is also important to know whether the level of PA affects the quality of life associated with BI. This is because BI is an important determinant of the continuation of PA in the adolescence period rather than skill (Foley Davelaar, 2021). Overtime, differences have been observed in terms of BI-related quality of life between each PA types and between those who engage in PA and those who do not. Nonetheless,

further research is still needed due to the different results in the literature. In studies where men and women are evaluated together, men are considered to be more physically active. However, including different aspects to the gender factor (Cognitive-Affective-Behavioral) so as to evaluate the differences between PA and BI can provide a better understanding. In addition, the study includes the level of PA as a new variable. Hence, the objective of this study is two folds: to determine whether the level of PA participation contributes to the PA attitudes of adolescents and their BI related quality of life and to examine whether there is a difference between the genders.

Method

Ethics and Research Design

A cross-sectional design was conducted for the research. The dependent variable of the research was the score from the scales. Purposeful sampling technique was used for sampling. Equal/similar age (15-17 years), gender, education, and PA levels in adolescence period were taken into consideration for purposeful sampling. Since it may change, BI or PA perceptions of those whose body mass indexes (BMI) were accepted as normal (between 20.0 and 22.9) were included in the study. Participants and their families were informed about the purposes and procedures of the research before the data were collected. The participants were informed that participation in the study was based on voluntary principle and they could leave it at any time. Consent forms stating that they were volunteers were signed. Those who had chronic health problems and took medications that would prevent them from doing physical activity were not included in the study. Ethics Committee permission was obtained from Uşak University (06.05.2021 date and 2021-94 decision). The study was conducted in accordance with the Declaration of Helsinki.

Study Group

The study included 1281 individuals between the ages of 15 and 17 in the middle adolescence period. Among the individuals who participated in the study, 45.7% (586) were females and 54.3% (695) were males. 441 people (32.2%) were 15 years old, 400 people (33.4%) were 16, and 440 people (34.4%) were 17. Some participants who engage in PA under the control of a coach and also participate in sports, such as basketball, football, volleyball, handball, tennis, and cycling, where physical appearance does not matter were included in the study. Participants from sports, such as fitness, gymnastics, ballet, and dance, where physical appearance is important were not included in the study. Irregular PA participants were individuals who tried to perform indoor or outdoor sports, such as spinning, squash, pilates, cardio, and hiking, under the supervision of a coach. However, they did not participate regularly. None of the participants had previously been on a weight loss diet. Just before scale applications, weight measurements were performed with the Jawon Make body composition analyser (Model IOI-353) with 0.1 accuracy on bare feet when they had light clothing on them. Height measurement was also taken with a portable stadiometer (Seca Corporation, USA) which had 0.1 cm accuracy. BMI was calculated by dividing weight by height (kg/m^2). Trained expert surveyors applied the scales. In order to ensure participants' focus and privacy, scales were applied in groups of 25-30 people in a large room. Participants were encouraged to write down their thoughts and they were informed that the measurement results were confidential. They were also told that they could leave the study when they wanted at any stage of the study.

Scales and Application

International Physical Activity Questionnaire Short Form (IPAQ-SF)

In order to determine the levels of PA, IPAQ-SF which was developed by Craig et al. (2003) was used. It is a valid method used in many regions of the world (Aibar, García-González, Abarca-Sos, Murillo, & Zaragoza, 2016; Gallardo, Abarca-Sos, & Doña, 2020) and was adopted into Turkish culture by Sağlam et al. (2005). Calculation was made depending on the fact that each activity in IPAQ-SF required at least 10 minutes. After determining the day and minute curves, the MET value (as score) was found by multiplying the result. According to MET score, classification was recorded as very active (>3000 METmin/week), minimal active (600-3000), and inactive (<600) (Craig et al., 2003). In addition, the results were compared with the U.S. Department of Health Services' age-specific PA recommendations and it was examined whether they were compatible or not (Physical Activity Guidelines Advisory, 2021). Those who could not meet the criteria were not included in the study. According to the data, 435 people were categorized as regular PA (very active), 401 were grouped as irregular PA (minimally active), and 445 were classified as non-PA (inactive). Cronbach α internal consistency value of IPAQ-SF was tested at the end of the study and its reliability was found to be good ($\alpha=0.781$).

Physical Activity Attitude

Cognitive Behavioral Physical Activity Questionnaire (CBPAQ) was developed by Schembre et al. (2015) for the individuals at the age of 13-17. It was adopted into Turkish culture by Eskiler et al. (2016). The scale identifies the social and cognitive aspects of PA. It consists of 15 items and 3 subsamples. Scale identifies the loadings depending on participation to PA as "Outcome Expectations" (Positive, Negative). Also, how adolescents adopt PA into their life was identified as "Self-Regulation" (Self-Management, Goal Setting, Planning, Contingency Management), while adolescents' real reasons of being constrained in participation to PA was categorized as "Barriers" (Lack of Social Support, Lack of Motivation, Lack of Self-Confidence, Lack of Time, Environmental Constraints, Insufficient Capabilities). A five-point Likert scale was used with points from 1 ("low") to 5 ("high"). Each subscale score was calculated by averaging the raw scores of 5 items. The internal consistency coefficient of the scale is $\alpha=.84$. The reliability of the scale that was applied (CBPAQ) was tested. Cronbach α internal consistency value was found sufficient for this age group ($\alpha=.782$).

Body Image Quality of Life Inventory (BIQLI)

The BIQLI was developed by Cash and Fleming (2002), and it was adopted into Turkish culture by Demiralp et al. (2015). BIQLI measures the positive and negative aspects of the psychosocial areas of BI on a person's quality of life (Cash, Jakatdar, & Williams, 2004). There are 19 items and 4 subsamples in Turkish version. It is a valid and reliable measuring tool used in many languages and cultures (da Silva, 2020). Subsamples of the scale were "Effect on Self-value", "Effect on Daily Life", "Effect on Interaction with Opposite Sex" and "Effect on Behavior/Attitude". Each item was scored from +3 to -3. Positive scores from the scale indicate that body image affects the quality of life at a positive level, and negative scores affect it negatively. Internal consistency of the scale was very high ($\alpha=.95$). 2-3 weeks' test-retest reliability was 0.79. Cronbach α internal consistency of the study was measured as good ($\alpha=.882$).

Statistical Method

SPSS 21.0 was used to analyse the data. Descriptive statistics were given as number,

percentage, average, and standard deviation. Kolmogorov-Smirnov test was applied to examine whether the data showed normal distribution. A comparison of the average scale score with a normal distribution was made with independent t-test groups. For multiple comparisons, One Way Anova Test was used while Tukey HSD was used for the Post Hoc test. The statistical significance level was considered as $p < 0.05$.

Results

Table 1. Comparison of PA Attitude and BI Quality of life According to PA Level

	PA Levels	N	M	SD	F	P
Effect on self-value	RPA Group	435	12.10 ^A	7.14	6.797	0.001*
	IPA Group	401	11.29 ^{AB}	6.74		
	NPA Group	445	10.24 ^B	7.38		
Effect on daily life	RPA Group	435	7.65 ^A	5.95	4.412	0.012*
	IPA Group	401	7.16 ^{AB}	5.79		
	NPA Group	445	6.40 ^B	6.07		
Interaction with opposite sex	RPA Group	435	5.72 ^A	4.76	17.488	0.000*
	IPA Group	401	5.23 ^A	4.52		
	NPA Group	445	3.85 ^B	4.79		
Effect on behavior/attitude	RPA Group	435	4.20 ^A	4.30	22.760	0.000*
	IPA Group	401	3.67 ^A	3.97		
	NPA Group	445	2.27 ^B	4.44		

BIQLI Total	RPA Group	435	29.67 ^A	18.53		
	IPA Group	401	27.36 ^A	16.71	15.898	0.000*
	NPA Group	445	22.77 ^B	17.98		
Outcome expectations	RPA Group	435	3.75 ^A	0.99		
	IPA Group	401	3.54 ^A	1.00	13.965	0.000*
	NPA Group	445	3.38 ^B	0.94		
Self-regulation	RPA Group	435	3.31 ^A	0.86		
	IPA Group	401	3.18 ^A	0.82	48.156	0.000*
	NPA Group	445	2.76 ^B	0.85		
Personal Barriers	RPA Group	435	2.96 ^B	0.89		
	IPA Group	401	2.92 ^B	0.82	10.097	0.000*
	NPA Group	445	3.15 ^A	0.75		
CBPAQ Total	RPA Group	435	3.34 ^A	0.66		
	IPA Group	401	3.21 ^A	0.65	13.999	0.000*
	NPA Group	445	3.10 ^B	0.62		

* $P < 0.05$ means significant difference. **A, B:** Different letters in the same column indicate the difference between the groups. RPA: Regular Physical Activity, IPA: Irregular physical activity, NPA: Non-physical Activity.

There was no difference between regular PA group and irregular PA group in terms of BIQLI total, interaction with opposite sex, effect on behavior/attitude, CBPAQ total, outcome expectations, and self-regulation. However, there was significant difference between regular and irregular PA groups and non-physical activity group ($P < 0.05$). While there was no difference between regular physical activity group and irregular physical activity group in terms of effect on self-value and effect on daily life, statistically there was difference between regular PA group and irregular PA group ($P < 0.05$). Furthermore, there was difference between non-physical activity group, regular physical activity group, and irregular physical activity group in terms of personal barriers ($P < 0.05$; Table 1).

Table 2. Comparison of the Gender Variable Independent of Groups

	Gender	N	M	SD	T	p
Effect on the self-value	Female	586	11.02	7.27	-0.559	0.576
	Male	695	11.24	6.97		
Effect on daily life	Female	586	6.95	6.00	-0.444	0.657
	Male	695	7.09	5.91		
Interaction with opposite sex	Female	586	4.26	4.55	-4.343	0.000**
	Male	695	5.40	4.83		
Effect on behavior/attitude	Female	586	2.71	4.49	-4.744	0.000**
	Male	695	3.84	4.06		
BIQLI Total	Female	586	24.93	17.35	-2.657	0.008**
	Male	695	27.58	18.18		
Outcome expectations	Female	586	3.60	0.99	1.861	0.063
	Male	695	3.49	0.99		
Self-regulation	Female	586	2.99	0.83	-3.003	0.003**
	Male	695	3.14	0.90		
Barriers	Female	586	3.10	0.80	3.657	0.000**
	Male	695	2.93	0.83		
CBPAQ Total	Female	586	3.23	0.61	1.143	0.253
	Male	695	3.19	0.68		

* P<0.05 means significant difference.

All individuals involved in the study were compared by gender factor. Regardless of PA, females had more Personal Barriers (Lack of Social Support, Lack of Self-confidence, Lack of Time, Environmental constrains) than males in engaging in physical activity. Nevertheless, their level of self-regulation (Self-management, Goal Setting, Planning) was less than males (P<0.05). Scores of the male participants in terms of BIQLI total, effect on behavior/attitude, and interaction with opposite sex were higher than the females (P<0.05; Table 2).

Discussion

It is known that PA provides a healthy body function for adolescents (Alghadir, Gabr, & Iqbal, 2020) and affects their academic success (Barbosa et al., 2020). Apart from academic success, it is also related with cognitive skill. Interestingly, it is reported in studies that PA influences a number of targeted processes known as executive functions including planning and self-regulation (Herting & Nagel, 2012; Belcher et al., 2021). Thus, it is especially important for the consistency of the results of this study to show that high-intensity PA or regular participation in PA can support planning and goal setting (Herting & Chu 2017). In the world, most adolescents aged 11-17 do not engage in PA (Seidu et al., 2020; Guthold, Stevens, Riley, & Bull, 2020). In the study, personal barriers such as lack of social support, lack of motivation, and time were stressed as barriers to active participation in PA. When the study was analysed, it was observed that the results of social support were positively related to participating in PA and the level of PA (Robbins et al., 2018). Therefore, it is necessary to continue motivation to maintain and increase the level of PA (Demetriou et al., 2019). The fact that lack of time is the most common reason for not engaging in PA at least once a week (Pelletier, Shanmugasegaram, Patten, & Demers, 2017) support the

findings of this study. PA plays a key role in many aspects of children's emotional and physical well-being, both in the short and long term. Thus, creating and expanding motivating factors is vital for adolescents to continue PA (Yaffe, 2018). Families and friends have quite a significant social impact/support on the level of physical activity of adolescents (Cheng, Mendonça, Farias & Júnior, 2014). When they engage in PA, declines in their performance is observed easily. Pre-regulation which plays an important role in those declines should be taken into consideration (Dishman, McIver, Dowda, Saunders, & Pate, 2019). More so, social support to participate in PA should be provided (Draper, Grobler, Micklesfield, & Norris, 2015).

In the study, the level of PA in adolescents was regarded as an important factor that affects the quality of life associated with BI. In order to determine the relationship between regular PA participation and BI, Hausenblas and Downs (2001) noted in meta-analysis studies, where they included adolescents between 1975-2000, that adolescents who engaged in regular PA had a more positive BI than those who did not actively participate in PA. The fact that Kantanista et al. (2018) pointed out that athletes competing internationally had a more positive view of BI than those performing nationally confirms the results in this study. PA plays an important role in adolescents' perception of the body and self-esteem (Altıntaş et al., 2014). Finne, Bucksch, Lampert, and Kolip, (2011) stated in their study that BI dissatisfaction was associated with lack of PA among adolescents, while Daniel et al. (2014) stated that adolescents with less frequency and duration of PA had more BI anxiety. It was pointed out that large number of adolescents reported that BI was associated with lower frequency and fewer PA applications during the week. Knowles, Niven, Fawkner, and Henretty, (2009) found in their study that physical perceptions partially explained the variance in PA change and physical appearance was an important individual predictor of PA. When BI dissatisfaction was examined in terms of regular PA and irregular PA, the results were similar. The difference between elite and non-elite athletes are expressed as uncertain (Neves, 2016). Regular PA is associated with more experience, greater awareness of individuals' bodies, and a more positive BI. Regular PA can also protect adolescents from BI concerns (Varnes et al., 2013).

Studies that may contradict with the results in this study often involve sports that require aesthetics. The fact that those who are engaged in sports that require aesthetics have a lower BMI than those who are engaged in non-aesthetic sports can affect results. BMI is an important factor leading to negative BI development in athletes (Fernández-Bustos, Infantes-Paniagua, Gonzalez-Martí, & Contreras-Jordán 2019). Meyer, Weidmann and Grob, (2021) found a positive link between PA and life satisfaction, and they noted that perceptions of being weak or overweight changed the impact of PA on it. However, this research included a relatively homogeneous group in terms of BMI. Having a similar BMI between groups that engage in PA and those who do not engage in regular PA may have decimated the negative pressure that could occur on BI and provided a healthier result. A similar study on BMI found that athletes from aesthetic sports were not different from athletes who were recreationally active in terms of overall body dissatisfaction (Krentz & Warschburger, 2011). Therefore, the balanced study groups that have been created may be important in terms of making the impact of PA on BI more understandable, especially during adolescence when the percentage of body fat increases and the hips develop (Greydanus, Omar, & Pratt, 2010).

When regular PA participants were compared in terms of gender, there were no differences in terms of the impact of BI on overall quality of life and subsamples. It was noted in the study that regular PA was associated with positive BI results (Laudańska-Krzemińska, Krzyszczoszek, Naczka, & Gajewska, 2020). Regular PA levels were positively associated with mental health, especially

quality of life in adolescence, and decreasing possibility of psychological distress (Guddal et al., 2019). In the study, similar regular PA groups were included and negative situations (sports requiring BMI, weight, and aesthetics) that might affect BI were eliminated by revealing gender-specific norms. It was important since it indicated that regular PA decayed psychosocial differences between genders and equally affected BI related quality of life for both genders. The most interesting results in the study revealed that women with irregular PA and non-PA got lower scores in “behavior and attitudes” and “effect on interaction with the opposite sex” than men. The results can pave the way for gender-related studies. This is because BI-related studies of gender differences indicate that girls, especially in adolescence, are more affected by BI than boys (Slater & Tiggemann 2011; Bassett-Gunter, McEwan, & Kamarhie, 2017; Jalali-Farahani, Amiri, Zarani, & Azizi, 2021). Therefore, the results are in accordance with the findings because girls give priority to body form. On the other hand, physical functionality, strength, and proving themselves are important for boys (Meyer, Weidmann, & Grob, 2021; Jalali-Farahani, Amiri, Zarani, & Azizi, 2021). These results also show that adolescents' gender roles in society have positive or negative effects on BI. Regular PA can protect adolescents from anxieties of BI related quality of life with “outcome expectations” or “self-regulation” (self-management, setting goals).

In the study, it was found that personal barriers (Lack of Social Support, Environmental Constrains) were more common in adolescent girls who engaged or did not engage in PA than boys. These results were very consistent with the results of a very large-scale study (Wang, Hsieh, Hsueh, Liu, & Liao, 2019; Guthold, Stevens, Riley, & Bull, 2020). In all the countries compared in the study, girls had lower PA levels than boys did. The study also stated that inter-gender outcomes had not changed since 2001 (Guthold, Stevens, Riley, & Bull, 2020). One of the main reasons for the decrease in PA level or not engaging in PA is that an individual may think that he or she lacks skill (Marcus, Selby, Niaura, & Rossi, 1992). At the same time, PA level is low in girls with low self-efficacy. In addition, adolescent girls who maintain a high perception of social support experience less decline in PA. High self-efficacy can prevent decline in PA despite decreased social support. However, adolescent girls with high self-efficacy experienced more decline in PA when they perceived a decline in social support (Dishman, Saunders, Motl, Dowda, & Pate, 2009). Although perceived social support from family and friends may seem associated with PA among adolescent girls (Laird, Fawcner, Kelly, McNamee, & Niven, 2016), it is shown in the study that the cultural environment may have a stronger relationship with PA (Martins et al., 2021). The results emphasize that girls need more social support than boys to continue physical activities.

In addition, the study has some limitations, but it also has some strengths. One of its key strengths is the limited and close number of adolescent girls and boys. Factors that may affect internal validity were excluded as much as possible in order to limit the study. One of the limitations of the study is the cross-sectional study design, which does not allow causal connections to be established. In the study, factors affecting PA and BI related quality of life were evaluated with their own notifications. Nevertheless, this method is commonly used by researchers who rely on secondary sources of data. The most important feature of the study indicates that it is the first study that has focused on the level of PA. While other studies compare doers and non-doers of PA and sports types, regular PA and irregular PA was analysed. Elements that could affect each other in the gender factor were eliminated, but the number of genders in their own groups could not be balanced. Since the averages were compared, it was assumed that it had no effect on the results. Nonetheless, this difference must be kept in mind while evaluating the results.

Conclusion

According to the findings, there are significant differences in the BIQLI total, interaction with the opposite sex, and impact on behavior/attitude between those who engage in regular or irregular PA and those who do not engage in PA at all. A difference in the effect on self-efficacy and effect on daily life sub-dimension is found between those who participate in regular PA and those who do not. Outcome expectation and self-regulation items of those who participate in PA are higher than those who do not. Adolescents who do or do not engage in PA still have a number of personal barriers in front of them. Studies show that while the prevalence of inadequate PA has decreased slightly in boys since 2001, there has been no change over time in girls (Guthold, Stevens, Riley, & Bull, 2020). If these trends continue, it seems that the 15% decline that the WHO targets in PA inactivity by 2030 will be impossible. According to the results, it is clear that in order to increase the regular or irregular PA of adolescents slightly, outcome expectations and the requirements for self-regulation must be supported. This can increase the impact on the BI-related quality of life of adolescents who engage in regular or irregular PA. Thus, it is recommended that experts in their studies on PA level should keep the following in mind: research factors for overcoming social barriers, the effect of the cultural environment, and the impact of the physical and social environment on adolescent girls and boys.

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