

The relationship between physical fitness levels, motivation to participate in physical education and physical activity attitudes of middle school students

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Abstract. This study investigates the relationship between physical fitness levels, motivation to participate in physical education lessons, and physical activity attitudes in middle school students. A total of 106 middle school students with an average age of 12.02 ± 1.16 from Yalova province were included in the study. Physical fitness tests were performed on the participants, and they filled out the Physical Education Motivation Scale (PEMS) and the Physical Activity Attitude Scale for Children and Adolescents (PAASCA). Within the scope of the findings, significant differences were found in right and left flexibility, PEMS total score, intrinsic motivation sub-dimension score, and PAASCA total score according to gender ($p < 0.05$). In contrast, no significant differences were found in other variables ($p > 0.05$). No significant relationship was found between the physical fitness parameters of the participants and PAASCA scores and PEMS total and sub-dimension scores ($p > 0.05$). A significant relationship was found between the PAASCA scores of the participants and the PEMS sub-dimension scores. As a result, as the intrinsic and extrinsic motivation to participate in physical education classes increases, the physical activity attitudes of middle school students improve. The level of physical fitness does not affect the motivation to participate in physical education lessons and the attitude to participate in physical activity of middle school students.*

1 Introduction

Physical activity is a necessary action to develop and improve the health of individuals and to increase their quality of life and physical fitness [1]. In particular, regularising physical activity at an early age enables individuals to lead a healthy life in the long term [2]. The school years play an important role in shaping this process. It is believed that physical activity habits acquired in childhood continue into adulthood [3]. Indeed, there are studies in the

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literature that show that physical activity habits in childhood influence physical activity levels, health status, and quality of life in adulthood [4-7].

Physical education is used in schools to improve students' physical fitness and increase their levels of physical activity. The determining factors of this course include students' motivation to participate in the course and their attitudes toward physical activity [8]. Students' motivation towards physical education affects their participation in physical activity and their performance in the course [9] and this motivation can be influenced by internal and external factors [10]. In addition, physical activity attitudes are defined as the emotional and cognitive responses that individuals develop towards physical activity. This attitude is shaped by the individual's background, social environment, and individual perceptions [11]. Studies show that there is a relationship between middle school students' attitudes toward physical activity and their participation in physical education and physical fitness [12]. The content of physical education classes plays an important role in shaping attitudes towards physical activity [13]. Increasing motivation to participate in physical education can increase student participation and physical activity levels [14]. Positive attitudes towards physical activity can lead to improved academic outcomes. Therefore, these attitudes should be promoted through physical education programs in schools [15].

Considering that students' motivation to participate in physical education affects their physical development and lifelong physical activity participation habits, it is of great importance to identify children's attitudes and interests towards physical activity during this period and to correlate them with their physical fitness levels to promote participation in physical activity at an early age. In this context, this study aims to examine the relationship between middle school students' level of physical fitness, their motivation to participate in physical education, and their attitudes toward physical activity. The results of the study can guide both physical education teachers and educational policies. In this regard, important implications can be presented in terms of developing strategies to increase students' physical fitness levels, improving the quality of physical education, and changing students' attitudes towards physical activity positively.

2 Method

2.1 Participants

A total of 106 middle school students, 45 females, and 61 males, residing in Yalova province with a mean age of 12.02 ± 1.16 years were included in the study. Inclusion criteria included being a student enrolled in a middle school in Yalova, while exclusion criteria included having a musculoskeletal injury that would prevent physical activity in the past week and having undergone surgery that would prevent physical activity. Demographic information about the participants is shown in Table 1.

Table 1. Demographic information of the participants.

Variables	n	Min	Max	Mean	SD
Age (years)	106	10.00	14.00	12.03	1.16
Weight (kg)	106	25.60	89.20	48.97	12.70
Height (cm)	106	134.00	179.00	154.20	9.91

2.2 Procedure

Participants and their parents were asked to complete an informed consent form. The volunteers were then asked to complete the personal information form, the Physical Education Motivation Scale (PEMS), and the Physical Activity Attitude Scale for Children and Adolescents (PAASCA), and physical fitness tests were performed. The physical fitness tests included measurements of flexibility (right-left leg sit-reach test), sit-up test, and push-up test.

2.3 Data Collection Tools

2.3.1 Personal Information Form

This form asked for information about the participants' sex, weight, height, and age.

2.3.2 Physical Education Motivation Scale

The scale was developed by Sulz et al. [16] and adapted to the Turkish language by Akbulut and Öncü [17]. The Physical Education Motivation Scale consists of nine items and three factors, and all items are scored on a 5-point Likert type. It has internal factors, external factors, and lack of motivation sub-dimensions. This scale determined the students' motivation towards physical education.

2.3.3 Physical Activity Attitude Scale for Children and Adolescents

Physical Activity Attitude Scale for Children and Adolescents (PAASCA) was used to assess participants' attitudes towards physical activity. This scale was first developed by Simonton et al. [11] and its Turkish validity and reliability was conducted by Uyhan et al. [18]. The PAASCA is a 5-point Likert-type scale consisting of 12 items with response options ranging from 'definitely yes (5)' to 'definitely no (1)'. The PAASCA consists of 12 items in total.

2.4 Physical fitness test

2.4.1 Sit and reach test

This test measures lower back and hamstring flexibility using a box with a height of 30 cm and a ruler of 30 cm. The ruler is attached to the cardboard box so that the zero part of the ruler is towards the participant and the part that says 23 cm is at the starting level of the box. The participant reaches as far as he can with bare feet, one foot sole touching the bench at a 90-degree angle, the other knee is bent, and the foot is fixed on the ground, and waits for 1-2 seconds at the endpoint. The distance he reaches on the ruler is recorded in cm. Two measurements are taken, and the best score is recorded. It was applied separately for the right and left legs.

2.4.2 Sit-up test

The participants lay on their backs on the mat with their hips and knees flexed and their feet in contact with the ground. Then, the upper body is lifted symmetrically upwards with the hands flat and parallel to the ground throughout the movement. The test was performed at a tempo of 1 sit-up every 3 seconds. The test was terminated when a total of 75 sit-ups were reached or when the form of the movement was broken twice. The total number of sit-ups was recorded.

2.4.3 Push-up test

Participants were initially placed in a plank position. During the movement, the participant lowered his/her body until the elbows were flexed to 90 degrees and the shoulders were parallel to the ground. The movement was repeated with the back and legs straight throughout. The test was performed at a pace that allowed one push-up every 3 seconds. When the movement became too tiring to continue, when the push-up form was broken twice, when signs of pain and strain or a verbal warning were received, the measurement was terminated. The number of push-ups the participant did until exhaustion was recorded.

2.5 Statistical Analysis

Data analysis was performed using the IBM SPSS Statistics 25.0 program. Skewness and kurtosis values were used for the normality analysis of the obtained data, and since the kurtosis and skewness values were between (-1.5) and (+1.5), they provided the assumption of normality [19]. For this reason, parametric tests were preferred in the analysis of the data, and descriptive statistics, independent sample t-test, and Pearson correlation analysis were used.

3 Results

Table 2 shows that there is a significant difference in right and left flexibility, PEMS total score and intrinsic motivation sub-dimension, and PAASCA total dimension score according to gender ($p < 0.05$). In contrast, no significant difference was found in other variables ($p > 0.05$). While flexibility was found to be higher in girls, it was determined that PEMS total and intrinsic motivation sub-dimension scores, and PAASCA total scores were higher in boys.

Table 2. Comparison of physical fitness parameters, PEMS, and PAASCA scores by gender

Variables	Gender	n	Mean	SD	t	df	p
Right flexibility	Female	45	22.89	9.17	2.146	104	0.034*
	Male	61	19.36	7.72			
Left flexibility	Female	45	23.00	8.73	2.143	104	0.034*
	Male	61	19.54	7.82			
Sit-up test	Female	45	17.08	13.74	-0.956	104	0.341
	Male	61	19.97	16.49			
Push-up test	Female	45	13.52	13.57	-1.562	104	0.121
	Male	61	18.33	17.04			
PEMS- intrinsic motivation	Female	45	12.31	2.48	-2.260	104	0.026*
	Male	61	13.33	2.14			
PEMS- extrinsic motivation	Female	45	10.93	3.26	-1.660	83	0.101
	Male	61	11.92	2.66			
PEMS- lack of motivation	Female	45	4.96	2.36	0.856	104	0.394
	Male	61	4.52	2.70			
PEMS-total score	Female	45	28.13	4.55	-2.014	78	0.047*
	Male	61	29.75	3.38			
PAASCA-total score	Female	45	48.91	8.27	-2.821	104	0.006*
	Male	61	53.21	7.36			

Note: * $p < 0.05$

Table 3. The relationship between the participants' PEMS and PAASCA scores

Variables		PAASCA total scores		
		Female	Male	Total
PEMS total scores	r	0.151	0.049	0.151
	p	0.321	0.708	0.124
PEMS- intrinsic motivation	r	0.607****	0.271***	0.467***
	p	0.000*	0.035*	0.000*
PEMS- extrinsic motivation	r	0.141	0.292**	0.249**
	p	0.357	0.022*	0.010*
PEMS- lack of motivation	r	-0.536****	-0.444***	-0.482***
	p	0.000*	0.000*	0.000*

Note: *p<0.05, **low correlation, *** medium correlation, **** high correlation

In Table 3, there was a positive correlation between the participants' PAASCA total score and PEMS intrinsic and extrinsic motivation sub-dimension scores and a negative correlation between the PAASCA total score and PEMS lack of motivation sub-dimension scores (p<0.05). In Table 4, no significant relationship was found between the physical fitness parameters of the participants and the total and sub-dimension scores of PAASCA and PEMS (p>0.05).

Table 4. Relationship between the participants' physical fitness parameters, PEMS, and PAASCA scores

Groups	Variables		Right flexibility	Left flexibility	Sit-up test	Push-up test
Female	PEMS- intrinsic motivation	r	0.219	0.212	0.061	0.197
		p	0.147	0.163	0.691	0.194
	PEMS- extrinsic motivation	r	0.069	0.081	0.100	0.088
		p	0.654	0.598	0.511	0.564
	PEMS- lack of motivation	r	-0.215	-0.183	-0.082	0.001
		p	0.156	0.229	0.591	0.994
	PEMS-total score	r	0.058	0.081	0.062	0.170
		p	0.706	0.595	0.684	0.263
	PAASCA-total score	r	-0.059	-0.020	0.139	0.054
		p	0.700	0.897	0.361	0.722
Male	PEMS- intrinsic motivation	r	-0.001	-0.010	-0.109	0.023
		p	0.995	0.940	0.404	0.862
	PEMS- extrinsic motivation	r	-0.010	-0.032	-0.197	-0.024
		p	0.941	0.805	0.129	0.852
	PEMS- lack of motivation	r	-0.008	-0.009	-0.001	-0.043
		p	0.952	0.946	0.996	0.742
	PEMS-total score	r	-0.008	-0.033	-0.220	-0.039
		p	0.952	0.802	0.089	0.768
	PAASCA-total score	r	0.060	0.069	0.032	0.149
		p	0.648	0.595	0.808	0.252
Total	PEMS- intrinsic motivation	r	0.060	0.049	-0.017	0.121
		p	0.540	0.619	0.864	0.216
	PEMS- extrinsic motivation	r	-0.004	-0.011	-0.052	0.047
		p	0.964	0.914	0.600	0.636
	PEMS- lack of motivation	r	-0.077	-0.062	-0.037	-0.040
		p	0.434	0.529	0.709	0.682
	PEMS-total score	r	-0.015	-0.016	-0.069	0.081
		p	0.877	0.873	0.484	0.412

	PAASCA-total score	r	-0.054	-0.030	0.097	0.145
		p	0.583	0.763	0.324	0.138

4 Discussion and Conclusion

This study investigated the relationship between middle school students' motivation to participate in physical education classes, their attitudes toward physical activity, and their physical fitness levels.

Studies have found that physical activity improves physical fitness [2, 20]. However, in the current study, no relationship was found between physical fitness parameters and motivation to participate in physical education and attitudes toward physical activity. When examined, this finding shows that middle school children do not have prejudices against participating in physical activity and that they can maintain the activity in their lives when directed towards physical activity. This situation suggests that health problems caused by sedentary lifestyles can be prevented through plans and policies designed to encourage children of this age to participate in physical activity. In this direction, directing children to physical activity and providing equal opportunities can increase the level of participation in physical activity among children. In particular, it is necessary to create interesting physical education curricula that encourage physical activity so that participation in physical activity is continuous [21].

When investigating whether physical fitness levels, motivation to participate in physical education, and attitudes towards physical activity among middle school students vary by gender, it is found that female students' flexibility levels are higher than those of male students. A similar result was found in the study conducted by Golle et al. [22]. It was found that male students' motivation for physical education and attitude toward physical activity were higher than female students. This result shows that more efforts should be made to motivate girls to participate in physical education to have a positive effect on their physical activity levels in later life. Bailey [23] describes physical education and sports as pioneers in the development of future lifestyles and participation in sporting activities. In light of this, it is necessary to prepare PE curricula at a level that can guide the gender participation of pupils in an equitable direction. In this way, steps can be taken to prevent health problems such as obesity, which can occur in women as a result of a lack of physical activity.

Another finding of the current study is that intrinsic and extrinsic motivation to participate in physical education is related to attitudes toward physical activity. This relationship is particularly strong for female students. In addition, a lack of motivation to participate in physical education reduces students' attitudes toward participating in physical activity. There are studies in the literature that show similar results [24]. This finding indicates that middle school students, especially female students, need to be motivated to participate in physical education classes to develop positive attitudes towards physical activity and increase their physical activity levels.

This study examines the relationships between middle school students' physical fitness, motivation to participate in physical education, and attitudes toward physical activity. The results show that gender differences have significant effects on these variables. In particular, tailored approaches need to be developed to increase girls' motivation to participate in physical education and to strengthen their attitudes towards physical activity. This study emphasizes that the physical education curriculum should be equally and effectively designed for both sexes and that it is particularly important to encourage girls to take part in physical activity. It is therefore important for schools and education policies to take these findings into account and make arrangements to provide equal opportunities for each pupil to encourage physical activity and prevent health problems. In this way, the physical and mental health of

middle school students can be supported, and a healthy lifestyle can be promoted in society as a whole.

Acknowledgments

All authors have an equal contribution to the publication. The authors have read and agreed to the published version of the manuscript. The authors declare no conflicts of interest.

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