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The Level of Physical Activity of Female Junior High School Students in Mazandaran, Iran, in 2017 and Its Relationship with Socioeconomic Status

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ABSTRACT

Introduction: Participating in regular physical activity has positive effects on the health and behavior of adolescents. Physical activity is multifaceted and has both interrelated psychological, biological and environmental effects. Therefore, this study was conducted to determine the level of physical activity of female students and its relationship with their socioeconomic status.

Methods: 630 junior high school students in Mazandaran were selected based on randomized multistage cluster sampling in the year 2017. The tools used for collecting data were pedometers, and demographic and Ghodratnama socioeconomic status questionnaires. Data analysis was done using $SPSS_{23}$ software with descriptive and inferential statistics (the Kolmogorov-Smirnov test, the one-way analysis of variance [ANOVA], and the Pearson correlation coefficient) at a significance level of $P \leq 0.05$.

Results: The results showed that the level of physical activity of students decreased as grade level increased. An ANOVA showed a significant difference between the level of physical activity of students in 7-9 grades, but Tukey's post hoc test showed a significant difference between the level of physical activity of 7th grade students with 8th and 9th, while the difference between the students of grades 8 and 9 was not significant statistically. Out of all students, 30.72% of students were active and 69.28% inactive. The Pearson correlation coefficient showed that there was no significant relationship between socioeconomic status and level of physical activity.

Conclusion: A vast majority of adolescent girls do not do the amount of physical activity recommended for good health, which is a worrying issue. It is suggested that relevant authorities mobilize basic strategies for changing the lifestyles of adolescent girls, including the development of a comprehensive program of physical activity by specialists.

Key words: Physical Activity, Adolescence, Socioeconomic Status

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Introduction

Regular engagement in physical activity is a prerequisite for healthy physical and psychological development [1]. Regular moderate to vigorous physical activity decreases the risk of multiple diseases and psychological disorders. Individuals should be encouraged from childhood and adolescence to be and remain active to obtain these health benefits. It's better to get benefits of physical activity; individuals should be encouraged to be active from an early age. The possible patterns of physical activity established in childhood and adolescence may continue in adulthood [2].

Physical activity "is any bodily movement produced by the skeletal muscle that results in energy expenditure" [3]. The American College of Sports Medicine (ACSM) offers 60 minutes of moderate to vigorous physical activity, resistance exercise, and bone-intensive activities at least three days a week for children and adolescents [4]. According to Riddoch et al.(2007), most children do not do enough activity according to the recommended levels for health, although boys tend to be more active than girls [5]. Further, Cairney et al. (2014) found that the participation in physical activity from late childhood to the early adolescence decreases more in girls than boys [6]. Klishadi et al. (2001) examined the pattern of physical activity of adolescents in Isfahan and showed that the duration and amount of physical activity of both sexes in high school was significantly less than that of the junior high school [7]. Although all studies cited in this paper have established that physical activity decreases with age, the estimated physical activity from different sources is not always comparable due to methodological differences such as different measurement methods and analyses. For example, using objective tools such as a pedometer and accelerometer provides more accurate information than devices that measure psychological realities (such as the questionnaire) [8].

Socioeconomic status (SES) also plays a significant role in their health-related behaviors. In health research, this variable is considered a contextual variable [9]. Children with high SES seem to be on average taller, heavier, and fatter than those with a low SES condition. However, in developed countries, especially in adolescence late, girls with low SES families are, on average, fatter than girls with high SES [10].

While the relationship between physical activity and socioeconomic status is evident in adults, it is controversial in adolescents [11]. Researchers such as Drenowatz et al. (2010) concluded that children with low SES had lower levels of physical activity and had more time in inactive behavior [12], Shi et al. (2006) found that girls adolescents with the low SES have the highest physical activity [13], and the results of Aghaalinezhad et al. (2005) showed that there is no relationship between SES and adolescent physical activity [14]. Given the limited information available with regard to physical activity of adolescents, especially when physical activity is measured by objective tools, as well as the contradiction in results of the relationship between physical activity and socioeconomic status, this study is to investigate the level of physical activity in adolescent girls and compare them with each other and with standard values, and then be examined in relation to socioeconomic status.

Methods

This research was a cross-sectional design with a survey and correlation strategy. The statistical population consisted of female junior high school students (grade 7–9) of state schools of Mazandaran province in the year 2017. Out of this population, 630 students were selected (using a Morgan table) with randomized multi-stage cluster sampling, following these steps: First, Mazandaran province was divided into three parts: western, central and eastern (based on education divisions of the province) and from each section, 3 cities were randomly selected. In the next step, a list of all female junior high schools was obtained and schools were selected randomly in each statistical zone. At the end, from each school a class of the first to third grades was selected randomly (i.e.

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grade 7–9). In the other word, 30 clusters consisting of 21 students were selected in which every school classes were considered as a cluster and all students in that class entered the study. The following tools were used to collect data:

Demographic questionnaire: A tool for asking questions about personal characteristics such as birth date, grade, height, weight, and body mass index. Height and weight were measured using a portable stadiometer (Seca 213) with a precision of 1mm and a weight scale (Seca robusta 813) with a precision of 0.01kg. Body mass index (BMI) was also calculated by formula: [weight (kg)/ height (m^2)].

Socioeconomic status questionnaire: A Ghodratnama questionnaire that included 4 components (family income, economic level, house situation and education) and 5 main questions. Eslami et al. confirmed the formal and content validity of the questionnaire by 12 experts, and the reliability of the questionnaire was 0.83 using Cronbach's alpha. The questionnaire was completed with the help of parents and school staff [15].

Pedometer: According to sample size and research cost, the Xiaomi Mi Band was selected for physical activity measurement for a week. According to El-Amrawy et al (2015), this pedometer is the best option compared to its price, with a precision of 96.56% and a coefficient of variation (CV) of 5.81%, which is an acceptable tool for measuring physical activity [16]. In addition to counting the number of steps one takes, it shows the amount of distance traveled and the number of calories consumed during the day. According to studies by Tudor-lock et al (2011), 60 minutes of moderate to vigorous physical activity in adolescents can be obtained from 10,000 to 11,700 steps/ day [17]. Consequently, the target number of step for the subjects was considered to be 10,000 steps. Accordingly, the subjects were placed in active (≥ 10000) and inactive (< 10000) groups.

Procedure: After obtaining written permission from the Education Department of the province and selected cities, schools were selected randomly from each city. At the first session, while explaining the work, consent forms were given to the students to inform the parents of the research and obtain their consent. In the next session, as part of the Physical Education class, participants completed the questionnaires and then height and weight were measured using a standard method. In the third session, based on the information obtained at the previous session, pedometers were calibrated based on height, weight, sex and birth date of the subjects. Information was given to the participants about the pedometer and how to use it. Students were strongly advised not separate the pedometer from their hands within the next 7 days. Data analysis was performed using $SPSS_{23}$ software by descriptive and inferential statistics (Kolmogorov-Smirnov to determine normality, one-way ANOVA and Tukey post hoc test for comparison between grades and Pearson correlation coefficient to examine relationship between SES and PA) at a significance level of $P \leq 0.05$.

Results

Of the 630 pupils, 57 girls were excluded from the study because of unwillingness to continue working or not use pedometer for at least 4 days and more than 10 hours/day or due to physical disease. In the end, 573 female students with a mean age (13.62 ± 0.85) were investigated. The average of physical activity during the week is 8583.95 steps / day, and when the five days of week are separated from weekends, the average of physical activity on the weekend (Thursday and Friday) is less than the average of the other days of the week (See table 1).

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Table 1. Demographic characteristics and physical activity of adolescent females in Mazandaran (2017)

Variable	Min	Max	Mean	Sd
Age (years)	11.58	15.58	13.62	0.85
Height (cm)	140	175	157.66	6.19
Weight (kg)	27.70	110.6	55.94	13.14
BMI (kg/m^2)	12.78	39.18	22.45	4.68
Physical Activity – 7 days of week (step)	2466.00	19471.86	8583.95	2477.50
Physical Activity – 5 days of week (step)	2491.80	20023.60	9054.62	2607.87
Physical Activity –weekend (step)	2139.00	19671.00	7407.27	2886.62
SES	9	25	15.32	2.58

In the table 2, a description of the community is presented based on the BMI and SES. Standard values were used to determine the body mass index groupings. Body mass index was classified as low weight (percentile equal to and less than 5), normal weight (5–85 percentiles), overweight (85–95 percentile) and obese (percentile equal to and above 95) [18].

Table 2. BMI*SES girl students in Mazandaran (2017)

			SES				Total
			Low	Moderate	High	Excellent	
BMI	thin	Count	4	19	4	1	28
		% within BMI	14.3%	67.9%	14.3%	3.6%	100.0%
		% within SES	5.9%	4.7%	4.8%	7.1%	4.9%
	normal	Count	58	325	66	9	458
		% within BMI	12.7%	71.0%	14.4%	2.0%	100.0%
		% within SES	85.3%	79.9%	78.6%	64.3%	79.9%
	overweight	Count	5	39	11	3	58
		% within BMI	8.6%	67.2%	19.0%	5.2%	100.0%
		% within SES	7.4%	9.6%	13.1%	21.4%	10.1%
	obesity	Count	1	24	3	1	29
		% within BMI	3.4%	82.8%	10.3%	3.4%	100.0%
		% within SES	1.5%	5.9%	3.6%	7.1%	5.1%
Total		Count	68	407	84	14	573
		% within BMI	11.9%	71.0%	14.7%	2.4%	100.0%
		% within SES	100.0%	100.0%	100.0%	100.0%	100.0%

For the normal distribution of data, one-way ANOVA was used to compare the level of physical activity in grade 7–9 pupils. The results showed that there was a significant difference between the level of physical activity, and that its level decreased the higher the grade ($F = 7.185$, sig = 0.001). However, the results of Tukey's post hoc test showed that there is a significant difference between the level of physical activity in grade 7 students with 8 and 9, but between grades 8 and 9, the difference is not significant ($P \leq 0.05$).

Out of the 573 participants, only 176 girls (30.72%) had the recommended level of physical activity (at least 10,000 steps/day) for their health, and 397 (69.28%) did not have the required level of activity.

The relationship between physical activity level and their socioeconomic status was analyzed using Pearson correlation coefficient. The result showed that there is not significant relationship ($P \leq 0.05$) between socioeconomic status and physical activity level ($r = -0.075$, sig = 0.073).

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Discussion

The purpose of this study was to determine and compare the level of physical activity of female junior high school students in Mazandaran province and also investigate the relationship physical activity with socioeconomic status. The results showed that only 30.72% of students had the recommended physical activity level. This is in line with the findings of Bashiri et al. (2015), which concluded that only 32% of the girls aged 14–18 were active and the remaining girls had insufficient physical activity [19]. It should be noted that low physical activity may increase the risk of multiple chronic noncommunicable diseases among children and adolescents. These diseases, including metabolic syndrome, insulin resistance, type 2 diabetes and high blood pressure, are directly related to childhood obesity and a major cause of obesity, is reduction of energy consumption and physical inactivity [20]. Mello et al. (2016) indicated that the number of steps/day was able to predict increased diastolic blood pressure (< 12,399 steps/day) and increased total cholesterol (< 9,400 steps/day) in adolescent girls [21]. The findings of Wu et al. (2017) suggest that school health programs promoting active lifestyles among children and adolescents may contribute to the improvement of health-related quality of life [22].

We also found that the level of physical activity decreases as grade level increases. However, this difference is not significant between students of grades 8 and 9. Riddoch et al. (2004) showed that at age 9, most children and adolescents achieved the recommended levels of physical activity, while a minority of people at the age of 15 had recommended levels of physical activity [23]. Cairney et al. (2014) suggested that the rate of decline in participation in PA was greater for girls than for boys. However, adjusting for biological age completely reduced the effect of sex and chronological age for participation in free play activities [6]. This confirms that research indicated that humans become less active as they progress towards the adult [24].

The last result of this study was a lack of significant correlation between physical activity level and students' socioeconomic status. Our research's findings are consistent with the research work of other researchers [25, 14]. It is possible that, on one hand, this is because the population of the study was taken from the only state school of Mazandaran province (more than 70% of the participants had moderate SES) (see table 2). On the other hand, this is due to the lack of attention of families to their girls' motor dimension as opposed to their cognitive dimension (the priority of the lesson to PA). They also believe that Physical Education classes in schools provide sufficient physical activity.

Lampinen et al. (2017) showed that children with low education and income parents had lower levels of physical activity under supervision and especially organized sports than those with high SES. Presumably, one explanation for these results is that children in higher-income families have lower financial barriers for organized physical activity. Furthermore, lower-educated parents may have irregular working hours and, therefore, less opportunity to take care of children's hobbies. However, their results indicate that there is no significant difference in overall physical activity among children with different SES, because low levels of monitored physical activity are compensated with high level unattended physical activity in children with lower SES [25]. In contrast, Klishadi et al. (2016) found that adolescents with higher SES had a healthier diet, but less physical activity than those with lower SES [26]. Although the result of the systematic review of Stalsberg & Pedersen (2010) confirmed the hypothesis that there is a relationship between SES and physical activity, and teenagers with higher SES are more active than those with low SES. However, this study showed that the findings do not have unity. Forty two% of such studies reported non-relationship or inverse relationship. They also suggested that the use of non-equal tools for both variables complicates the interpretation of the findings and reinforces the claim that there is no explanation for the possible difference in physical activity between groups with different SES in adolescents [11]. As Lampinen et al. (2017) showed,

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SES is likely to be more related to type of activity than general physical activity [25]. This issue can be explained through a distinction between girls of different SES girls in terms of physical acticity, and also can be considered as a challenge in future research area.

Conclusion

According to the finding of this study, the majority of adolescent girls do not have enough physical activity to maintain their health, and their engagement in physical activity decrease as they move up in grade level. Considering the fact that established physical activity patterns in childhood and adolescence may continue in adulthood, attention to the physical activity of adolescents, especially girls, is becoming more important. Low levels of physical activity and inactivity is a major problem and also one of the most important risk factors for the health of the community, so effective action is needed to promote general health and promote regular daily physical activity. Therefore, it is suggested that parents and the authorities of the Education Department of Mazandaran province take effective steps and follow-up monitoring with help of physical education specialists to address this issue. Changing the lifestyles of adolescent girls will have a positive effect on the overall health of the community.

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Conflict of Interest

The authors have no conflicts of interest to report.

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