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Comparing the Physical Fitness Conditions of Boys' School Students in the City of Kashan

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A B S T R A C T

Overweight and obesity are significant health risk factors. Regular physical activity, which leads to physical fitness, requires access to sports facilities. This research aimed to assess the relationship between physical fitness conditions and access to sports facilities among overweight and normal-weight students in elementary, secondary, and high schools. In this cross-sectional study, the BMI and waist-to-hip ratios of overweight/obese and normal-weight boy students from elementary, secondary, and high schools were measured using scales equipped with height bars and flexible tapes in gymnasiums. Demographic data were collected and recorded using researcher-designed questionnaires. Statistical analysis, including descriptive and inferential analysis, was performed using SPSS version 22. A total of 542 students participated in this research. The results showed significant differences in BMI and waist-to-hip ratios among elementary, secondary, and high school students (P<0.0001), except for the waist-to-hip ratio of high school students (P=0.699). Additionally, there was a significant association between being overweight and access to sports facilities at home for secondary and high school students (P=0.000, P=0.014), but not for elementary students (P=0.384). Based on the findings of this research, access to sports facilities at home and school significantly contributes to the health conditions of students at all school levels. Therefore, school authorities and parents should ensure sufficient sports facilities are available for children.

Keywords: *Students, Body Mass Index, Sports Facilities.*

1. Introduction

One of the most important health risk factors during childhood and adolescence is body composition, defined as a health-related physical fitness index. This condition is particularly important during the school-age years. The deterioration of this index is reflected in overweightness or obesity. With the advancement of technology and the expansion of social media, more and more children spend their time on screens such as mobile phones, televisions, or laptops. Such involvement leads to a decrease in physical activities, particularly sporting events. Weight gain is most likely a consequence of such involvements, and a sedentary lifestyle is associated with moderate to severe physical and mental health issues in children and adolescents aged 5 to 18 years, as well as in adults from age 18 onwards (World Health Organization, 2020). Modern communication devices such as computers, laptops, mobile phones, and tablets significantly decrease the need to move; therefore, their use leads to a sedentary lifestyle (Pandya & Lodha, 2021). Routine manual labor has been drastically reduced due to technological advancements,

mechanization, automation, and computerization. Work organization and household chores have been simplified using computers and machines that reduce physical activity, thereby promoting sedentary lifestyles (Chaput et al., 2020). Participation in regular physical activities is one of the healthiest means of controlling weight gain and, in most circumstances, results in weight loss. Numerous studies show that children and adolescents who are active exhibit improved physical fitness, cognitive function, and physical and mental health throughout their lives (Ekelund et al., 2016; Granger et al., 2017; Schmitz et al., 2000; Zhang et al., 2020). In addition, regular sports practice at an early age lowers the risk of chronic diseases later in life (Piercy et al., 2018), extends lifespan, leads to better self-rated health outcomes (Ferdinand et al., 2012; Lee et al., 2016), and regulates body mass index (BMI), thereby preventing overweight and obesity (Limstrand & Rehrer, 2008)

Despite the benefits of regular physical activity and various forms of sports for health, there are limiting factors that may prevent individuals from active engagement. These include motivation and ease of access to sports facilities, among others (Ferdinand et al., 2012). Such conditions are particularly important and to some extent determine whether a person will engage in any form of physical activities. Access to sports facilities in the environment is very important, particularly for school children. Previous work suggested that the distance required for an individual to travel to a sports facility affects sports facility usage in the adult population (Ranchod et al., 2014; Halonen et al., 2015; Kubota et al., 2019; Bojorquez et al., 2018). Such conditions may be more detrimental for children. This research was designed to examine the association between access to sports facilities and the overweight and normal weight status of school students.

2. Methods and Materials

In this cross-sectional study, 452 elementary, secondary, and high school students from the city of Kashan participated. Data including weight, height, waist, and hip measurements were obtained using a Seca scale equipped with a height bar and flexible tape inside the gym and recorded in a data form prepared in advance by the researcher. The students answered questions about their access to sports facilities at their school and home. The researcher and his assistants, including the physical education teacher working with the students, collected the data in the gym where the students participated in their physical education program. Statistical analysis was performed using SPSS version 22, and all statistical tests were set to an alpha level of 0.05.

3. Results

The results of the analysis are presented in various tables. Table 1 shows the distribution of students based on education level and weight condition.

Table 1

Distribution of Students Based on Education Level and Weight Condition

BMI	Education Level	Frequency	Percent	Cumulative Percent
Overweight	Elementary	98	48.0	48.0
	Secondary	67	32.8	80.9
	High School	39	19.1	100.0
	Total	204	100.0	
Normal	Elementary	103	41.2	41.2
	Secondary	74	29.6	70.8
	High School	73	29.2	100.0
	Total	250	100.0	

The results of independent t-tests comparing BMI and waist-to-hip ratio among elementary, secondary, and high school students are presented in Table 2. These results show significant differences between the BMI and waist-to-hip ratios of elementary, secondary, and high school students ($p < .0001$), except for the waist-to-hip ratio of high school students ($p = .699$).

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Table 2

Comparing BMI and Waist/Hip Ratios of Overweight/Obese Students According to Education Level

Level	Variables	Weight	N	Mean	Std. Deviation	t-value	Sig. (2-tailed)
Elementary	BMI	Over	98	19.58	3.69	-16.342	.000
		Normal	103	25.61	0.60		
	Whip	Over	98	1.02	0.24	-2.226	.027
		Normal	103	1.10	0.29		
Secondary	BMI	Over	67	22.67	3.13	-12.32	.000
		Normal	74	30.49	4.24		
	Whip	Over	67	1.13	0.39	5.399	.000
		Normal	74	0.85	0.20		
High School	BMI	Over	39	20.44	2.38	-20.892	.000
		Normal	73	30.76	2.54		
	Whip	Over	39	0.81	0.19	-0.387	.699
		Normal	73	0.83	0.23		

Table 3 shows the relationship between access to sports facilities at home and the weight condition of overweight and normal students of elementary, secondary, and high school levels. The results indicate significant associations between overweight status and access to sports facilities at home for secondary and high school students (p = .000, p = .014), but not for elementary students (p = .384).

Table 3

Relationship Between Access to Sports Facilities at Home and Weight Condition of Students

Level	Weight	Facility at Home	Total	Pearson Chi-Square	Asymp. Sig. (2-sided)
Elementary	Normal	No	47	.784a	.376
		Yes	51		
	Over	No	43		
		Yes	60		
	Total		201		
Secondary	Normal	No	31	14.181d	.000
		Yes	36		
	Over	No	57		
		Yes	17		
	Total		141		
High School	Normal	No	31	6.022f	.014
		Yes	8		
	Over	No	41		
		Yes	32		
	Total		112		

Table 4 presents the relationship between access to sports facilities at school and the weight condition of overweight and normal students of elementary, secondary, and high school levels. The results show significant associations between overweight status and access to sports facilities at school for high school students (p = .017), but not for elementary (p = .489) and secondary students (p = .135).

Table 4

Relationship Between Access to Sports Facilities at School and Weight Condition of Students

Level	Weight	Facility at School	Total	Pearson Chi-Square	Asymp. Sig. (2-sided)
Elementary	Normal	No	71	.479a	.489
		Yes	27		
	Over	No	79		
		Yes	24		
	Total		201		

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Secondary	Normal	No	44	2.231d	.135
		Yes	23		
	Over	No	57		
		Yes	17		
	Total		141		
High School	Normal	No	33	5.707f	.017
		Yes	6		
	Over	No	46		
		Yes	27		
	Total		112		

4. Conclusion

The purpose of this research was to examine the association between access to sports facilities at home and school with body composition, one of the main indices of health-related physical fitness, in overweight and normal students of elementary, secondary, and high school. The beneficial effects of participation in various forms of physical activity are well known. The increase in health problems related to the lack of physical activity includes overweightness, obesity, cardiovascular complications, diabetes, and metabolic syndrome. These health problems, categorized as hypokinetic disorders, are the main concern of medical professionals and sports professionals. Different age groups may choose to participate in different sports or physical activities; however, school-age children may engage in any sport when the environment provides such opportunities. By having access to sports facilities, children can find time to engage in their favorite sport or other physical activities, which may lead to weight loss. Several researchers have examined the association between sports facility accessibility and physical activity (Raza et al., 2022; Xiaoyan & Wenfang, 2020). The research by Kubata conducted in Japan showed that access to sports facilities significantly increased participation (Kubota et al., 2019). Additionally, an increase in distance from home to any facility, whether free outdoor, paid outdoor, or paid indoor, was associated with an increased risk of low frequency of exercise. These studies demonstrated that the farther the facilities from the living or residential place, the lower the frequency of exercise. Similarly, a longer distance from work to the nearest paid outdoor physical activity facility was associated with an increased risk of low frequency of exercise. Obviously, lower frequency of participation in regular physical activities is associated with an increase in weight gain and overweightness.

Despite the fact that previous research examined the association between sports facility distance from home or work for adult populations, the results were similar to the findings of the present research (Bojorquez et al., 2018; Lee et al., 2016). The findings of our research showed the importance of access to sports facilities at home for secondary and high school students but not for elementary students. This discrepancy may be attributed to the knowledge level of children regarding the benefits of exercise for health or other developmental conditions. The reverse condition was observed for the accessibility of sports facilities at school. High school students seemed to benefit more from school sports facilities compared to elementary and secondary students, probably because they were more inclined to exercise at a place far from their residence.

In summary, access to sports facilities at home or school significantly contributes to the physical activity levels of students who are physically more fit than their overweight counterparts. However, there were some limitations in conducting this research, including the measurement of other components of health-related physical fitness such as muscular endurance or power and the exclusion of girl students.

The results of the present research showed that the accessibility of sports facilities is associated with better body composition for boy students. Therefore, it is important to provide sports facilities that are more accessible to students at home and school to ensure that they benefit from these environments and achieve healthier body composition.

Authors' Contributions

M.S. conceptualized the study, designed the research methodology, and supervised the overall implementation of the study. M.E.H., the corresponding author, conducted the data analysis using SPSS, interpreted the results, and led the drafting and revising of the manuscript. S.A.D. assisted in the recruitment of participants, facilitated the collection of physical fitness data, and contributed to the literature review. All authors discussed the findings, critically reviewed the

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manuscript for important intellectual content, and approved the final version for publication.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethics Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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