



The Relationship between Physical Literacy of Adolescents and the Socioeconomic Status of Families

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Abstract

Background: Health researchers have increasingly focused on the relationship between social factors and health status. Several studies have demonstrated the link between socioeconomic status and people's health. This study aims to determine the physical literacy of Iranian adolescents based on the educational level and economic status of their families.

Materials and Methods: In this cross-sectional study, 510 Iranian adolescents aged 16 to 18 years were randomly sampled from high schools in Tehran, Iran, in 2021. Data were collected using a two-part questionnaire assessing general characteristics and physical literacy. The physical literacy section comprised 34 items across four dimensions: information acquisition, information comprehension, information assessment, and self-care skills. Data were analyzed using SPSS software (version 16.0).

Results: The study population comprised 256 girls (50.2%) and 254 boys (49.8%). ANOVA revealed a significant association between adolescents' mean physical literacy scores and the educational level of both mothers ($p = 0.001$) and fathers ($p = 0.007$). Specifically, adolescents whose mothers and fathers had a university education exhibited higher mean physical literacy scores (73.84 ± 14.96 and 73.11 ± 14.74 out of 100, respectively). No significant association was found between overall physical literacy scores and family economic status ($p = 0.068$); however, a significant relationship was observed between family economic status and the self-care domain ($p = 0.021$).

Conclusion: Based on the results, parental education is significantly and positively associated with adolescent physical literacy in Iran. However, while overall family economic status did not correlate with physical literacy, it did show a significant relationship with self-care skills. This underscores the need to consider both parental education and socioeconomic factors when designing interventions to promote self-care skills among Iranian adolescents.

Key Words: Adolescent, Economic status, Educational level, Iran, Physical literacy.

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1- INTRODUCTION

Physical literacy is essential for adolescents to achieve a healthy and active lifestyle (1). Introduced by Margaret Whitehead in 1993, the concept of physical literacy encompasses motivation, confidence, physical competence, knowledge, and understanding, all of which are necessary to engage in physical activity throughout life (2). Research indicates that the mean physical literacy score for adolescents is moderate, at 63% for boys and 62% for girls; girls typically score lower than boys (3, 4). The World Health Organization (WHO) reports that globally, 1.6 billion people have a body mass index (BMI) over 25, and 400 million have a BMI over 30 (5). A literature review indicates that sedentary lifestyles affect between 30% and 70% of the Iranian population (6).

Physical inactivity is associated not only with mortality and disability from chronic diseases but also places a significant burden on society through treatment costs and reduced productivity (7, 8). Studies indicate that a family's socioeconomic status during early life significantly impacts adolescent well-being. Greater family wealth is linked to increased access to resources and a more supportive learning environment (9-11). Research on family income and adolescent health has found that adolescents from higher-income families, whose parents also have higher incomes, tend to have better health outcomes due to increased access to quality medical care and opportunities for physical activity (12). Further studies have shown that girls from economically disadvantaged backgrounds and ethnic minorities tend to have lower levels of physical activity (13, 14).

In today's world, family education is a significant factor in human progress. Parents' education level plays an important role in raising their children. Educated parents often have higher incomes due to

better job opportunities, which positively affects their children's attitudes toward them, as well as their sense of security and self-confidence. As a result, children are better able to interact with their environment, allowing their talents to grow and flourish. Low income can be detrimental to students, leading to complications such as impatience and reluctance to participate in activities (15). Inadequate physical activity is a leading global risk factor for mortality, contributing to approximately 3.2 million deaths annually (16). Physical activity has declined across all age groups in the last two decades, with over 80% of the world's adolescent population not meeting recommended activity levels (6). School age is a crucial period for establishing lifelong health, as appropriate physical activity during developmental years helps to stabilize health status, presenting a significant opportunity for health maintenance in this age group (17, 18).

Adolescents occupy a critical position in public health, as they form the foundation for the future of social health (19). In Iran, evidence suggests a rapid increase in the prevalence of chronic diseases among adolescents, with overweight being a particularly common concern (20, 21). Therefore, given that adolescence is a key stage for developing healthy behaviors, promoting physical activity during this period can yield significant long-term health benefits (22). Cultivating physical literacy requires the cooperation of various stakeholders, including parents, school principals, physical education teachers, sports associations, and fitness trainers (23).

Globally, most physical literacy studies focus on children aged 8 to 12 years, often utilizing the Canadian Assessment of Physical Literacy (CAPL). The CAPL assesses physical literacy in Canadian children within this age group across four domains: knowledge and understanding,

motivation and confidence, physical competence, and daily behavior. It serves as a standard questionnaire for measuring physical literacy in this age range (3, 4, 24). Some studies, however, examine only the knowledge dimension of physical literacy using the Physical Literacy Knowledge Questionnaire (PLKQ) (24). This study employs a physical literacy questionnaire designed specifically for adolescents aged 16 to 18 years, tailored to Iranian culture and attitudes (25), and encompasses all dimensions of physical literacy. The aim is to investigate the physical literacy of these adolescents in relation to their parents' educational levels and their families' socioeconomic status.

2- MATERIALS AND METHODS

2-1. Study Design

In this cross-sectional study, conducted in 2021, 510 Iranian adolescents were randomly selected from high schools in Tehran, Iran, and their physical literacy was assessed in relation to their parents' educational levels and their families' socioeconomic status.

2-2. Participants and method

The study population consisted of Iranian adolescents aged 16 to 18 years, attending high schools in education districts 1, 2, 4, and 6 in Tehran, Iran. The sample size was determined using the formula:

$$n = \frac{Z_{1-\frac{\alpha}{2}}^2 P(1-P)}{d^2}$$

where $p=0.50$ (the proportion of people with sufficient physical literacy), $\alpha=0.05$, the confidence level (CI) was 95%, and $d=0.05$ (the margin of error). Considering a 10% attrition rate, a total of 424 samples were deemed necessary. To ensure adequate sample coverage, Tehran was divided into five regions: northeast, northwest, southeast, southwest, and center. From these, four education districts (1, 2, 4, and 6) were randomly selected

from a total of 19 districts. Subsequently, one girls' high school and one boys' high school were randomly selected from each of the chosen districts. Upon visiting the selected schools, the researcher introduced themselves and provided a concise overview of the research to the principals. In coordination with the school administrators, one class was randomly selected from each grade and field of study, and all students in these classes were invited to participate in the study with their consent.

2-3. Data collection

Data was collected using a validated and reliable questionnaire (25) comprised of two sections: a section on general characteristics (12 items) and a section assessing adolescent physical literacy (34 items across four dimensions: skills of information acquisition, information comprehension, information assessment, and self-care). The general characteristics section gathered information on age, gender, educational grade, field of study, parents' education and occupation, family socioeconomic status, sports club membership, and sources of physical activity information.

The physical literacy section consisted of 34 items distributed across four skill domains: information acquisition (8 items), information comprehension (11 items), information assessment (6 items), and self-care (9 items). Responses were rated on a five-point Likert scale: never (1 point), rarely (2 points), sometimes (3 points), most of the time (4 points), and always (5 points) (25).

Based on cut-off points of 50, 66, and 84, adolescent physical literacy was categorized into four levels: insufficient (scores 0 to 50), not sufficient (50.1 to 66), good (66.1 to 84), and excellent (84.1 to 100) (26). Data was collected through self-report questionnaires. Due to the data collection period coinciding with the

COVID-19 pandemic, questionnaires were administered in person at some schools and online at others. Data collection spanned two months (April to May 2021). Students completed 406 questionnaires online through the Press Line website (out of 955 visits) and 126 questionnaires in person. After reviewing 532 completed questionnaires, those with incomplete information were excluded, resulting in 510 questionnaires with complete data included in the final analysis. The number of completed questionnaires exceeded the initial sample size because more questionnaires were distributed via the online platform.

2-4. Inclusion criteria

Participants were included in the study if they were Iranian students aged 16 to 18, actively participated in the study, had no physical disabilities, and provided written informed consent.

2-5. Exclusion criteria

Participants were excluded from the study if they withdrew at any time or submitted incomplete questionnaires.

2-6. Validity and reliability of the tool

Previous studies conducted in Iran have examined the psychometric properties of this tool, confirming its validity in terms of content, face, and cultural relevance. The reported Cronbach's alpha for this tool is 0.93, indicating a high degree of internal consistency and supporting its reliability within the Iranian population (25).

2-7. Ethical considerations

This study, conducted as part of a PhD thesis in Health Education and Health Promotion and approved by Shahid Beheshti University of Medical Sciences (IR.SBMU.PHNS.REC.1398.125), fully complied with the ethical principles outlined in the Belmont Report to ensure the protection of human subjects. Respect for persons was upheld by guaranteeing

voluntary participation, securing comprehensive informed consent, and emphasizing participants' right to withdraw at any time without penalty. The principle of beneficence was addressed through the use of validated assessment tools for adolescent physical literacy, aimed at maximizing benefits while minimizing potential risks to participants. Justice was ensured by employing random sampling across educational districts in Tehran, facilitating equitable participant selection and a fair distribution of the research's burdens and benefits. Throughout the study, strict measures were implemented to safeguard participant privacy and maintain confidentiality.

2-8. Data analysis

Normality was assessed using the Kolmogorov-Smirnov test. Descriptive statistics, including frequency, mean, and standard deviation, along with inferential statistics such as the independent t-test and one-way ANOVA, were employed to analyze the data. Statistical analyses were conducted using SPSS software version 16.0. A p-value of less than 0.05 was considered statistically significant.

3- RESULTS

Of the 510 adolescents participating in the study, 256 (50.2%) were girls and 254 (49.8%) were boys. The age distribution was as follows: 134 (26.3%) were 16 years old, 207 (40.6%) were 17 years old, and 169 (33.1%) were 18 years old. The distribution of participants by field of study is detailed in Table 1. Regarding parental education, 55.3% of mothers and 62.7% of fathers had attained an academic education. A majority of fathers (63.1%) were employed. Almost half of the adolescents (49.6%) reported their family's economic situation as average. Based on physical literacy scores, 6.7% (34) of adolescents demonstrated insufficient physical literacy, 28.6% (146) demonstrated not sufficient physical

literacy, 43.7% (223) demonstrated good physical literacy, and 21% (107) demonstrated excellent physical literacy (**Table 1**). A one-way ANOVA revealed a significant association between the mean physical literacy score and the adolescents' field of study ($p = 0.001$). Post-hoc analysis indicated significant differences in the mean physical literacy scores between students in Technical and Vocational Training and those in Humanities ($p = 0.001$), as well as between students in

Vocational Training and Experimental Sciences ($p = 0.004$). Furthermore, one-way ANOVA showed significant differences in the mean scores for the acquisition ($p = 0.001$), comprehension ($p = 0.001$), information assessment ($p = 0.001$), and self-care ($p = 0.010$) dimensions of physical literacy across different fields of study. The mean physical literacy score was highest in the Technical field of study (75.56 ± 13.82) compared to other fields (**Table 2**).

Table-1: The general characteristics of the participants (n = 510).

Variables	Number	%
Gender		
Boy	254	49.8
Girl	256	50.2
Age (years)		
16	134	26.3
17	207	40.6
18	169	33.1
Field of study		
Vocational Training	103	20.2
Technical Training	96	18.8
Humanities	108	21.2
Experimental Sciences	111	21.8
Mathematics & Physics	92	18
Mother's education level		
Illiterate	6	1.2
Primary school	25	4.9
High school	197	38.6
University degree	282	55.3
Father's education level		
Illiterate	10	2
Primary school	32	6.3
High school	148	29
University degree	320	62.7
Father's job		
Unemployed	322	63.1
Retired	38	7.5
Employed	150	29.4
Economic situation		
Very bad	11	2.2
Bad	26	5.1
Average	253	49.6
Good	171	33.5
Very good	49	9.6
Physical literacy score		
Insufficient	34	6.7
Not very sufficient	146	28.6
Good	223	43.7
Excellent	107	21

Table-2: Comparison of mean scores of adolescents' physical literacy and its dimensions based on the study field of students.

Field of study	Dimensions of Physical Literacy								Total physical Literacy	
	Acquisition		Comprehension		Assessment		Self-care		Mean	SD
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Vocational Training	68.05	18.83	69.26	17.44	64.60	18.39	59.62	18.34	65.61	14.06
Technical	78.93	15.75	79.47	15.59	74.04	17.64	68.77	18.90	75.56	13.82
Humanities	77.80	19.58	79.79	17.91	76.04	17.96	62.19	27.63	74.01	16.46
Experimental Sciences	77.30	17.86	78.56	15.82	74.84	16.25	60.03	20.66	72.71	13.04
Mathematics & Physics	75.20	19.05	76.21	17.49	71.96	18.56	59.32	18.12	70.76	14.17
P-value	0.001		0.001		0.001		0.010		0.001	

SD: Standard deviation.

One-way ANOVA revealed a significant association between the mean physical literacy score of adolescents and their mothers' level of education ($p = 0.001$). Post-hoc analysis indicated significant differences in the mean physical literacy scores between adolescents whose mothers had a primary school education and those whose mothers had a university degree ($p = 0.008$), as well as between those whose mothers had a high school education and those with a university degree ($p = 0.025$).

Furthermore, one-way ANOVA showed significant differences in the mean scores for the acquisition ($p = 0.001$), comprehension ($p = 0.019$), assessment ($p = 0.030$), and self-care ($p = 0.002$) dimensions of physical literacy in relation to mothers' education. The mean physical literacy score was highest among adolescents whose mothers held university degrees (73.84 ± 14.93) compared to other groups (**Table 3**).

Table-3: Comparison of mean scores of adolescents' physical literacy and its dimensions based on mother's education.

Mother's education level	Dimensions of Physical Literacy								Total physical literacy	
	Acquisition		Comprehension		Assessment		Self-care		Mean	SD
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Illiterate	68.22	19.40	75.75	16.43	71.52	28.31	39.81	16.06	63.74	10.73
Primary school	62.87	16.59	69.00	15.21	64.33	15.12	58.77	21.80	64.03	13.20
High school	74.22	18.39	75.09	17.05	70.87	17.81	59.22	20.87	69.94	14.14
University degree	77.61	18.48	78.52	17.38	74.12	18.19	64.56	21.36	73.84	14.96
P-value	0.001		0.019		0.030		0.002		0.001	

SD: Standard deviation.

Furthermore, one-way ANOVA revealed a significant association between the mean physical literacy score of adolescents and their fathers' level of education ($p = 0.007$). Post-hoc analysis indicated a significant difference in the mean physical literacy scores between adolescents whose fathers had elementary degrees and those whose fathers had university degrees ($p = 0.008$). One-way ANOVA also demonstrated significant differences in the mean scores for the acquisition ($p = 0.010$),

comprehension ($p = 0.006$), and assessment ($p = 0.031$) dimensions of physical literacy in relation to the fathers' level of education. However, there was no significant association between the mean score for the self-care dimension and the fathers' level of education ($p = 0.125$). The mean physical literacy score was highest among adolescents whose fathers held university degrees (73.11 ± 14.74) compared to other groups (**Table 4**).

Table-4: Comparison of mean scores of adolescents' physical literacy and its dimensions based on father's education.

Father's education level	Dimensions of Physical Literacy								Total physical literacy	
	Acquisition		Comprehension		Assessment		Self-care		Mean	SD
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Illiterate	70.31	22.64	75.68	20.49	74.58	20.26	60.83	20.22	70.29	12.56
Primary school	65.33	15.58	66.69	13.13	63.80	15.74	59.11	18.52	63.86	10.87
High school	74.85	18.84	76.45	16.71	71.56	18.54	58.85	23.43	70.56	15.06
University degree	76.93	18.38	77.84	17.52	73.51	17.94	63.66	20.59	73.11	14.74
P-value	0.010		0.006		0.031		0.125		0.007	

SD: Standard deviation.

One-way ANOVA did not reveal a significant difference between the mean physical literacy scores of adolescents and their families' economic status ($p = 0.068$), except in the domain of self-care ($p = 0.021$). Additionally, there were no significant differences in the mean scores of other dimensions of physical literacy among adolescents based on their families' economic status ($p > 0.05$), with the exception of self-care. The mean physical literacy score was higher among adolescents with very good economic status (74.31 ± 15.56) compared to those with lower economic status (**Table 5**).

Furthermore, one-way ANOVA showed no significant difference between the mean physical literacy scores and fathers' occupations among adolescents ($p = 0.119$). There were also no significant differences in the mean scores for various dimensions of physical literacy based on fathers' jobs: acquisition ($p = 0.242$), comprehension ($p = 0.267$), assessment ($p = 0.459$), and self-care ($p = 0.246$). The mean physical literacy score was highest among adolescents whose fathers were self-employed (73.75 ± 13.75) compared to other groups (**Table 6**).

Table-5: Comparison of mean scores of adolescents' physical literacy and its dimensions based on the economic status of students' families.

Economic status	Dimensions of Physical Literacy								Total physical literacy	
	Acquisition		Comprehension		Assessment		Self-care		Mean	SD
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Very bad	61.36	19.77	67.35	11.95	67.04	19.58	51.01	20.53	61.56	12.58
Bad	75.60	17.58	75.00	16.94	72.75	20.14	60.68	24.18	70.96	15.36
Average	74.95	18.59	76.09	17.29	72.44	17.21	59.96	21.86	70.91	14.18
Good	77.17	18.28	77.84	17.50	72.36	18.37	63.72	20.13	72.98	15.08
Very good	75.31	19.52	78.80	17.15	72.87	21.05	68.87	20.34	74.31	15.56
P-value	0.093		0.262		0.910		0.021		0.068	

SD: Standard deviation.

Table-6: Comparison of mean scores of adolescents' physical literacy and its dimensions based on their father's job.

Father's job	Dimensions of Physical Literacy								Total physical literacy	
	Acquisition		Comprehension		Assessment		Self-care		Mean	SD
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Unemployed	74.35	19.33	75.71	17.83	71.82	18.19	60.55	21.94	70.70	15.02
Retired	76.48	18.74	77.57	17.29	74.56	18.24	63.52	20.20	73.07	15.27
Employed	77.72	16.90	78.70	15.91	73.09	18.04	64.57	20.36	73.75	13.75
P-value	0.242		0.267		0.459		0.246		0.119	

SD: Standard deviation.

4- DISCUSSION

Individuals with high physical literacy can demonstrate appropriate behavior in new situations by utilizing their acquired skills (23). Healthy behaviors and habits are established during adolescence, and sufficient physical literacy skills can facilitate a consciously healthy lifestyle. Therefore, physically literate adolescents can mitigate the adverse effects of insufficient physical activity at a generational level (28). The available evidence in Iran indicates a rapid increase in the prevalence of chronic diseases among adolescents, with overweight being one of the most common issues they face (20). Therefore, promoting physical activity during this critical period can yield significant long-term health benefits, as adolescence is a key stage for developing healthy behaviors. The development of physical literacy requires collaboration among various stakeholders, including parents, physical education managers and teachers, sports associations, and club managers (23).

This study aimed to determine the physical literacy of adolescents in relation to parental education levels and the socioeconomic status of their families. Conducted on 510 students from selected high schools in Tehran, Iran, the findings indicated that the mean physical literacy score was higher among adolescents studying in technical fields compared to other fields. A significant association was found between the mean physical literacy score and the field of study ($p = 0.001$).

Greater emphasis on theoretical coursework may contribute to lower physical literacy levels in students pursuing theoretical disciplines. These findings highlight the need for enhanced planning and attention to physical education within schools, including the provision of physical education resources to promote adolescent physical literacy. Adolescents demonstrate creative physical

literacy and possess strong skills in the acquisition, comprehension, and assessment of information related to physical activity. This enables them to take proactive measures towards their health through consistent physical activity and the maintenance of a healthy lifestyle (29).

The findings of the present study also revealed a significant association between the mean physical literacy score of adolescents and both maternal ($p = 0.001$) and paternal ($p = 0.007$) education levels. Adolescents whose parents had academic degrees exhibited higher average physical literacy, a result consistent with the findings of Valadi et al. (30). Informed parents, aware of the benefits of physical activity, are more likely to encourage their adolescents to participate in physical activity and improve their physical literacy. Furthermore, parents' awareness of, and ability to clearly explain, physical activity-related information to their adolescents can facilitate understanding and application of this knowledge in relevant situations (31).

In the current study, no significant association was found between the mean physical literacy score of adolescents and their family's socioeconomic status ($p = 0.068$). However, one-way ANOVA indicated a significant association in the domain of self-care ($p = 0.021$). Although not statistically significant, the average physical literacy score of adolescents from families with good socioeconomic status was slightly higher. For adolescents, financial considerations such as the cost of gym memberships, sports equipment, potential injury expenses, and tutoring to maintain academic performance while pursuing sports can present barriers to engaging in desired physical activities. Adolescents from families with higher socioeconomic status may have greater opportunities to participate in physical activities, potentially leading to higher physical literacy (32). To address this

disparity, educational institutions and municipalities could collaborate to make sports clubs more accessible to teenagers from families with lower socioeconomic status, thereby increasing participation in physical activity and improving physical literacy (33).

The present study also found no significant relationship between fathers' employment status and the physical literacy score of adolescents ($p = 0.119$). While not significant, teenagers with employed fathers tended to have higher physical literacy compared to those with unemployed or retired fathers, possibly because employed fathers are more active and create a more motivating environment for family members to engage in physical activity. Additionally, the higher income associated with employed fathers may alleviate financial constraints related to sports participation (34). Contradictory to these findings, the studies by Valadi et al. and Ahmadi et al. reported lower average physical literacy scores among adolescents whose fathers were employed in the military. This may be attributed to military fathers' long deployments and higher levels of fatigue, leading to prioritizing rest and reduced engagement in their teenagers' physical activity upon returning home (30, 35).

4-1. Study Limitations

This study's findings should be interpreted in light of several limitations. First, the reluctance of some eligible individuals to participate, despite encouragement emphasizing the project's importance, may have introduced a selection bias, potentially overestimating overall physical literacy levels. Second, initial lack of cooperation from some schools necessitated the inclusion of a substitute school via coordination with the education department; this substitution may have affected the generalizability of findings to the entire district. Finally, reliance on a self-report questionnaire to assess

adolescent physical literacy introduces the potential for social desirability and recall biases, hindering direct comparison of observable physical literacy differences between individuals. Future research should address these limitations by incorporating objective measures and strategies to improve participation rates.

5- CONCLUSION

This study demonstrates that adolescent physical literacy is significantly influenced by field of study and parental education. Adolescents in Technical and Vocational fields displayed higher physical literacy, suggesting that curricula in these areas may inherently foster physical literacy skills. The strong positive relationship between both maternal and paternal education levels and adolescent physical literacy underscores the critical role of the home environment and parental knowledge in shaping these skills, particularly in acquisition, comprehension, assessment, and self-care. While family economic status was not broadly associated with physical literacy, its significant relationship to self-care highlights potential disparities in access to resources and opportunities. These findings suggest that interventions to enhance adolescent physical literacy should consider: (1) incorporating physical literacy components across all educational fields, (2) developing parental education programs to promote physical literacy knowledge and skills within the family, and (3) addressing socioeconomic barriers to ensure equitable access to resources that support self-care and overall physical literacy development.

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7- CONFLICT OF INTEREST: None.

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