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# Association of Health-promoting Lifestyle and related factors among female high school students in Iran Public high school

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## Abstract

**Background:** Health promotion is the most important strategy to encourage people to live a healthy lifestyle and prevent non-communicable diseases. It is important to note that no study has been conducted comparing students' health-promoting behavior (HPBs) in different types of schools in Iran. This study aimed to investigate and compare the associated factors of female students in these schools.

**Material and Methods:** A cross-sectional descriptive study was conducted in 2023 Ardabil, Iran. The questionnaire used in this study consisted of two parts: the first included sociodemographic information and body mass index measurement and the second consisted of questions from the Health-Promoting Lifestyle Profile II. In addition, SPSS Ver. 22 was applied to statistical analysis.

**Results:** The highest and lowest scores of HPB were calculated for schools in the central city, elite, and outskirts. Although these behaviors were evaluated as good ( $154.59 \pm 22.65$ ) in all the studied students, in total 76% of the students are far from excellent level. Family support ( $P < 0.001$ ) and parental education ( $P < 0.05$ ) are identified as the most important factors in improving children's behaviors and benefiting society.

**Conclusions:** Considering that, students' adherence to HPB plays a significant role in health and disease prevention development in society and is one of the determinants of health and a healthy lifestyle, should provide health educational strategy, educational infrastructure, and plan behavior modification techniques in this field.

## Keywords:

Female students, health behaviors, health promotion, HPLPII, health education

## Introduction

Improving health refers to the empowerment of people in identifying factors that affect individual and social health and making sensible

decisions about adopting healthy behaviors and leading a healthy lifestyle.<sup>[1,2]</sup> Health-promoting behaviors (HPB) are actions taken to achieve or maintain individual and group health

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and self-actualization.<sup>[3]</sup> Health-promoting activities and a healthy lifestyle are important means to achieve and maintain health, as many chronic diseases are caused by human behavior and lifestyle choices. As a result, HPBs are among the primary reasons for achieving good health and preventing various illnesses.<sup>[4]</sup> The main factors that constitute a health-promoting lifestyle are proper nutrition, regular physical activity and exercise, self-care, spiritual well-being, social and communication skills, and a good sleep pattern. These factors are critical to achieving good health and well-being.<sup>[5]</sup> It has been found in many studies that health issues such as obesity, cardiovascular disease, various forms of cancer, stress, and addiction, in particular in developing countries, are significantly related to individual lifestyle choices.<sup>[6]</sup> According to annual reports from global organizations, diseases related to lifestyle account for 70% to 65% of deaths and mortalities around the world.<sup>[7]</sup> However, an unhealthy lifestyle is one of the causal factors affecting chronic illnesses, many of which form in adolescence and transition to later stages of the life cycle.<sup>[8]</sup> Adolescence [between the ages of 10 and 19] is a unique period of life and is one of the most challenging stages of human growth and development.<sup>[9]</sup> Adolescence is a critical period of body, psychological, emotional, and social growth and change as individuals enter adulthood and become responsible for maintaining and improving their health and well-being.<sup>[10]</sup> Adolescence is accompanied by maturity, which causes stress, motivates, and drives teenagers to form and adopt HPBs that are new to them.<sup>[11]</sup> During their educational experience, adolescents face a range of continuous stressors related to past academic expectations and goals. The stress caused by studying can affect academic progress, reducing motivation and increasing the risk of dropping out of school.<sup>[12]</sup> The health of adolescent females is considered more important than that of boys because of various cultural and social reasons. This is because of the importance of female puberty and its role in fertility and family life. As a result, the focus on health behaviors for adolescent females is a priority in public health because of their critical role in puberty and their future family life.<sup>[13]</sup> Elite students are individuals, who are selected and accepted to special schools through national exams. In these schools, they engage in their education and learn in an environment tailored to their needs and abilities. This type of focused academic support can assist them in reaching their full potential and improving their social and emotional skills.<sup>[14]</sup> Following HPBs as a student is

critical to developing healthy habits and preventing illnesses in the community. This behavioral pattern should be predicted for individuals in the community, especially adolescent females, given their importance in society and the impact their health can have on future generations.<sup>[15]</sup> The review of past research reveals that in Iran, few studies have focused on HPBs among students.<sup>[16]</sup> In addition, our research shows that past studies have generally investigated promotional behaviors among female students, and the different dimensions of this issue need more attention in a more detailed and comparative manner.<sup>[17]</sup>; therefore, it is necessary to carry out more research in this field. Furthermore, it is important to note that there has yet to be a study comparing the HPBs of students in regular and elite schools in Iran. Therefore, this analytical-descriptive study aimed to investigate and compare the HPBs and associated factors among student females in these schools in Ardabil city.

## Material and Methods

### Study design and setting

The study was initially planned in early 2020, however, because of the COVID-19 pandemic, government restrictions, and school closures, it was carried out in mid-2023. The objective was to examine and contrast HPBs and related factors among female students.

### Study participants and sampling

- Based on previous investigations and using the Chris Gee and Morgan sampling table,<sup>[18]</sup> a sample size of 540 participants was determined [360 for regular schools and 180 for elite schools]. Sampling was conducted randomly and in multiple stages by selecting student participants.
- Schools were selected based on city classification by the municipality in Ardabil. From the first and second districts, eight regular schools and two elite schools were selected. In the next step, randomly selected schools from each cluster were determined as study scope. The cluster included two schools from the outer region and two schools from the central part of the city.
- Three classes from each school were included in the research, including seventh-, eighth-, and ninth-grade subjects, respectively. The number of participants from each class was determined to be between 10 and 12 people for the survey.
- After coordinating with school managers and teachers, and providing necessary explanations to the students, the students were given the relevant questionnaire and asked to fill it out. Participation and completion of the questionnaire were voluntary for the students, so to account for any potential errors in the completion of the

survey, there were 600 copies of the questionnaire distributed.

#### Data collection tool and technique

#### Health-Promoting Lifestyle Profile [III] (HPLPIII) for Adolescents questionnaire:

- The validity and reliability of the Persian version of the questionnaire were confirmed through testing by Mohammadi *et al.*,<sup>[19]</sup> where the Cronbach's Alpha coefficient was determined to be 0.82.
- The questionnaire is used to measure HPBs on a multidimensional scale and consists of 52 items in six dimensions: responsibility for one health [ROH], spiritual growth and self-actualization [SGS], interpersonal support and communication [ISC], nutrition [Nut.], stress management [SM], and physical activity [PA].
- To score the items on the questionnaire, a Likert scale was used that rated each item on a range of 1 to 4, with 1 meaning "Never," 2 meaning "Occasionally," 3 meaning "Often," and 4 indicating "Always." The minimum and maximum scores for each questionnaire were calculated to be 52 and 208, respectively.

The ranking of scores obtained from the questionnaire in Table 1 is based on the following criteria:

#### Statistical analysis

Total scores for each dimension were obtained by adding up the scores of each question related to that dimension. The total score for the individual was obtained by adding up the scores across all questions. Using information entered into SPSS 22 software, statistical analysis of the data was conducted using t-test, ANOVA, Pearson's correlation coefficient, and chi-square.

#### Results

Upon reviewing the initial data, it was found that 20 and 40 questionnaires gathered from elite and regular schools were incomplete, respectively. Therefore, these questionnaires were removed from the dataset, and the details of 540 participants were analyzed the ages of these students were with ranging from 11 to 16 ( $14.14 \pm 0.96$ ) years old. The demographic information of the participants is provided in Table 2.

Because the students could choose more than one source of health information, the total percentage of sources for health information was greater than the number of participants. Additionally, the average educational level of parents in elite schools was found to be higher than in regular schools.

Given the non-normality of the variables, the non-parametric Kruskal-Wallis's test (equivalent to one-way ANOVA) was used for analysis. The results of the analysis according to selected schools in different regions of the city are provided in Table 3.

The results show that significant difference in the scores of the HPB dimensions in investigated schools ( $P\text{-value} < 0.05$ ). Table 4 shows the minimum, maximum, and average scores of the completed questionnaires by students in the 6 behavior dimensions under discussion.

The results show that SGS and PA have the highest and lowest average scores, respectively. The statistical test (ANOVA) shows the significant difference between the average scores of the six health-enhancing behaviors dimensions between students at normal public schools, gifted students' schools, and schools in outskirts areas ( $P < 0.05$ ). In Table 5, to evaluate the results, the average scores of HPBs in the studied schools have been classified. The results in Table 5 reveal that about 60% of students have HPBs at levels of good and excellent, and about 40% of the students have behaviors at levels of poor and medium. However, the difference in the level of the students' HPB scores in the schools under study was observed and is significant ( $P = 0.047$ ).

Table 6 illustrates the correlation between demographic variables and the HBP among students of the three types of schools under study.

Based on Table 6, the correlation between the variables of age, family support, and body mass index with the average of HPB scores has reached the level of statistical significance.

According to the findings presented in Table 7, the sig value demonstrates a remarkably high level of significance, thereby confirming the meaningfulness of the regression model.

#### Discussion

Health is the primary factor for sustainable development and chronic diseases associated with lifestyle affect the person's quality of life.<sup>[20]</sup> Therefore, it is necessary to prevent diseases and improve health, which requires the change of behaviors and habits of individuals in the community.<sup>[21]</sup> As a result, the prediction of HPBs of individuals in the community, especially female students, as part of the significant member of healthy societies and families, is a necessity for the future.<sup>[22]</sup> Therefore, the present study to determine and compare the HPBs of female students in Ardabil city, as well as to identify the factors associated with them conducted in 2023. The results showed that overall HPBs among students at all schools are at a good level ( $154.59 \pm 22.65$ ). In addition, the HPB of students at city central schools is better than of elite students and students at city outskirts schools, respectively. However, Karimi *et al.*,<sup>[17]</sup> reported an average HPB score of  $54.57 \pm 11.24$  for high school female students. Similarly, in the study of Piri *et al.*, the average HPB score among elementary and secondary school students was 64.4 percent of the total score, and also, in

the Saboohi *et al.* study the average HPB score among adolescents was  $89.3 \pm 11.3$ , which calculated to be at the medium level.<sup>[23,24]</sup> As well as, Dargahi's *et al.*<sup>[25]</sup> study among students and staff of health and dental schools and Alzahrani *et al.*,<sup>[26]</sup> among medical students, showed an average HPB score of  $24.20 \pm 2.99$  and  $8.19 \pm 8.123$ , respectively. Similarly to the studies already mentioned, the results of the studies conducted by Raiyat *et al.* and Moeini *et al.* among students in the cities of Qazvin and Hamedan, respectively, also reported the average HPB scores in the medium levels.<sup>[27,28]</sup> While the results in the present study have been evaluated as good rank. Differences between the results of this study and other studies conducted may be because of the following factors: timing of the study, measurement tools (different questionnaires), target groups (different age groups), research location sociocultural agents' (adherence to the ancient traditions of Ardabil), extensive access to social networks and virtual spaces over the past ten years. Additionally, the occurrence of the COVID-19 pandemic may have had a positive impact on the promotion of healthy behaviors among students under study. The results of the present study regarding different dimensions of HPB are in coordination with the results of some studies and do not match with some others. For example, in this study, it was found that the highest score is related to the dimension of SGS, and in this sense, it is in line with the results of the study by Barmania and Reiss, Reisi *et al.*, and Golchin *et al.*<sup>[29-31]</sup> According to Barmania, religious teachings have a significant role in promoting health, including his views on the meaning of life and death, which can be different from the views of people without religious faith. It also states that religious leaders can play a vital role in health policymaking even when that policymaking does not have any obvious reference to religion, so only cooperation with people with religious beliefs is introduced as an effective factor in improving the level of health. Golchin *et al.*<sup>[31]</sup> also have a similar interpretation as a result this rendition can be generalized to the present study: Islamic culture and spiritualism prevailing in society and emphasis on spirituality within families have an important role in the mental health and growth of adolescents. This growth is achieved through targeted living. We can add to this interpretation that in the teachings of Muslim religions, there is an emphasis on spirituality and spiritual presence in rituals such as Friday prayer, Eid prayers, Ramadan fasting as well as prayers and reading the Quran to enhance spiritualism in individuals. This is likely to be a factor in the higher score obtained in the dimension of SGS.

Our results in the ISC dimension are inconsistent with those of Pascoe *et al.* agreed research.<sup>[32]</sup> In Pascoe's study,

the highest score was attached to the dimension of ISC. In Pascoe's study, the ISC dimensions received the highest scores. In addition, the results of the present study in the dimension of ROH are not consistent with the results of Pashaeipour and Haghani<sup>[33]</sup> regarding the assessment of HPB among nurses and Abdolkarimy *et al.*<sup>[34]</sup> in health staff. In the mentioned studies, ROH has been reported as the first rank of behavior. The reason for this difference can be related to the fact that adults, especially in jobs such as medical and health staff, feel more responsible for their health and their target group. However, it can be argued that students have not yet reached the necessary maturity to bear responsibility for their health.

Furthermore, our findings in the dimensions of physical activities matched with the results of the studies of Lee Eun-Kyoung *et al.*,<sup>[14]</sup> Pashaeipour and Haghani<sup>[33]</sup> and the survey by Abdolkarimy *et al.*,<sup>[34]</sup> but it was not the same with the findings of Raiyat *et al.*<sup>[27]</sup> Because in their investigation, the lowest score was related to the dimension of responsibility, however in the current study, the lowest score belonged to the dimension of exercise and physical activity. In this regard, reasons such as restrictions for females to exercise, especially outdoors, and the influence of social media on decreasing physical activity can be some of the factors in reducing this behavior. In addition, although in the present study, we could not find a significant relationship between the type of housing ownership and HPB. However, in Mitra *et al.*'s<sup>[35]</sup> study, access to parks increased the possibility of improving physical and outdoor activities. Therefore, it seems that reducing the students' physical activity condition in schools and houses with little free space or limited access to sports places and parks is related, and therefore school managers and municipalities should pay special attention to the issue of urban green space development.

The results of the present study in the dimension of stress control of HPBs are not consistent with the results of the investigation by Cha J. *et al.*<sup>[36]</sup> In this survey, the highest average score belonged to the stress control dimensions. In explaining this finding, it should be stated that in religious teachings, spirituality is introduced as a meaningful factor in reducing stress, mental pressure, and anxiety, despite lifestyle; stress management training is discussed more.

Furthermore, the results show that age, educational level, and BMI have a significant relationship with HPB ( $P = 0.01$ ). It was also found that there is an inverse and significant relationship between age and HPB ( $P = 0.042$ ) so that as the age of students increases, HPB becomes poor. This finding confirms the results of Karimi *et al.*'s<sup>[17]</sup> study.

Regarding family support for students' health, the results of this study were consistent with the findings of Cha J. *et al.*<sup>[36]</sup> The results show that there is a positive and significant relationship between social support and HPBs. In addition, interpersonal support has more predictive power in HPB, which was in line with our findings, as more than 94% of the participants in the study stated that their families supported them.

The difference between the average HPB score in the studied schools and their average BMI score was significant ( $P = 0.01$ ). As the BMI increases, the HPB score decreases, and in this sense, the results of the present study are in line with the results reported by Piri *et al.*<sup>[23]</sup> Piri reported that BMI has a significant relationship with variables such as parent's education, mother's occupation, family dimension, and type of hobby, further HPB, which confirms the results of the present study.

The average weight and height among the studied students were higher than the results of the study by Derakhshan<sup>[37]</sup> Derakhshan reported the average weight of 11- and 17-year-old females as 33 and 50.5 kg, respectively. However, in the present study, the average weight of students aged 11 to 14 years was estimated to be 54.34 kg, which is higher than the calculated weight of Derakhshan. In addition, the average height of the students was calculated to be 162.27 cm, which is higher than the average height declared by Derakhshan (142 cm at 11 years old and 158 cm at 17 years old). In this regard, the reduction of childbearing in society, excessive parental care of the only child in the family, children not working while studying, and conditions caused by the coronavirus epidemic (decreasing physical activity and virtual education) can be considered as the cause of these results. In our study, there was no significant correlation between the hours of using virtual space and the Internet with the average HPB score, which does not confirm the Cha J. *et al.* survey results.<sup>[36]</sup> In addition, the results of the present study regarding the correlation between parents' income and education with HPB were not consistent with Abdolkarimy *et al.* results.<sup>[34]</sup> It is necessary to explain that the correlation between the mentioned variables and the type of school was significant. Students with higher income and education levels were studying in the central and elite schools.

Furthermore, the results shown in Table 7 demonstrate the positive and significant impact of the variables under investigation, indicating that each of these factors can have an influential role in promoting health-oriented behaviors among students. Among these factors, family support and parental education have been identified as the most important factors, highlighting the significance of the role of family and education in improving children's behaviors and ultimately having a positive

impact on society. The current study confirms the findings of Ostovarfar *et al.*<sup>[38]</sup> It highlights the importance of family health climate, specifically the support and involvement of mothers, in encouraging HPBs in female students. The study also emphasizes the essential role of parental education and family support in cultivating healthy eating habits and regular physical activity in adolescents. In addition, The Centers for Disease Control and Prevention (CDC) emphasizes the importance of establishing healthy and supportive school settings to encourage positive behaviors among students. The CDC's initiatives concentrate on strengthening family and community involvement to bolster student health and emotional wellness, highlighting the significance of parental education and family backing in cultivating a comprehensive approach to student well-being.<sup>[39]</sup>

### Conclusion

Considering that, the observance of HPBs by students plays an essential role in the development of health and prevention of diseases in society and is one of the determining factors of health and a healthy lifestyle, students should be taught behavior change techniques to reduce risky behaviors in schools, and become familiar and more empowered in this field. In addition, we suggest the development of educational infrastructure, the design and implementation of physical activities, and artistic and health programs that are suitable for the needs of females' school students.

### Limitation

Self-reporting, lack of practical measurement of height and weight of students.

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### Ethical consideration

This research was approved by ethical committee of Ardabil university of medical sciences: cod: IR.ARUMS.REC.1398.639.

### Author's contribution

All authors equally contributed to preparing this article.

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### Conflicts of interest

There are no conflicts of interest.

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Table 1: Ranking based on questionnaire average scores

Dimension	Questions	Ranking			
ROH	1-9	Poor 52-90	Medium 91-129	Good 130-168	Excellent 169-208
SGS	10-18				
ISC	19-27				
Nut.	28-36				
SM	37-44				
PA	45-52				

Table 2: Participants' demographic information

Variables	Min	Max	Mean			
Height (Cm)	70	178	178 ± 16			
Weight (Kg)	35	94	54.22 ± 9.94			
BMI	14.64	36.63	20.96 ± 3.56			
Use of virtual space (hr.)	1	15	3.38 ± 2.37			
History of chronic diseases	Yes	9	2.67%			
	No	531	97.33%			
Family support	Yes	531	97.33%			
	No	9	2.67%			
Family income	Poor	142	26.29%			
	Medium	166	30.74%			
	Good	102	18.90%			
	Unknown	130	24.07%			
Residence ownership type	Tenant	102	18.89%			
	Owner	386	71.48%			
	Unknown	52	9.63%			
<b>Students' mother's education</b>						
<b>Less than First High School</b>	<b>First High School</b>	<b>Second high school and diploma</b>	<b>Associate and bachelor degree</b>	<b>Master degree and more</b>		
48(8.89%)	71(13.15%)	182(33.70%)	142(26.30%)	97(17.96%)		
<b>Students' father's education</b>						
38 (7.03%)	60(11.11%)	177(32.78)	153(28.33%)	112(20.75%)		
<b>Father's job</b>			<b>Mother's job</b>			
<b>Freelance</b>	<b>Hired</b>	<b>Unknown</b>	<b>Freelance</b>	<b>Hired</b>	<b>Unknown</b>	<b>housewife</b>
304(56.30%)	200(37.04)	36(6.66%)	30(5.56%)	111(20.55%)	45(8.33%)	354(65.56%)



Table 3: Analysis of HPB in selected schools

Dimensions	City central	Elite schools	City outskirts	P-value
ROH	0.964 ± 3.106	0.805 ± 2.738	0.944 ± 3.149	0.028
SGS	1.020 ± 3.657	1.107 ± 3.298	1.140 ± 3.166	0.018
ISC	0.895 ± 3.676	0.833 ± 3.257	0.781 ± 3.513	0.042
Nut.	0.942 ± 3.599	0.869 ± 3.264	0.861 ± 3.274	0.036
SM	0.805 ± 3.799	0.629 ± 3.617	0.687 ± 3.513	0.044
PA	0.870 ± 3.957	0.916 ± 3.852	0.840 ± 3.690	0.041

Table 4: HPB dimensions score

Dimensions	Items	Min	Max	City central	Elite schools	City outskirts	P-value
ROH	9	9	36	27.4 ± 13.93	25.4 ± 41.87	23.5 ± 74.49	0.021
SGS	9	9	36	31.4 ± 2.08	29.4 ± 65.6	27.4 ± 18.87	0.013
ISC	9	9	36	28.5 ± 12.76	27.5 ± 80.43	25.5 ± 13.12	0.034
Nut.	9	9	36	27.4 ± 2.12	24.4 ± 94.33	23.4 ± 14.28	0.041
SM	8	8	32	25.5 ± 11.21	24.5 ± 52.02	22.4 ± 66.63	0.047
PA	8	8	32	25.6 ± 41.09	25.6 ± 41.09	22.4 ± 62.12	0.048

Table 5: HPB score rank

HPB rank	City central students		Elite schools students		City outskirts students		Sum.	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Poor	10	23.81	14	33.33	18	42.86	42	7.78
Medium	34	28.10	42	34.71	45	37.19	121	22.41
Good	90	37.97	81	34.18	66	27.85	237	43.89
Excellent	59	42.14	43	30.71	38	27.15	140	25.92

Table 6: Correlation between demographic variables and HPB score

HPB scores	BMI	Family support	Family income	Mother's job	Father's job	Mother's education	Father's education	Age (year)
<b>Central</b>	0.184	0.389	0.211	0.270	0.385	0.202	0.117	-0.245
	0.050	0.004	0.058	0.068	0.073	0.620	0.063	0.000
<b>Elite</b>	0.167	0.288	0.233	0.255	0.291	0.189	0.222	-0.255
	0.045	0.000	0.060	0.066	0.148	0.661	0.055	0.000
<b>Outskirts</b>	0.201	0.306	-0.246	0.236	0.310	0.160	0.106	-0.236
	0.050	0.049	0.065	0.074	0.880	0.603	0.071	0.000

Table 7: Regression model to investigate the relationship between variables

Model fitting summary		ANOVA					
<b>Standard Error</b>	13.53	<b>Sum of Square</b>		<b>df.</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig</b>
<b>R</b>	0.75	<b>Regression</b>	12765.38	9	1418.37	21.815	0.000
<b>R Square</b>	0.56	<b>Residual</b>	34524.09	531	65.13	-	-
<b>Adjusted R Square</b>	0.54	<b>Total</b>	67289.48	540	-	-	-
<b>Variables</b>	<b>B</b>	<b>Std. Error</b>	<b>Beta</b>	<b>t-value</b>		<b>Sig</b>	
<b>Age</b>	1.48	0.30	0.14	4.66		0.000	
<b>Father's education</b>	11.34	3.98	0.11	2.87		0.004	
<b>Mother's education</b>	14.96	4.83	0.15	3.09		0.002	
<b>Father's job</b>	10.29	3.84	0.10	2.67		0.008	
<b>Mother's job</b>	12.54	4.62	0.12	2.71		0.007	
<b>Family income</b>	8.11	3.58	0.08	2.16		0.031	
<b>Family support</b>	18.65	3.88	0.18	4.79		0.000	
<b>BMI</b>	8.75	3.70	0.08	2.36		0.018	



