



## Relationship between Physical Activity, Knowledge, Attitude, and Nutritional Practice with Body Mass Index (BMI) of Iranian Teenage Girls

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### Abstract

**Background:** Adolescence is considered one of the most critical periods of human development, in which nutrition, physical activity and weight control play a very effective role. This study was conducted to determine the relationship between physical activity, knowledge, attitude and nutritional practice with (BMI) in student girls.

**Methods:** the statistical population of 270 female students in the age range of 14.3±1.3 in Miami city in 1401 with the convenience sampling method and were selected as available. They completed the questionnaire containing demographic information, knowledge, attitude and nutritional practice (KAP), the international physical activity questionnaire, Anthropometric values (BMI) were computed and compared with CDC2000 standards and then using SPSS software. The significant level was set at 0.05.

**Results:** The results showed that students had 48.7%, 48.1% and 41% moderate score knowledge, practice but attitude score low respectively. Comparison of BMI with standard values showed that 24.5%, 7.7% and 4% of participants were underweight, overweight and obese respectively. Statistically significant correlation was seen knowledge, attitude and nutritional practice with BMI and also between attitude and nutritional practice with physical activity (Pvalue<0.05).

**Conclusions:** Based on the findings, the data indicate that knowledge, attitude and practice nutritional of Mime Shahrud province were moderate or relatively low and all of the students, need more Theoretical and applied nutritional education, physical activity, weight control methods in textbooks and cyberspace is necessary.

**Keywords:** Knowledge, Attitude and nutritional practice, Physical activity, Body mass index.

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## Introduction

Adolescence is a transitory period. The world health organization defines adolescence as the age of 10-19 years and calls this period the time to reach independence. It can affect their health in adulthood.<sup>1</sup> In a study it has shown that cultural and demographic factors play an important role in the diet, habits and attitudes towards food among teenagers, and these factors ultimately contribute to their eating habits and nutritional status.<sup>2</sup> In another way, it can be said that adolescence is one of the most sensitive and important periods of human development, in which human growth suddenly increases and requires special nutritional needs. Studies show

that factors such as misleading advertisements, the availability of fast foods, business and poor nutritional knowledge cause adverse effects on (BMI) and reduce health. One of the important reasons for improper nutrition is the lack of knowledge or lack of young athletes and coaches in this field. Most people's nutritional actions and behaviors are based on nutritional attitudes. The use of height and weight indices to understand the health and nutrition status of children and adolescents in society is becoming increasingly important.<sup>3</sup> Currently, teenagers are more attracted to fast food available in the market than homemade food, consumption of fast food and lack of physical activity are important causes of various diseases, including obesity and high blood pressure. The results of studies showed that 60% of girls regularly eat fast food and have little nutritional knowledge about a balanced diet, food patterns, and health.<sup>4</sup> Inactive people are exposed to diseases such as obesity, ischemic heart disease, diabetes and stroke. The increase in the consumption of energy-dense foods and inactivity are the reasons for overweight and obesity in different ages, especially in adolescence. Childhood and adolescent obesity is a major crisis worldwide.<sup>5</sup> Physical inactivity is the fourth-biggest cause of premature but preventable death in the world.<sup>6</sup> Among the benefits of physical activity, we can mention improving cardiac and respiratory strength, strengthening blood circulation, and muscle preparation. Physical activity has a positive effect on cognitive practice, academic and mental progress of adolescents.<sup>7</sup> Overweight and obesity during childhood and adolescence increases the risk of contracting various diseases in adulthood. The most common method of assessing obesity is the body mass index (BMI).<sup>8</sup> In addition to preventing the occurrence of diseases, proper nutritional knowledge in adolescence also affects the body composition of people. Eating habits are one of the important factors that affect a person's health. Nutritional habits are more influenced by cultures and nutritional beliefs and attitudes than awareness.<sup>2</sup> In the last few decades, obesity and overweight have increased significantly in adolescents all over the world. Currently, 1/3 of the population around the world can be considered obese or overweight. According to the world health organization (WHO), obesity is one of the most well-known medical conditions in students. Several studies on obesity have shown that obesity is directly related to the reduction of physical activities and high consumption of industrial food. Such an epidemic of obesity may be recognized as an obvious concern for public health. Therefore, the relative importance of sedentary lifestyle, which is a related factor it

cannot be denied with obesity. Studies show that the clinical efforts of health care to encourage teenage students to consume healthy food and more physical activity with the aim of reversing the prevalence of obesity in recent years have not yet been successful in any country.<sup>9</sup> Current evidence shows that overweight in children is the beginning of health problems such as cardiovascular diseases, diabetes and cancer.<sup>10</sup> Chronic diseases related to obesity can create many physical limitations in daily activities, and its psychological effects can be aggravated even in the later stages of life.<sup>11</sup> Physical activity is an essential behavior for the health of children and adolescents. Young people who regularly participate in physical activity have improved cardiorespiratory fitness, bone and muscle growth, weight control, and reduction of anxiety and depression symptoms in comparison to less active peers. Physical activity goes beyond the health benefits it has. The educational practice of young people is improved. Globally, 81% of 11-17 year olds did not meet WHO recommendation of at least 60 minutes of moderate to vigorous daily Physical activity in 2016.<sup>12</sup> Physical activity prevents the development of many diseases and prevents early death in adults. Maintaining sufficient levels of physical activity among children is necessary to prevent childhood obesity and many diseases in children.<sup>13</sup> Considering the mentioned cases and few researches in our country and due to the necessity and acceptability of this topic because it has not been done in this region of Iran, the importance of conducting this research is felt with the purpose of investigating the relationship between physical activity and knowledge, attitude and nutritional practice with the body mass profile of female students. Hoping that the results of this study and similar studies can open a way to improve the nutritional status and physical activity of society, especially teenagers.

## Materials and Methods

In this descriptive and analytical study that was conducted in Miami city of Semnan province in 1401, a number of 270 students participated in the study with the convenience sampling method and were selected as available. After completing the consent form and reading the explanations included in the questionnaire, including its goals and application, the questionnaire was completed by the students with the satisfaction of the individuals and their parents. Based on the entry and exit criteria of the study, 5 questionnaires were used in order to carry out this study, which are:

**General information questionnaire:** Data related to individual and family characteristics were collected through this questionnaire. A questionnaire was used, which contains 15 questions on the principles of nutrition, nutrition during puberty, pregnancy and breastfeeding. This questionnaire includes a total of 15 points, each question includes one point.

**Nutritional attitude questionnaire:** This questionnaire was used to determine the nutritional attitude of the students, which consists of 6 questions based on the.

**Likert scale** (completely agree - agree - I have no opinion - I disagree, and I completely disagree) or: (1, poor; 2, below average; 3, good on average; 4, very good; and 5, excellent) are graded from one to five. **Nutritional practice questionnaire:** To obtain the practice and eating habits of the students, this

questionnaire consists of 14 questions of one point, one question of six points and one question is three points was used. 0.5, 0.25, and 0.75 percentiles have been calculated for the questionnaires of knowledge, attitude, and nutritional practice, and based on the percentiles, people have been categorized into three levels of poor, medium, and good.

**International physical activity questionnaire for children and adolescents (IPAQ-C):** IPAQ-C was used to measure the physical activity level of the participants. This questionnaire has 10 questions that measures the level of physical activity of people on a 5-point Likert scale during the past week in the form of self-report. Reliability and validity of the questionnaire: Zamani et al. reviewed and approved. Also, the reliability of the questionnaire was obtained by calculating Cronbach's alpha of 0.89%.<sup>14</sup> Questionnaires of nutritional knowledge, attitude and practice were prepared using reference books and the contents of the questions were checked by the faculty members of the university and its validity after making the necessary changes based on the opinions of the faculty, and its reliability was confirmed by determining the Cronbach's alpha coefficient ( $\alpha = 0.78$  was accepted).<sup>15,16</sup> According to the estimation of the study by Delvarianzadeh et al. (2013), the level of awareness, attitude and practice was such that people whose score was more than 75% of the maximum score were considered good and desirable and people whose score was in the range of 50-75% of the maximum score and the people who obtained less than 50% of the maximum score were considered as weak.<sup>15</sup> The names of the people were not asked in the questionnaires, and the information of the people was analyzed in general. The present thesis in Shahrood university of technology was reviewed and approved with the code of ethics IR.SHAHROODUT.REC.1401.007. It can also be seen on the website of the National System of Ethics in Biomedical Research. Analysis of data was done using descriptive statistics including frequency, mean, standard deviation, median, smallest and largest data, as well as inferential statistics including chi-square tests, Fisher's exact test, and one-way analysis of variance (ANOVA). The significant level was set at 0.05. Analysis was done using SPSS version 22 statistical software.

## Results

270 female middle school students participated in this study. The average age of female middle school students in Miami city is  $14.3 \pm 1.3$ . The average age of the participants in the study is 14. The average weight and height of female students are  $50.5 \pm 1.08$  kg and  $1.56 \pm 1.14$  meters, respectively.

The average body mass index of female students is equal to  $20.64 \pm 4.24$  and the median is 19.85. According to the body mass index for age and weight for age, underweight (percentile equal to and less than 5), with normal weight (85-5th percentile), was considered at the risk of overweight (85th to 95th percentile) and obesity (equal to and above the 95th percentile).<sup>17</sup> Most of the students participating in the study, i.e. 51.6% had a normal body mass index and 7.7% were overweight, 81% of the female students participating in this study are studying in public schools. Most of the middle school female students participating in the study are in the first high school. The education level of the father of most of the students, i.e. 53.1%, is in the cycle category and below. The

education level of the mother of most of the students, i.e. 49.5%, is in the cycle category and below. The father's occupation of most of the students is 34.1% freelancer and 24.5% worker. The occupation of the mother of most students is 34.1% freelance and 24.5% worker. The average size of students' households is 4 people, and the median is 5 people. The average score of the participant's physical activity showed a significant correlation with the body mass index ( $P < 0.04$ ). (Table 1). The average physical activity score of girls was  $2.1 \pm 0.66$  (Table 2). According to the standard of physical activity index, if this index is 75% or higher, the physical activity score is between 3 and 5, which is the maximum physical activity score. An index between 50 and 75 percent is equivalent to a score between 2 and 3, indicating an average activity score, and an index less than 50 is equivalent to score 2, which indicates poor physical activity. In this study, the physical activity score was less than 2, which indicates poor activity in the studied subjects.<sup>15</sup>

Statistically significant difference between the average physical activities of girls based on the level of body mass index has been obtained, so that the average score of physical activity in girls with body mass index at the thin and normal level is higher than the other two groups.

The majority of the studied subjects had average knowledge and practice, and poor attitude. In total, 30.8, 48.7, and 15.7 girls had poor, average, and good knowledge, respectively, and 37, 41, 1.1, and 16 girls had poor, average, and good nutritional attitudes, respectively.

They had weak, average, and good attitude respectively, and also 18.3, 48.1, 16.1 girls had weak, average, and good practice, respectively (table 3).

A statistically significant relationship between the level of nutritional knowledge and the body mass index of middle school girls of Miami city participating in the study has been obtained ( $P = 0.02$ ). It can be said that most students whose BMI was at a normal level had an average level of knowledge and most of the obese people had a weak knowledge (table 4).

A statistically significant relationship between the level of nutritional attitude and the body mass index of middle school girls of Miami city participating in the study has been obtained ( $P = 0.001$ ). Most of the underweight and normal students or participants had a moderate nutritional attitude (table 5).

A statistically significant relationship was obtained between the education level of parents and the nutritional attitude of girls.

## Discussion

Most of the students participating in the study, i.e. 51.6% had normal body mass index and 7.7% were overweight. The average physical activity score of girls was  $2.1 \pm 0.66$ . In our study, there was a statistically significant relationship between the level of nutrition awareness and BMI, which is in line with the study of Jagim et al.<sup>8</sup> Our results showed that the nutrition awareness affects the eating habits of athletes and their body mass index.

In this study, the score of knowledge and nutritional practice was average and the score of nutritional attitude was

poor, which is similar to the study of Delvarianzadeh et al. stated that adolescent girls have average knowledge and practice and their nutritional practice is not in accordance with their attitude, and it is consistent with the necessity of regular nutrition interventions in students.<sup>15</sup> In a study conducted on the knowledge, attitudes and behaviors of physical activity among Saudi teenagers before and during the restrictions of COVID-19 on Saudi teenagers aged 11 to 15, it showed that although the importance of physical activity and their attitude towards physical activity were reported positively, the teenagers did not follow the recommendations, as a result of measures such as coordination with school, it is necessary to achieve the recommended level of physical activity during the day among adolescents at home and at school with the support of family and school teachers, which our study confirms the necessity of this.<sup>6</sup> This study emphasizes the need for awareness and education about the importance of physical activity and healthy nutrition, which is consistent with a study that was conducted on students to check whether BMI changes with physical activity programs and educational programs, because the study showed that education with the issue of nutrition and physical activity is an effective way to raise the awareness of young people to become more active and have a healthier diet.<sup>5</sup> In the study of Zare-Zardiny et al.<sup>16</sup>, which examined the relationship between BMI and health literacy of high school students showed that the body mass index was normal and the health literacy score of the students was at the borderline level.

The body mass index was normal and the health literacy score of the students was at the borderline level. It showed that the normal body index of the students is consistent with the results of this study.<sup>16</sup> The correlation of body mass index was consistent with another study that evaluated knowledge, attitude, and nutritional practice and body mass index of adolescents living in orphanages.<sup>18</sup> In a study that examined the relationship between nutrition knowledge and physical activity and body mass index for school children in Ghana on 591 children aged 8-13 years, it showed that students have poor knowledge and good knowledge about physical activity, and children in private schools have excellent nutritional knowledge. The results of this study in public schools were not similar to private schools.<sup>19</sup>

In the study that was conducted in Hamadan to investigate the nutritional factors and body composition of selected high school student athletes, Jafari et al. considered the importance of education about nutrition and useful strategies in this field to be essential, and the results of this study were consistent with our results.<sup>3</sup> Also, a study was conducted with the aim of analyzing the physical activity levels of teenagers and the relationship with their body image and nutritional habits on 1089 high school students showed that the physical activity level of girls is low, and measures should be taken to promote physical activity and inform about the importance of proper eating habits should be done in this way by more people, and the results of study are also consistent with our study.<sup>20</sup> Yaghi Maria Ekram (2022) investigated the relationship between knowledge and attitude and nutrition practices with nutritional status and eating habits and BMI in different educational and organizational environments in Lebanon, and they did not find

any relationship between knowledge and healthy eating, and no relationship between BMI and KAP, but they considered BMI to be related to unhealthy eating behavior, which is not consistent with our study, because in this study, a statistically significant relationship was obtained between the level of nutrition attitude and the body mass index of girls, and most of the thin and normal people had an average nutritional attitude, which perhaps this discrepancy was due to the difference in the geographical area of these two studies.<sup>21</sup> In general, physical activity, nutrition and having the knowledge, attitude and practice of proper nutrition are very important in students during adolescence and education. We know that adolescence is one of the most sensitive periods in human life. The results of this study show that although most of the students are aware of the importance of physical activity and nutrition and its place in health, their level of awareness and average practice and poor attitude are not at a good level, which may be due to the low level of literacy of their parents, the cultural level of rural life, The lack of communication with the larger society, the early marriages of the parents, that the necessity of increasing students' awareness of the mentioned matters through educational classes, consulting with nutritionists and sports experts and giving more information through books and cyberspace is felt, as well as the need to give suitable information for doing more physical activity is also important.

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### Conflict of Interest

The authors declare that they have no conflict of interest.

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