



## Studying the prevalence of obesity among students in Mashhad

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### Abstract

Obesity is one of the most health problems in society. Childhood obesity can lead to medical problems in adulthood. Given the increasing prevalence of obesity, we decided to determine its prevalence among students in Mashhad. In this cross-sectional study, five regions (north, south, east, west, and center) of Mashhad were selected, and 20 schools and 1,040 students were selected in a multi-stage, simple random sampling method. The height and weight of the children were measured using a standard measuring instrument in a standing position without shoes with an accuracy of 0.1 cm, and the weight of the children without shoes and additional clothing was measured with a standard digital scale with an accuracy of 0.1 kg, and the body mass index of each individual was recorded. The mean age of the students was 10.6 years with a standard deviation of 0.74 years. Based on the criteria of the CDC, the obesity rate in female students was 65.8%, overweight was 54.16%, normal weight was 25.61%, and thinness was 56.13%. These rates were also calculated based on the WHO criteria, which were 26.8% of obese students, 83.21% overweight, 21.62% normal weight, 87.5% thin, and 83.1% very thin, respectively. Given the high prevalence of overweight and obesity in students and its significant relationship with the level of parental education, urgent measures need to be taken to educate families about proper nutrition, lifestyle changes, and appropriate physical activity.

**Keywords:** Obesity, Prevalence, Student

### Introduction

Obesity has become a human concern today, and its prevalence has become a problem in many countries at the beginning of the third millennium (3-1). Of course, human societies have been struggling with obesity since ancient times, and the statues left by the ancient Greeks and the writings of Avicenna confirm this (5-4). However, today, a sedentary and sedentary lifestyle has led to an increase in this issue, which can be said to originate from childhood and lifestyle. In recent years, obesity among children in developed countries has been on the rise, to the extent that the World Health Organization has also issued many warnings to various countries (5-9). In Iran, obesity has also spread among students in recent years, with the prevalence rate showing 34% in girls and 31% in boys (10). In a study conducted by Madah in Zahedan, the prevalence of obesity among students is about 10% (11). Also, in a study conducted by Akbari and his colleagues, this rate was stated as 15% (12). In 2017, Khazai and his colleagues showed that the prevalence of obesity in Iranian students was about 18.5% (13). Also, in 2022, Shirzadeh and his colleagues obtained a prevalence of obesity of 21% in Iranian children (14). In 2023, Jeong and his colleagues showed that obesity in American students was about 19.1% (15).

The numerous medical and psychosocial complications of obesity in children and adolescents and the harm it imposes on society demonstrate the necessity of control and prevention in students. Given the high prevalence of obesity, the consequences of which in adulthood lead to diseases such as heart disease, diabetes, etc., we decided to conduct this study in about 20 schools in Mashhad in different areas to investigate the prevalence of obesity in students.

## Method and Materials

This study was cross-sectional and was conducted on the fourth and fifth grade girls in Mashhad. Considering the 5% alpha error and other previous studies, the statistical population was determined to be 865. Also, considering the 20% correction factor for multi-stage sampling, the required sample size was calculated to be 1040 students. The sampling method was multi-stage. In the first stage, each of the geographical areas of Mashhad was randomly selected. Then, 4 schools were selected in each area. After selecting 20 schools, the sample share of each area was determined to be about 200 students and then in the next stage, the height and weight of the children were accurately measured (measurement of the ankle without shoes and with an accuracy of 0.1 cm / measurement of body weight with clothes with a digital scale). To measure the body mass of the students, 2 criteria of the Center for Disease Control (CDC) and the criteria of the World Health Organization (WHO) were used (4,19,21,23). Children whose obesity was due to genetic diseases, organic diseases, use of corticosteroids and hypothyroidism were excluded from this study. Also, none of the students were forced to participate in this study. Chi-square test was used to analyze the data to determine the relationship between variables (SPSS22).

## Result

Our study was conducted on 1040 female students in Mashhad. The mean age of these students was 10.8 with a standard deviation of 0.74 and a median age of 11.3 years. The age range of the sample studied was 9.2 to 12.3 years. The parents' occupation of 40% of these students was in the market, 34% were employees and 12% were workers. A family history of obesity was reported for 642 samples (52%). Based on the criteria of the Center for Disease Control (CDC), the obesity rate in the students of this study was 8.72%, overweight was 16.74%, normal weight was 61.12% and underweight was 13.47%. These rates were 8.27, 21.94, 62.26 and 5.87 respectively based on the criteria of the

World Health Organization (WHO). Also, based on this criterion, the percentage of very thin people was 1.86. Tables 1 and 2 show the prevalence of obesity, overweight, and underweight according to the criteria of the Center for Disease Control ( $P_{value} < 0.01$ ) and the World Health Organization ( $P_{value} < 0.01$ ) by region. Tables 3 and 4 also show these rates according to the criteria of the Center for Disease Control ( $P_{value} < 0.01$ ) and the World Health Organization ( $P_{value} < 0.01$ ) by age, respectively. In relation to body mass index and father's occupation ( $P_{value} < 0.05$ ), obesity was higher in children with a doctor father and overweight in children with a contractor father. Similarly, children whose fathers had low literacy levels were more obese. Also, people with obese family members showed a higher percentage of obesity ( $P_{value} < 0.01$ ).

Table 1: Results of BMI based on CDC criteria by region (n=1040)

$P_{value}$	Thin		Normal		Over-weight		Fat		Region
< 0.01	%	No	%	No	%	No	%	No	
	18.66	38	61.5	114	14.06	31	11.8	21	West
	10.88	22	60.53	130	16.72	30	10.54	22	North
	9.88	20	63.2	113	16.16	33	12.09	25	Center
	17.89	21	54.12	149	24.75	52	4.35	9	East
	18.77	40	66.25	131	11.43	25	5.7	13	South
		141		637		172		90	Total

Table 2: Results of BMI based on WHO criteria by region (n=1040)

$P_{value}$	Very- thin		Thin		Normal		Over-weight		Fat	Region
< 0.01	%	No	%	No	%	No	%	No	%	No
	3.78	7	4.63	11	68	143	17.78	37	5.5	12
	2.12	5	5.89	10	57.94	109	12.84	41	12.45	24
	1.96	4	4.75	10	61.65	130	22.02	44	9.54	19
	0	0	4.8	10	52.72	108	32.75	70	9.76	21
	1.35	3	8.56	20	69.45	157	15.35	35	4.77	10
		19		61		647		237		86
										Total

Table 3: Results of BMI based on CDC criteria by age (n=1040)

$P_{value}$	Thin		Normal		Over-weight		Fat		Age
< 0.01	%	No	%	No	%	No	%	No	
	39.5	10	38.2	8	12.8	3	19	4	9
	13	60	53.4	230	20.2	87	10/6	46	10
	11.9	53	66.9	304	13.4	60	7.8	35	11
	11.4	18	68.2	96	16.5	22	4.2	5	12
		141		637		172		90	Total

Table 4: Results of BMI based on WHO criteria by age (n=1040)

<i>P<sub>value</sub></i>	<i>Very-thin</i>		<i>Thin</i>		<i>Normal</i>		<i>Over-weight</i>		<i>Fat</i>		<i>Age</i>
< 0.01	%	No	%	No	%	No	%	No	%	No	
	0	0	19	4	50	9	18	6	19	5	9
	1.8	8	4.6	20	59.7	255	23.8	101	9.6	41	10
	2.4	10	4.8	22	65.9	300	18.4	83	7.5	32	11
	0.8	1	11.5	15	59.8	83	25.7	37	4.9	8	12
		19				647		227		86	Total

## Discussion

Our results show that the prevalence of obesity (8.7%) and overweight (16.5%) in students can be the result of improper nutrition, low physical activity, and an inappropriate lifestyle. In this regard, proper education for parents, especially students, seems essential. In recent years, various studies have been conducted that confirm our results. In a study conducted in Zahedan, the prevalence of obesity among students was about 10%. The results of Akbari and his colleagues showed that the prevalence of obesity and overweight was 15%. Also, a study by Khazai and his colleagues in 2017 proved that the prevalence of obesity in Iranian students was about 18.5%. Also, in 2022, Shirzadeh and his colleagues obtained a prevalence of obesity of 21% in Iranian children. In 2023, Jeong and his colleagues showed that obesity in American students is about 19.1%. Given the high prevalence of obesity and overweight among students in the country, it is necessary to provide necessary education to families. This disease in children leads to many problems in later life. Various studies show that obesity persists in later years and also causes secondary diseases. In this study, the relationship between obesity and the father's occupation and the level of education of the parents was also examined. The results show that the higher the level of education of the parents, the higher the prevalence of obesity, indicating a relationship between the level of welfare and obesity. Also, in this study, the relationship between family history of this disease and obesity in children was examined, and the results showed that the presence of obese parents can have an upward effect on the prevalence of obesity.

## Conclusion

The results of our study showed that the prevalence of obesity among students is related to the type of nutrition, lifestyle, education level, and occupation of parents. Therefore, in order to prevent the occurrence of secondary diseases in older ages, there is an urgent need for necessary education for families, especially students.

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