



Obesity Prevalence and Effective Factors in High School Students in Erzincan City Center

Erzincan İl Merkezindeki Lise Öğrencilerinde Obezite Prevalansı ve Etkili Faktörler

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Abstract

Aim: Obesity is an important public health problem causing morbidity and mortality in both developed and developing countries, which can be caused by excessive fat deposition in the body. This study was planned to determine the prevalence of obesity and risk factors affecting obesity among high school students in Erzincan city center

Material and Method: In 2015, there are 9901 students in education in these schools. Obesity prevalence was estimated to be 10% in the case that the sample size was known and it was calculated as 796 with 95% confidence interval and 2% error margin. A questionnaire form questioning sociodemographic information, nutritional habits, physical activity status of the students was prepared. Body mass index (BMI) was defined as overweight between the 85th and 95th percentile and obese in the 95th percentile.

Results: 10.5% of the students were obese. When the risk factors leading to an increase in BMI were examined, it was seen that overweighting and obesity were more frequent among the students living in the province/district than the students living in the village. The frequency of overweighting and obesity was found to be higher in students whose mothers were housewives, who had overweight individuals in their families, who had fast eating habits, who come to school by vehicle and do not walk regularly.

Conclusion: Education should be provided for families to develop conscious behaviors about balanced and regular nutrition. Students should be able to establish eating and regular walking habits.

Keywords: Obesity, high school students, prevalence, risk factors

Öz

Amaç: Obezite, vücutta aşırı yağ depolanmasıyla ortaya çıkan, morbidite ve mortaliteye neden olabilen, hem gelişmiş hem de gelişmekte olan ülkelerde önemli bir halk sağlığı sorunudur. Bu çalışma Erzincan il merkezinde öğrenim gören lise öğrencilerinde obezite sıklığını tespit etmek ve obeziteye etki eden risk faktörlerini saptamak amacıyla planlanmıştır

Gereç ve Yöntem: Erzincan il merkezinde toplam 9901 öğrencinin öğrenim görmektedir. Örneklem büyüklüğü evrenin bilindiği durumda obezite prevalansının %10 olduğu tahmin edilerek %95 güven aralığında ve %2 hata payı ile hesaplanarak 796 olarak bulunmuştur. Öğrencilerin sosyodemografik bilgileri, beslenme alışkanlıkları, fizik aktivite durumlarını sorgulayan anket formu hazırlanmıştır. Öğrencilerin tartı ve boy ölçümleri sonrası VKİ (Vücut Kitle İndeksi)'leri hesaplanmıştır. Yaş ve cinsiyete göre belirlenmiş çizelgelerde VKİ değeri 85. ile 95. persentil arası fazla tartılı, 95. persentil ve üzeri şişman olarak tanımlanmıştır.

Bulgular: Öğrencilerin %10,5'i obez bulundu. Vücut kitle indeksinde artışa yol açan risk etmenleri incelendiğinde il/ilçede oturan öğrencilerde fazla tartı ve obezite sıklığı köyde yaşayan öğrencilere göre daha fazla olduğu görüldü. Anneleri ev hanımı olan öğrencilerde obezite sıklığı daha fazla idi. Ailesinde fazla kilolu birey olan öğrencilerde fazla tartı ve obezite sıklığı daha fazla bulunmuştur. Hızlı yemek yeme alışkanlığı olan, okula vasıtayla gelen ve düzenli yürüyüş yapmayan öğrencilerde obezite sıklığı daha fazla bulunmuştur.

Sonuç: Ailelerin dengeli ve düzenli beslenme konusunda bilinçli davranışlar geliştirmek için eğitimler verilmelidir. Öğrencilere yemek yeme alışkanlıklarının oluşturulabilmesi için düzenli yürüyüş alışkanlıklarının edinilmesi sağlanmalıdır.

Anahtar Kelimeler: Obezite, lise öğrencileri, prevalans, risk faktörleri

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INTRODUCTION

Obesity is a disease that forms when the energy taken from the food is higher than the energy consumed and it is characterized by the increased proportion of fat tissue in the body weight. Nowadays, obesity is increasing as one of the most important health problems in the developed and developing countries.^[1]

It is known that the onset of obesity extends to childhood in the majority of adults. It is especially important that obesity, which starts at the age of 4-11, continues in adulthood and is associated with problems such as hypertension, cardiovascular diseases and diabetes. Therefore, prevention from obesity is becoming increasingly important in childhood and adolescence.^[2]

The prevalence of childhood obesity is increasing all over the world. It is one of the major health problems in the world and has become a pandemic. The worldwide prevalence of obesity has increased almost three-fold since 1975. In 2016, the World Health Organization estimated that around 650 million people worldwide were fat; it also states that more than 340 million children and young people aged 5-19 are overweight or obese.^[3] Obesity is not only considered as a problem of developed countries; it is also a problem in developing countries due to the negative impact of globalization. It is emphasized that more than 50% of those currently living in the United States are overweight whereas 20% are obese.^[4] In our country, according to The Population and Health Survey, 17.2% of children aged from 12 to 17 were found to be overweight/obese.^[5] According to The Turkish Nutrition and Health Survey that was performed in 2017, approximately 17.2% of children in the age group 15 to 18 were found to be overweight and 7.5% were obese.^[6]

This study was planned to determine the prevalence of obesity among high school students in Erzincan city center and to determine the risk factors affecting obesity.

MATERIAL AND METHOD

This study is a cross-sectional descriptive study performed to investigate the prevalence and risk factors of obesity among high school students in Erzincan city center. Necessary written permissions were obtained from Erzincan University Faculty of Medicine Ethics Committee and Provincial Directorate of National Education (E.36584). It was found that there were 31 high schools in the city center of Erzincan and a total of 9901 students attended these high schools. Sampling was done using Epi info program. The sample size was calculated as 796 in the case that the universe is known and the prevalence of obesity was estimated to be 10% with 95% confidence interval and 2% error margin. The schools that the study was going to be held were determined by lot. The classes and students were determined by stratification of class and gender. 871 students participated in the study, but after excluding the students that had been found to have completed an incorrect or incomplete survey, 864 students were taken into evaluation. A questionnaire was used to collect sociodemographic information, nutritional habits and physical activity.

BMIs of the students were calculated after weight and height measurements. When evaluating BMI results, WHO's published limit values for children aged 5-19 in 2007, which include overweight and obesity limits by age and sex, were used. BMI was defined as normal weight between the 5th and 85th percentile, overweight between the 85th and 95th percentile, and obese in the 95th percentile and over in the charts determined by age and gender.

Statistical Package for Social Science (SPSS) version 21 was used for the statistical analysis. We used methods of descriptive and analytical statistics; the relations between categorical data were evaluated using chi-square test. Statistical tests were two-sided at a significance level of 5 %.

RESULTS

A total of 864 students, 433 girls and 431 boys, participated in the study. According to WHO international growth reference values, 76% of the students were found to be normal weight, 13.5% were overweight and 10.5% were obese.

When BMI changes of students were examined according to gender; the prevalence of overweight students was 13.2% for girls and 13.9% for boys whereas the prevalence of obesity was 8.5% in girls and 12.5% in boys, and no statistically significant difference was found between them ($p=0.13$).

Among the students who participated in the study, the prevalence of overweight/obesity was significantly lower in those living in the village compared to those living in urban areas ($p=0.04$). The prevalence of overweight was found to be statistically significant in children of working mothers with 23.2% and the prevalence of obesity was also found to be statistically significant in children whose mothers were housewives with 10.8% ($p=0.006$). There was a higher incidence of obesity and overweight in students and families that have diseases compared to those without diseases and no significant difference was found between the BMI changes of the students according to the disease status. The frequency of both overweight and obesity were significantly higher in students who had overweight individuals in their families ($p<0.001$). The prevalence of obesity was higher in smokers with 12.8% and no significant difference was found between the BMI changes of students (**Table 1**).

When the eating habits of the students were examined, it was found that the frequency of obesity was significantly lower in the slow eating students ($p=0.02$). No significant difference was found between the BMI changes of the students according to their meal skipping and eating status.

When the students' access to school was analyzed, the frequency of overweight and obesity were found to be higher in those who came to school by vehicles. However, there was no statistically significant difference between them and those who walked. The frequency of obesity was higher in patients with 1 or less weekly sports activity. When the walking status of the students was examined, the frequency of obesity was found to be significantly higher in those who did not walk ($p=0.02$). When the daily sleep time of the students was examined, it was observed that as the duration of sleep increased, the frequency of overweight and obesity increased (**Table 2**).

Table 1. Distribution of BMI changes with some characteristics of students

| Gender | BMI change status | | | | | | | | Statistics |
|-------------------------------|-------------------|------|-----|------|-------|------|-------|------|-----------------------------|
| | NW | | OW | | Obese | | Total | | |
| | n | % | n | % | n | % | n | % | |
| Girls | 339 | 78.3 | 57 | 13.2 | 37 | 8.5 | 433 | 50.1 | $\chi^2=3.98$ $p=0.13$ |
| Boys | 317 | 73.5 | 60 | 13.9 | 54 | 12.5 | 431 | 49.9 | |
| Place of living | | | | | | | | | |
| City center | 509 | 75.6 | 96 | 14.3 | 68 | 10.1 | 673 | 77.9 | $\chi^2=10.3$ $p=0.04$ |
| District | 55 | 67.1 | 12 | 14.6 | 15 | 18.3 | 82 | 9.5 | |
| Village | 92 | 84.4 | 9 | 8.3 | 8 | 7.3 | 109 | 12.6 | |
| Disease in the Student | | | | | | | | | |
| Yes | 39 | 83.0 | 3 | 6.4 | 5 | 10.6 | 47 | 5.4 | $\chi^2=2.207$ $p=0.332$ |
| No | 617 | 75.5 | 114 | 14.0 | 86 | 10.5 | 817 | 94.6 | |
| Disease in the family | | | | | | | | | |
| Yes | 64 | 68.8 | 16 | 17.2 | 13 | 14.0 | 93 | 10.8 | $\chi^2=2.901$ $p=0.230$ |
| No | 592 | 76.8 | 101 | 13.1 | 78 | 10.1 | 771 | 89.2 | |
| Obesity in the Family | | | | | | | | | |
| Yes | 89 | 58.2 | 32 | 20.9 | 32 | 20.9 | 153 | 17.7 | $\chi^2=34.2$ $p<0.001$ |
| No | 567 | 79.7 | 85 | 12 | 59 | 8.3 | 711 | 82.3 | |
| Smoking | | | | | | | | | |
| Yes | 75 | 79.8 | 7 | 7.4 | 12 | 12.8 | 94 | 10.9 | $\chi^2=3.60$ $p=0.16$ |
| No | 581 | 75.5 | 110 | 14.3 | 79 | 10.3 | 770 | 89.1 | |

Table 2. Distribution of nutritional and physical activity status and BMI changes of students

| Meal skipping | BMI change status | | | | | | | | Statistics |
|-----------------------------|-------------------|------|-----|------|-------|------|-------|------|-----------------------------|
| | NW | | OW | | Obese | | Total | | |
| | n | % | n | % | n | % | n | % | |
| Yes | 347 | 76.9 | 58 | 12.9 | 46 | 10.2 | 451 | 52.2 | $\chi^2=0.55$ $p=0.75$ |
| No | 309 | 74.8 | 59 | 14.3 | 45 | 10.9 | 413 | 47.8 | |
| Eating between meals | | | | | | | | | |
| Yes | 624 | 76.3 | 108 | 13.2 | 86 | 10.5 | 818 | 94.6 | $\chi^2=2.756$ $p=0.25$ |
| No | 32 | 69.6 | 9 | 19.6 | 5 | 10.9 | 46 | 5.4 | |
| Eating speed | | | | | | | | | |
| Fast | 155 | 73.5 | 35 | 16.6 | 21 | 10.0 | 211 | 24.4 | $\chi^2=11.69$ $p=0.02$ |
| Normal | 413 | 74.5 | 76 | 1.7 | 65 | 11.7 | 554 | 64.1 | |
| Slow | 88 | 88.9 | 6 | 6.1 | 5 | 5.1 | 99 | 11.5 | |
| Going to school | | | | | | | | | |
| On foot | 253 | 79.1 | 38 | 11.9 | 29 | 9.1 | 320 | 37.0 | $\chi^2=2.74$ $p=0.25$ |
| By vehicle | 403 | 74.1 | 79 | 14.5 | 62 | 11.4 | 544 | 63.0 | |
| Weekly sports | | | | | | | | | |
| ≤ 1 | 457 | 76.7 | 72 | 12.1 | 67 | 11.2 | 596 | 68.9 | $\chi^2=4.09$ $p=0.12$ |
| ≥ 2 | 199 | 74.3 | 45 | 16.8 | 24 | 9.0 | 268 | 31.1 | |
| Regular walking | | | | | | | | | |
| Yes | 287 | 79.1 | 50 | 13.8 | 26 | 7.2 | 363 | 42.0 | $\chi^2=7.586$ $p=0.023$ |
| No | 369 | 73.7 | 67 | 13.4 | 65 | 13.0 | 501 | 58.0 | |
| Daily sleeping time | | | | | | | | | |
| 7> | 138 | 79.3 | 19 | 10.9 | 17 | 9.8 | 174 | 20.1 | $\chi^2=2.61$ $p=0.62$ |
| 7-9 | 457 | 75.7 | 83 | 13.7 | 64 | 10.6 | 604 | 69.9 | |
| 9< | 61 | 70.9 | 15 | 17.4 | 10 | 11.6 | 86 | 10.0 | |

DISCUSSION

Overweight and obesity seen in children and adolescents are among the biggest epidemic problems in the world today. Obesity seen in these periods is an important health problem that can affect the whole life of the person.

In our study, 13.5% of adolescents between the ages of 14-18 were found to be overweight and 10.5% were obese. The prevalence of obesity was reported to be 10.8% in the study conducted by Yılmaz,^[7] in the 14-18 age group in Erzurum, which is adjacent to our city and the results were similar with our study results. Yuca et al.^[8] found the prevalence of

overweight and obesity to be 11.1% and 2.2% in their study in the 6- 18 age group in Van. Yuca et al.^[8] seem to have found lower results than our study. The low socioeconomic level of the studied region and the age group being different from ours may have caused this difference. Eichen et al.^[9] found that the prevalence of overweight in adolescents in the USA was 30.8% which was higher than our results. According to WHO, the highest prevalence of overweight and obesity in the world is the region of Americas.^[10]

In many studies, it has been reported that there is no difference in terms of the prevalence of obesity between the sexes and they show similar values.^[7-9]

In our study, the prevalence of obesity was examined according to the place of residence, and the prevalence of overweight/obesity was found to be significantly lower among those living in the village compared to those living in urban areas. Urban life increases the tendency to obesity in terms of both nutrition and physical activity. The studies conducted support our results.^[11-13]

In our study, the frequency of overweight was found to be higher in children whose mothers were working, and the frequency of obese was higher in children whose mothers were housewives. In the study of Citirik,^[14] it was found that the frequency of obesity was significantly higher in children whose mothers were working. In the study of Hassan et al.^[12] it was stated that the frequency of obesity was higher in the children of housewife mothers. Working mothers feed their children with ready-to-eat foods, which causes the child to consume more fat and sugar-consuming foods. As housewives can spend more time in the kitchen, children may have excessive nutritional status.

The frequency of both overweight and obesity was found to be significantly higher in students who had overweight individuals in their families. In the study of Gezgin, it was found that the risk of obesity was 5.5 times higher in children if both parents had obesity.^[15] In the study of Savashan, it was reported that the risk of obesity was 1.5 times higher in those with obese individuals in the family.^[16] In the study of Metinoglu, a significant relationship was found between the presence of obese individuals in the family and BMI.^[17] In the study conducted by Ozturk.^[18] in Kayseri, it was stated that the parental BMI of the overweight and obese students was significantly higher than that of the control group. The studies have obtained findings consistent with our results.

When the smoking status of the students participating in the study was examined, the prevalence of obesity was higher in smokers and there was no significant difference. Uzun's,^[19] Akarca's,^[20] and Gumusler's^[21] thesis studies did not find a significant relationship between smoking status and students' BMI averages. Neutzling et al.^[21] found no significant relationship between smoking status in obese children and smoking status in the control group.

When the eating speed of the students participating in the study was examined, the incidence of obesity was found to be significantly lower in slow-eaters. Similar to our study, Ozturk.^[18] stated that the risk of obesity was 3.6 times higher among students who ate fast food. In the studies of Wu et al.^[23] it was found that overweight and obese people ate their food faster than the control group.

The frequency of obesity was found to be significantly higher among students who did not walk regularly. Similar to our study, in their studies Ghavamzadeh et al.^[24] and Ha et al.^[25] found that the daily walking time was significantly lower in the obese and overweight group than in the normal weight group.

CONCLUSION

Due to their genetic basis, children who have obese or overweight individuals in their families need to be more careful about regular nutrition and expenditure of energy taken. All members of the family should be informed about this subject and they should all be under supervision. Areas that increase the physical activity of the students should be established. Education should be provided for families to develop conscious behaviors about balanced and regular nutrition. On certain days of the week, students should have time for walking and have regular walking habits.

Epidemiological studies of obesity, which is preventable by cross-sectoral cooperation, should be increased and necessary measures should be taken to protect future generations from this disease which is thought to increase further.

ETHICAL DECLARATIONS

Ethics Committee Approval: The written permissions were obtained from Erzincan University Faculty of Medicine Ethics Committee and Provincial Directorate of National Education (E.36584).

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

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