



DOI: 10.5505/anatoljfm.2020.38358
Anatol J Family Med 2021;4(1):26–30

Prevalence of Obesity among University Students: A Cross-Sectional Study

 Serkan Köksoy

Department of Nursing, Health Science Faculty, Mehmet Akif Ersoy University, Burdur, Turkey

ABSTRACT

Objectives: Obesity is a global public health problem awaiting a solution. The body mass index (BMI) is one parameter out of the many measurements used to evaluate obesity. There are limited studies comparing the BMI of students studying and those not studying health protection and promotion. Therefore, this study aims to evaluate the BMI of students studying in the department of health, social science, and engineering in university with various independent variables.

Methods: This cross-sectional study was conducted in Burdur Mehmet Akif Ersoy University during May 2018 to August 2018. Independent variables such as sociodemographic variables and dependent variable such as BMI, were included in the study.

Results: Of the total 2193 people participating in the study, 719 (32.8%) were from department of health, 696 (31.7%) were from department of social sciences and 778 (35.5%) were from department of engineering. The mean BMI of the departments was found to be 23.4±4.1 kg/m² for health, 22.5±3.4 kg/m² for engineering and 22.5±3.5 kg/m² for social sciences (p<0.001).

Conclusion: According to the data of our study the mean BMI of the health department was higher than other departments and the percentage of people with a BMI below 18.5 kg/m² was higher in the participants aged 18 to 21 years.

Keywords: Body mass index, health, obesity, students



Please cite this article as:
Köksoy S. Prevalence of Obesity among University Students: A Cross-Sectional Study. Anatol J Family Med 2021;4(1):26–30.

Address for correspondence:
Asst. Prof. Dr. Serkan Köksoy.
Department of Nursing, Health Science Faculty, Mehmet Akif Ersoy University, Burdur, Turkey
Phone: +90 543 403 75 00
E-mail:
skoksoy@mehmetakif.edu.tr

Received Date: 07.05.2020
Accepted Date: 04.11.2020
Published online: 10.03.2021

©Copyright 2021 by Anatolian Journal of Family Medicine - Available online at www.anatoljfm.org

OPEN ACCESS



This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

INTRODUCTION

Body mass index (BMI) is calculated by dividing the weight (kg) by the height in meters squared (kg/m²). This simple measurement and calculation is a very practical method to determine obesity, and its value can be classified according to international standards.^[1] Several studies use this simple measurement.^[2,3] Conditions causing obesity and caused by obesity are not fully understood.^[4] Also, obesity and obesity-related diseases create a burden of disease and can negatively affect the health systems of countries.^[5] Since obesity negatively affects almost every age of life, it is considered as a major public health problem.^[6] Several factors cause obesity and a significant number of these are not well understood. The factors related to the social life such as nutrition, physical activity, and sleep condition are well known.^[7,8] Some situations related to the development age can cause obesity, university students are population group affected by the development age.^[9] This is because university life can inculcate both positive and habits to the individual. These negative habits could be risks for obesity and can turn the university age into a risky period.^[10] For this reason, it is required to conduct obesity research on individuals at the university age. Various studies have been conducted on individuals of university age to understand and classify obesity.^[10,11] In these studies, conditions

such as physical activity and nutrition were compared with sociodemographic data. Studies comparing the data of students studying and not studying on health protection and promotion fields were limited. Therefore, this study aims to evaluate the BMI of students department of health, social sciences and engineering.

METHOD

Students in the undergraduate departments of health, social sciences and engineering in the main campus of Burdur Mehmet Akif Ersoy University were included. Participants were divided by age groups, class groups, and department groups. Accordingly, the age variable is grouped as 18-21 years, 22-25 years and 26-29 years. The class variable is divided into 4 subgroups. Departments are designated as health (nursing), social sciences (education) and engineering.

The students data including age, gender, height, weight, department and class was collected. The height was measured using a standard tape measure, the weight parameter was measured using an electronic scale (2100098635, Tefal, France). To ensure a standard measurement, the height and weight were measured by one person. The weight of the clothes on the participants was considered insignificant due to the high air temperatures ($\approx 32^{\circ}\text{C}$) during the study period. The BMI was calculated by dividing the weight by the square in meters of the height (kg/m^2).

The BMI classification was based on World Health Organization criteria. According to these criteria BMI was classified as below $18.5 \text{ kg}/\text{m}^2$ underweight, $18.5\text{--}24.9 \text{ kg}/\text{m}^2$ normal weight, $25\text{--}29.9 \text{ kg}/\text{m}^2$ overweight, $30\text{--}34.9 \text{ kg}/\text{m}^2$ obesity class I, $35\text{--}39.9 \text{ kg}/\text{m}^2$ obesity class II, and above $40 \text{ kg}/\text{m}^2$ obesity class III.^[1]

The sample size of the study was calculated according to subgroups with the G*Power program. Since the study will be compared between the 4 subgroups of the class variable using the analysis of variance (ANOVA) test and sample number was set at four in sample calculation (effect size=0.25, $\alpha=0.05$, power=0.80).^[12] The total number of samples was determined as 180. The minimum calculated size was 45 participants for each subgroup to reach a 0.80 power.

The data was analyzed using the SPSS program (Version 22, IL, USA). Descriptive parameters were represented as frequency, percentage, mean, standard deviation. Independent sample t-test and One way ANOVA test were performed to compare the groups. Post-hoc Tukey test was used to determine in which group the statistical difference originated from. Differences were considered statistically significant at p-value <0.05 .

RESULTS

A total of 2193 university students participated in the study. The mean age was 21.1 ± 2.3 years, the mean BMI was $22.8\pm 3.7 \text{ kg}/\text{m}^2$, 1297 (59.1%) were male and 896 (40.9%) were female. Also, the mean BMI was $23.5\pm 3.6 \text{ kg}/\text{m}^2$ in males and $21.8\pm 3.4 \text{ kg}/\text{m}^2$ in females ($p<0.001$). BMI according to age groups, classes and departments are summarized in Table 1. As a result of post-hoc analysis, statistical differences were detected between the health department and other departments, between class one and class three and class four students, and between all age groups. BMI groups according to age groups, classes and departments are summarized in Table 2.

DISCUSSION

Obesity is a global public health problem, which could be determined and classified using a simple method called BMI.^[1] There are many factors (stress, nutrition, sleep, etc.) that can increase the weight, which is an important parameter used in BMI calculation.^[4,13] Abnormal increases in weight may cause other chronic diseases besides obesity.^[5,6,9] Therefore, research on BMI may give an idea about both obesity and other chronic diseases associated to it. University students usually study in a place far from their families. Distancing from the family may cause various changes (stress, nutrition, sleep) in their social life which can be a risk factor to obesity.^[11] Therefore, conducting studies on obesity in university students is important. In previous

Table 1. Body mass index according to age groups, classes and departments

	n (%)	BMI (kg/m^2)	p
Age groups			
18-21 years	1389 (63.4)	22.3 ± 3.4	<0.001
22-25 years	683 (31.1)	23.3 ± 3.8	
26-29 years	121 (5.5)	25.5 ± 4.2	
Class			
1 th class	784 (35.8)	22.4 ± 3.4	<0.001
2 nd class	589 (26.9)	22.8 ± 3.8	
3 rd class	491 (22.4)	23.1 ± 3.8	
4 th class	328 (14.9)	23.2 ± 3.8	
Departments			
Health	719 (32.8)	23.4 ± 4.1	<0.001
Social sciences	696 (31.7)	22.5 ± 3.5	
Engineering	778 (35.5)	22.5 ± 3.4	

BMI: Body mass index.

Data are presented mean \pm SD.

One way ANOVA test.

Table 2. Body mass index groups according to age groups, classes and departments

	Classification of BMI					
	Underweight	Normal weight	Overweight	Class I Obesity	Class II Obesity	Class III Obesity
Age Groups						
18-21 years	133 (72.3)	990 (66.3)	228 (54.0)	24 (34.8)	13 (56.5)	1 (100.0)
22-25 years	50 (27.2)	449 (30.0)	146 (34.6)	32 (46.4)	6 (26.1)	0 (0.0)
26-29 years	1 (0.5)	55 (3.7)	48 (11.4)	13 (18.8)	4 (17.4)	0 (0.0)
Total	184 (100.0)	1494 (100.0)	422 (100.0)	69 (100.0)	23 (100.0)	1 (100.0)
Class						
1 th class	29 (20.9)	584 (38.8)	141 (32.6)	22 (27.2)	8 (23.5)	0 (0.0)
2 nd class	49 (35.2)	388 (25.7)	115 (26.6)	26 (32.1)	11 (32.4)	0 (0.0)
3 rd class	37 (26.6)	319 (21.2)	110 (25.5)	17 (21.0)	8 (23.5)	0 (0.0)
4 th class	24 (17.3)	215 (14.3)	66 (15.3)	16 (19.7)	7 (20.6)	1 (100.0)
Total	139 (100.0)	1506 (100.0)	432 (100.0)	81 (100.0)	34 (100.0)	1 (100.0)
Departments						
Health	47 (25.5)	184 (100.0)	535 (35.9)	113 (26.8)	38 (52.1)	73 (100.0)
Social sciences	63 (34.3)	461 (30.9)	1491 (100.0)	149 (35.3)	19 (26.0)	12 (54.5)
Engineering	74 (40.2)	495 (33.2)	160 (37.9)	422 (100.0)	16 (21.9)	6 (27.3)
Total	4 (18.2)	22 (100.0)	1 (100.0)	0 (0.0)	0 (0.0)	1 (100.0)

BMI: Body mass index.
Data are presented as n(%).

obesity studies, data such as physical activity and nutrition were generally compared with sociodemographic data.^[10,11] Since studies comparing the data of students studying and not studying on health protection and development fields were limited, there is a need in the literature to fill this gap. Therefore, this study aims to evaluate the BMI of students studying in the field of health, social sciences, and engineering in university using various independent variables. The mean BMI of the participants in our study was found to be close to a previous study.^[14] However, in another study with similar epidemiological features, the mean BMI was lower than that in our study and also, the mean BMI in men was higher than that in women.^[15] The reason for this may be that men at the age of development have a greater muscle-bone density and do more physical activity than women.^[16,17] Therefore, these results were consistent with the literature. In the study, the prevalence of participants with a BMI below 18.5 kg/m² was 8.39%, which was lower than in a previous study.^[18] In another study of 557 participants, frequency of underweight was 7.7%.^[19] Although both studies consisted of epidemiologically similar participants, the population of both studies was smaller than the population of this study. The prevalence is thought to be affected by sample size and is high in the present study. Similar to other studies, the prevalence of participants with BMI above 25 kg/m² and below 30 kg/m² was 23.8%.

The prevalence was 33.3% in a previous study in which 536 people, mostly women, were included, and in another study, overweight was 21.6%.^[8,20] Many variables, including the sample size, socio-cultural structure, economy, tobacco use, affect the results of obesity.^[21] The prevalence found in this study falls in the range of the other studies and, this is considered to be normal for a study that is affected by many variables and factors. Concerning BMI above 30 kg/m² data, 4.47% of the population was obese. In a study including many university students in 22 countries, the prevalence of obesity was 5.8% in men and 5.2% in women. The result of this study provide information about the prevalence of low and middle-income countries.^[21] In a study conducted in Turkey the prevalence was detected to be 2.5%, and in one conducted in Lebanon, it was 7.2%.^[22,23] The prevalence calculated in this study was found to be in between the prevalence values found in the literature. BMI showed a linear increase with age and class. In a previous study, while the odds ratio was 1 under the age of 20, the rate increased to 1.78 when aged above 22 years.^[22] It is known that the prevalence of BMI above 25 kg/m² increases with age in university students between the ages of 17–21 years, and therefore with class.^[24] Consistent with literature, we found that there was a linear increase in the mean BMI with age and class. One of the most important results obtained in this study was that the mean BMI of participants studying

in the department of health was significantly higher than that of participants studying in the department of engineering and social sciences. This situation is the opposite of what is expected because it suggests that these students, which have as duty to protect and improve health, face an important problem such as being overweight or obese. This result may be related to the risk factors of obesity. For example, a study found that the frequency of tobacco use among those studying in the field of health is higher compared to other fields.^[25] A similar situation is observed in the professional life, students studying at the health faculty have problems with falling asleep and are not healthy.^[26-28] Therefore, it is thought that this result may be related to risk factors.

A limitation was that the study only comprised undergraduate programs and the weight of the participant's clothes was not known.

CONCLUSION

The mean BMI was found to be higher in the health department, 4th grade and age range of 26-29 years. The prevalence of participants with obesity was higher in the age range of 26-29 years, 4th grade and the health department. The prevalence of participants with a BMI below 18.5 kg/m² was found to be higher in the age of 18-21 years, 2nd grade and engineering department.

Disclosures

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

Funding: This study was not conducted with financial support from any institution.

Ethics Committee Approval: Ethics committee approval for the study was obtained from Burdur Mehmet Akif Ersoy University Non-interventional Studies Unit (Approval date: May 06, 2018 and Approval number: GO2018/87).

REFERENCES

1. WHO. WHO child growth standards: length/height for age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age, methods and development. WHO 2006:229. Available at: <https://www.who.int/publications/i/item/924154693X>. Accessed Mar 10, 2021.
2. Kenchaiah S, Evans JC, Levy D, Wilson PW, Benjamin EJ, Larson MG, et al. Obesity and the risk of heart failure. *N Engl J Med* 2002;347(5):305–13. [CrossRef]
3. Calle EE, Rodriguez C, Walker-Thurmond K, Thun MJ. Overweight, obesity, and mortality from cancer in a prospectively studied cohort of US adults. *N Engl J Med* 2003;348(17):1625–38. [CrossRef]
4. Reilly JJ, Armstrong J, Dorosty AR, Emmett PM, Ness A, Rogers I, et al; Avon Longitudinal Study of Parents and Children Study Team. Early life risk factors for obesity in childhood: cohort study. *BMJ* 2005;330(7504):1357. [CrossRef]
5. Mokdad AH, Ford ES, Bowman BA, Dietz WH, Vinicor F, Bales VS, et al. Prevalence of obesity, diabetes, and obesity-related health risk factors. *J Am Med Assoc* 2001;289(1):76–9. [CrossRef]
6. Franks PW, Hanson RL, Knowler WC, Sievers ML, Bennett PH, Looker HC, et al. Childhood obesity, other cardiovascular risk factors, and premature death. *N Engl J Med* 2010;362(6):485–93. [CrossRef]
7. Morse KL, Driskell JA. Observed sex differences in fast-food consumption and nutrition self-assessments and beliefs of college students. *Nutr Res* 2009;29(3):173–9. [CrossRef]
8. Huang TTK, Harris KJ, Lee RE, Nazir N, Born W, Kaur H. Assessing overweight, obesity, diet, and physical activity in college students. *J Am Coll Health* 2003;52(2):83–6. [CrossRef]
9. Malik VS, Willett WC, Hu FB. Global obesity: trends, risk factors and policy implications. *Nat Rev Endocrinol* 2013;9(1):13–27.
10. Avşar P, Kazan EE, Pınar G. Üniversite öğrencilerinin beslenme alışkanlıkları ile obezite ve kronik hastalıklara ilişkin risk faktörlerinin incelenmesi. *Yıldırım Beyazıt Üniversitesi Hemşirelik E-Dergisi* 2013;1(1).
11. Dülger H, Mayda A. Nutritional habits and obesity prevalence of students at Bartın University Vocational School of Health Services. *J DU Health Sci Inst* 2017;6(3):173–7.
12. Faul F, Erdfelder E, Lang AG, Buchner A. G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behav Res Methods* 2007;39:175–91. [CrossRef]
13. WHO. Obesity: preventing and managing the global epidemic (No. 894). WHO 2000:16. Available at: https://www.who.int/nutrition/publications/obesity/WHO_TRS_894/en/. Accessed Mar 8, 2021.
14. Sogari G, Velez-Argumedo C, Gómez MI, Mora C. College students and eating habits: a study using an ecological model for healthy behavior. *Nutrients* 2018;10(12):1823. [CrossRef]
15. Sakamaki R, Toyama K, Amamoto R, Liu CJ, Shinfuku N. Nutritional knowledge, food habits and health attitude of Chinese university students--a cross sectional study. *Nutr J* 2005;4:4.
16. Nieves JW, Formica C, Ruffing J, Zion M, Garrett P, Lindsay R, et al. Males have larger skeletal size and bone mass than females, despite comparable body size. *J Bone Miner Res* 2005;20(3):529–35. [CrossRef]
17. Rodríguez F, Palma X, Romo A, Escobar D, Aragón B, Espinoza L, et al. Eating habits, physical activity and socioeconomic level in university students of Chile. *Nutr Hosp* 2013;28(2):447–55.
18. Al-Rethaiaa AS, Fahmy AE, Al-Shwaiyat NM. Obesity and eating habits among college students in Saudi Arabia: a cross sectional study. *Nutr J* 2010;19(9):39. [CrossRef]
19. Brunt A, Rhee Y, Zhong L. Differences in dietary patterns

- among college students according to body mass index. *J Am Coll Health* 2008;56(6):629–34. [\[CrossRef\]](#)
20. Vargas PA, Flores M, Robles E. Sleep quality and body mass index in college students: the role of sleep disturbances. *J Am Coll Health* 2014;62(8):534–41. [\[CrossRef\]](#)
21. Peltzer K, Pengpid S, Samuels T, Özcan N, Mantilla C, Rahamefy OH, et al. Prevalence of overweight/obesity and its associated factors among university students from 22 countries. *Int J Environ Res Public Health* 2014;11(7):7425–41. [\[CrossRef\]](#)
22. Şahin H, Aykut M, Öztürk A, Yılmaz M, Gün İ, Celik N, et al. Obesity prevalence and related factors among medical students in Kayseri. *Actualite Chimique* 2015;37(2):51–8. [\[CrossRef\]](#)
23. Yahia N, Achkar A, Abdallah A, Rizk S. Eating habits and obesity among Lebanese university students. *Nutr J* 2008;7:32.
24. Desai MN, Miller WC, Staples B, Bravender T. Risk factors associated with overweight and obesity in college students. *J Am Coll Health* 2008;57(1):109–14. [\[CrossRef\]](#)
25. Alexopoulos EC, Jelastopulu E, Aronis K, Deugenis D. Cigarette smoking among university students in Greece: a comparison between medical and other students. *Environ Health Prev Med* 2010;(15):115–20. [\[CrossRef\]](#)
26. Tezcan S, Yardım N. Türkiye’de çeşitli sağlık kurumlarında doktor, hemşire ve tıp fakültesi öğrencilerinin sigara içme boyutu. *Tuberk Toraks* 2003;51(4):390–7.
27. Yılmaz FT, Kumsar AK, Sen HT, Karakaplan S, Kirdar L, Leymun A. Evaluation of the nutritional and physical activity habits towards protection from cancer of nurses in a Turkish hospital. *Int J Caring Sci* 2017;10(1):532.
28. Panigrahi A, Behera BK, Sarma NN. Prevalence, pattern, and associated psychosocial factors of headache among undergraduate students of health profession. *CEGH* 2019;(8)2:365–70. [\[CrossRef\]](#)