THE NEW ARMENIAN MEDICAL JOURNAL
Vol.16 (2022), No 2, p.91-99
DOI: https://doi.org/10.56936/18290825-2022.16.2-91

PREVALENCE OF WEIGHT STATUS AND ASSOCIATED FACTORS OF UNDERWEIGHT AMONG THE MEDICAL STUDENTS IN IRAN

Karimpour F.F.[1], Afroughi S[2,*]

[1] Social Determinants of Health Research Center, Food and Nutrition Department , Faculty of Health and Nutritional Sciences, Yasuj University of Medical Sciences, Yasuj, Iran.

[2,] Department of Biostatistics and Epidemiology, Faculty of Health and Nutritional Sciences, and Social Determinants of Health Research Center Yasuj University of Medical Sciences, Yasuj, Iran

Received 18.03.2022; accepted for printing 30.05.2022

Abstract

Background: Increasing weight abnormalities among university students is a challenging problem around the world. Published studies most researched overweight/obesity and its contributing variables in this population. However, underweight can threat health and wellbeing of the students during academic period. The Objective of the present study was to investigate the prevalence of weight status and to explore associated factors of underweight among the students from Yasuj University of Medical Sciences.

Methods: In a cross-sectional study, a random sample including 455 students were recruited from Yasuj University of Medical Sciences, Iran, during 2018-2019. Academic, socio-demographic and anthropometric characteristics of the students were gathered through a structured questionnaire. Body mass index was determined and classified according to the World Health Organization reference. Descriptive statistics were used to summarize data in numbers and percentages. The relationships of students' characteristics with their weight status were checked using Chi-square test. Factors associated with underweight occurrence in students were detected by analyzing multiple binary logistic regression model and adjusted odds ratio.

Result: Of the total participated students 87.5% were 19-24 years old and 66.2% were female. The mean ± standard deviation of students' weight and BMI were 61.42±11.51and 22.14±3.36, respectively. The prevalence of underweight, normal weight and overweight/obesity among students were 15%, 66.15 and 18.9%, respectively. Among the considered variables, age (OR: 0.78 95% CI: 0.63,0.97), gender (OR:2.o8 95% CI: 1.o8, 3.99), number of educational term (OR:1.25, 95% CI: 1.06, 1.47) and father's occupation (Or:2.13 95% CI:1.14, 3.99) were significantly associated with the underweight occurrence in students.

Conclusion. The prevalence of underweight and overweight/obesity among studied university students were high. The younger students, female students, students at higher number of educational term and students with fathers not an employee were at higher risk of being underweight. Suitable programs to promote healthy diets and practices among university students must be provided.

Keywords: *Weight status, body mass index, students, underweight.*

Introduction

University students construct the future of families, communities, and countries [*Anderson AS , Good DJ, 2017*]. As, they potentially comprise workforce of the serving institutions, instructors of educational foundations, scientific staff of academic centers, decision-makers, opinion leaders and governmental managers in near future of a society [*Monteiro MRP et al., 2010; Quick V et al., 2015; Chen Y et al., 2020*]. Therefore, as a representative sample of both current adolescents and later adults in a population, investigating of the physical health of university students has con-

Cite This Article as:

Karimpour FF, Afroughi S; Prevalence of weight status and associated factors of underweight among the medical students in Iran; NAMJ v.16 (2022) no.6, p. 91-99; DOI: https://doi.org/10.56936/18290825-2022.16.2-91

Address for Correspondence:

Solaiman Afroughi. Assistant professor; Yasuj University of Medical Sciences, Faculty of Health and Nutritional Sciences, Yasuj, Kohgiluyeh and Boyer-Ahmad, Iran
E-mail: s.afroughi@gmail.com, Solaiman@yums.ac.ir; Tel: +987433223505

cerned authorities and health policy-makers around the world [*El Ansari W et al., 2011; El Ansari W et al., 2013; Patterson-Silver Wolf D.A. et al., 2013; Jingya B et al., 2013; Sogari G et al., 2018*]. University students, due to leaving from home and transition to educational centers are confronted with changes in nutritional habits, environmental condition and activity levels [*Herrera H et al., 2003; Cilliers J et al., 2006; El Ansari W, Monteiro MRP et al., 2010; Stock C, 2010*]. These variations in combination with perceived stresses from study burdens, difficult academic tasks and assessing tests as well as financial constraints can put university students at risks of becoming underweight or overweight and/or obese [*Cilliers J et al., 2006; Mikolajczyk R T et al., 2008; Mikolajczyk R T et al., 2010; Thurber C A ,Walton E A, 2012; Gazibara T et al., 2013*].

Overweight students are susceptible to metabolic disorders such as high blood pressure, blood fat imbalance and glucose intolerance, which may lead to occurrence of excess morbidity and mortality of cardiovascular diseases [*Lin S et al., 2006; Bray G A et al., 2008; Cheng C-H et al., 2010; Biswas T et al., 2017*]. Conducted studies have shown that among university students, obesity was associated with type 2 diabetes, hypercholesterolemia, hypertension, lung diseases, rheumatoid arthritis, sleep apnea, colon diseases, and thyroid disorders [*Franssen R et al., 2011; Campbell P T, 2014; Althumiri N A et al., 2021*]. On the other hand, the consequences of underweight in university students may include increased morbidity and mortality, infectious disease presence, weak immunity, reduced performance capacity, anemia, osteoporosis, low productivity and for women, adverse pregnancy outcomes and irregular menstruation [*Montero P et al., 1996; Chumlea W C ,Guo S S, 1999; Nube M ,Van Den Boom G, 2003; Caballero B, 2005; Moretti G D S et al., 2014; Biswas T et al., 2017*].

To overcome it is possible, due to the uniting the knowledge and will of all doctors in the world

Numerous studies have shown that underweight, overweight and obesity were prevalent among university students across the globe [*Peltzer K et al., 2014*]. The prevalence of underweight, overweight and obese students in China were 11.7%, 12.53%, and 1.77% , respectively [*Jingya B et al., 2013*], in Italia, were 1.8%, 24.5% and 5.4%, respectively [*Gallè F et al., 2019*] , and in Serbia were 10.6%, 11.5% and 1.5%, respectively [*Gazibara T et al., 2013*]. In Egypt 32% of female students and 25% of male students were overweight/obese [El Ansari W et al., 2013]. Moreover, the prevalence of overweight and obesity among university students from Saudi Arabia [*Baig M et al., 2015*] , USA [*Patterson-Silver Wolf D.A. et al., 2013*] and Cameron [*Niba L L et al., 2017*] were 29.8% and 18.6%, 20.9% and 7.3% and 24.6% and 2.2%, respectively, and the prevalence of underweight female university students in Pakistan [*Sirang Z et al., 2013*] and Spain [*Cutillas A B et al., 2013*] were 27.25% and 10.2%, respectively.

Evidences have shown that abnormal weight consequences can ultimately lead to decreased academic and professional performance and low overall quality of life among university students [*Mikolajczyk R T et al., 2008; Mikolajczyk R T et al., 2010; Moretti G D S et al., 2014; Zaccagni L et al., 2014; Sogari G et al., 2018*]. Whilst, detecting the burden of the students' physical health problems provide an evidence-base guideline to implement health promotion interventions in the concerned universities1.

At present the majority of the published studies targeted the university students from the USA, Europe and Far East countries [*Mikolajczyk R T et al., 2010; Anderson A S ,Good D J, 2017; Gallè F et al., 2019*]. Moreover, the majority of the conducted investigations have been concentrated on overweight/obesity and its determinants among university students [*Musaiger A O et al., 2015; Qin X et al., 2018*]. Whilst, little attention has been paid to underweight status and its related factors in this society. However, there is a sparse published data on the physical health of the subjects from Eastern Mediterranean region countries, including Iran [Nojomi M, Najamabadi S, 2006; El Ansari W et al., 2013;]. The objective of this study was to evaluate the prevalence of underweight, overweight and obesity and to investigate the socio-demographic and educational factors associated with underweight presence

in university students from Yasuj University of Medical Sciences, Yasuj, Iran.

2. Materials and Methods

Study design and participants

This cross-sectional study was conducted among students at Yasuj University of Medical Sciences, Iran, during 2018-2019. Yasuj city is the center of the Kohgiluye-va-Boirahmad province in southern Iran. Yasuj University of Medical Sciences comprised of five faculties and about 2500 undergraduate students. Considering a statistical power of 80% with a 95% confidence interval (CI), using the formula specially designed for such studies, the required sample size was acquired as 475. Participants were selected through implementing a multi-stage stratified-cluster sampling technique. The study was approved by the Ethical Committee of Yasuj University of Medical Sciences and informed consent was obtained from all participants. Ultimately, 455 students participated in the study, so, the response rate was 95%.

Data collection and measures

An author-structured questionnaire was implemented to gather data on interested variables. The measured academic and socio-demographic characteristics were: educational term(number), age) years), sex (male, female), father's education level (illiterate, under complete high school, complete high school and University educated) and occupation status (freelancer, employee) and mother's education (illiterate, under complete high school, complete high school and University educated) and occupation status (housewife, not housewife) of the sample students. Furthermore, body weight (to the nearest 0.1 kg), body height (to the nearest cm) were measured using a calibrated medical scale, stadiometer and measuring tape, respectively and entered the questionnaire. BMI was calculated as weight in kg over the squared height in meter (kg/m^2) and classified viewing WHO cutoff points [*Ataide Lima R P et al., 2015*]. Weight statuses were determined through classifying BMI as follows: underweight <18.5; normal weight 18.5-24.9; overweight 25-29.9; and obesity ≥30.

Statistical analyses

Descriptive statistics such as frequencies (number and percent), mean and standard deviation (SD) were used to summarize data in both tables and figures. One-way and two-way analysis of variance techniques were implemented to compare mean of age, weight and height variables among BMI and BMI-sex groups, respectively. The relationships of weight status with sex, father's education, father's occupation, mother's education and mother's occupation in students were described utilizing Chi-square test. Factors associated with underweight occurrence in students were detected by fitting multiple binary logistic regression model and evaluating adjusted odds ratio (OR) with its 95% confidence interval (CI). Data were analyzed using SPSS version 25. The statistical significance was set at $p<0.05$.

Result

Characteristics of the studied students

The distribution of the study sample according to age and sex groups revealed that 87.5% of university students were 19-24 years old and of the 455 participated students, 301 (66.2%) were female. The mean ± standard deviation (SD) of students' age, weight, height and BMI were 22.31±2.86, 61.42±11.51, 166.35±8.75 and 22.14±3.36, respectively. Among all students, 39.6% had a university educated father, 38.5% had an employee father, 15.8% were with university educated mothers and 86.4% were with housewife mothers (Table 1).

Weight and body mass index (BMI) statuses of students

The result showed that the students' weight varied from 37 kg to 95 kg. Regarding the WHO classification considered in the method section, the distribution of the whole students in terms of BMI categories was obtained and depicted in the Figure 1. Of the total 455 students, 68(11.7% male, 16.8%

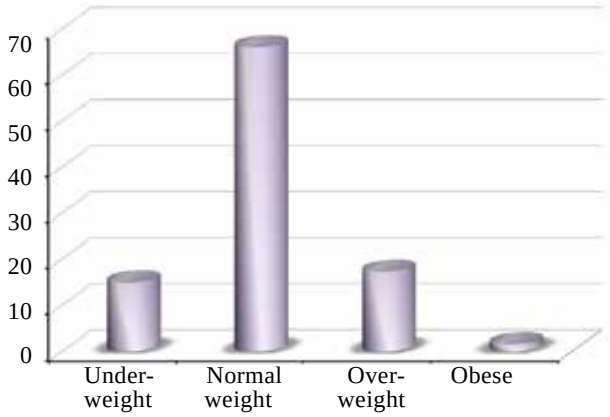

Figure 1. *The BMI categories among students*

TABLE 1.

Characteristics of the participated university students

Characteristic	Mean±SD / n(%)
Age (*years*)	
all	22.31±2.86
male	22.4±2.36
female	22.26±3.09
Weight (*kg*)	
all	61.42±11.51
male	69.03±10.21
female	57.5±10.1
Height (*cm*)	
all	166.35±8.75
male	175.29±6.61
female	161.6±5.38
BMI (kg/m^2)	
all	22.14±3.36
male	22.46±3.05
female	21.96±3.5
Father's education level	
Complete high school and lower	275(60.4%)
College and university	180(39.6%)
Father's occupation	
An employee	176(38.5%)
Not an employee	279(61.5%)
Mother's education level	
Complete high school and lower	383(84.2%)
College and university	72(15.8%)
Mother's occupation	
housewife	393(86.4%)
Not housewife	62(13.6%)

female) were underweight, 301 (68.8% male, 64.6% female) were of normal weight and 86(19.5% male, 18.6% female) were overweight.

Association of weight status (BMI categories) with the characteristics of the students

The results showed the means of BMI in male and female students were not significantly different (F=2.2, p=0.14). However, among all studied students as well as both males and females the mean age was significantly different in terms of three weight(BMI) groups (p=0.008 and p=0.008, respectively), such that as the weight category was higher; the increase of mean age was grater. Furthermore, as is expected, for bout the whole students and sex groups the means weight were different among the three categories (p=0.001 and p=0.001, respectively). However, considering the mean height, there was not found a significant dif-

TABLE 2.

Mean and standard deviation of the age, weight and height variables across the three weight categories by sex group among the studied sample

Variable	Under-weight	Normal weight	Over-weight	p
Age (*year*)				
all	21.77±1.52	22.22±2.76	23.16±3.85	0.008
male	22.33±2.22	22.25±2.39	22.97±2.33	0.008
female	21.54±1.09	22.20±2.96	23.27±4.52	
Weight (*kg*)				
all	47.68±5.88	60.78±8.66	75.31±8.37	0.001
male	55.11±4.13	67.88±7.41	81.43±7.53	0.001
female	44.9±3.56	56.68±6.4	71.85±6.72	
Height (*cm*)				
all	165.70±8.34	166.53±9.1	166.7±7.9	0.76
male	176.44±6.56	175.49±6.7	173.9±6.4	0.76
female	161.67±4.44	161.36±5.6	162.58±5.3	

TABLE 3.

Association of weight status with socio-demographic variables among the students

variable	Under-weight n (%)	Normal weight n (%)	Over-weight/ obese n (%)	p
Sex				
male	18 (11.7)	106 (68.8)	30(19.5)	0.35
female	50 (16.8)	195 (64.6)	56(18.6)	
Father's education level				
complete high school and lower	42 (16.2)	167 (64.5)	50 (19.3)	0.64
College and university	22 (13)	115 (68)	32 (18.9)	
Father's occupation				
Employee	18 (11.3)	107 (67.3)	34 (21.4)	0.24
Not employee	45 (16.9)	174 (65.4)	47 (17.7)	
Mother' s education level				
Complete high school and lower	57 (15.8)	236 (65.4)	68 (18.8)	0.63
College and university	8 (11.9)	44 (65.7)	15 (22.4)	
Mother's occupation				
housewife	59 (15.7)	247 (65.9)	69 (18.4)	0.49
Not housewife	7 (12.3)	36 (63.2)	14 (24.6)	
Total	68 (15)	301 (66.1)	86 (18.9)	

ference among the three BMI categories of the students according sex groups (p=0.76) (Table 2).

Table 3 shows the distribution of the students according to the weight categories and some demographic variables. The percentage of students among weight groups according to sex condition was not different (p=0.35). Also, the prevalence of underweight in females versus males was not significantly different (p=0.30). Furthermore, father's education level and occupation and mother's education level and occupation were not associated with weight status (respectively P=0.64, p=0.24, p=0.63, and p=0.49) among the studied students.

The above results were obtained through bivariate analysis. However, the adjusted and the specific effects of the determinants influenced underweight presence in university students, using multivariate logistic regression analysis were detected and are reported in Table 4. Among the considered variables, age, sex, number of educational term and father's occupation were significantly associated with underweight in students. Therefore, as age increased the odds of being underweight has been decreased and in female students the probability of underweight was more than two times that of male counterparts. The students with fathers not an employee had odds of underweight 1.13 times larger than those with fathers an employee. Moreover, with the number of educational terms, the risk of underweight increased 25% in students.

Table 4.

Factors associated with underweight occurrence in students detected through multiple logistic regression and odds ratio

variable	Co (β)	P value	OR	95% CI of OR
age	-.244	0.03*	0.78	(0.63, 0.97)
sex				
male			ref	
female	0.73	0.03*	2.08	(1.08, 3.99)
Father's occupation				
Employee			ref	
Not an employee	0.76	0.02*	2.13	(1.14, 3.99)
Education term	0.22	0.01*	1.25	(1.06, 1.47)

Notes: *: significant, ref : reference group, Co (β)-Coefficient (β), OR -. odds ratio

Discussion

In the present study we aimed to assess weight status and factors associated with underweight among university students. The prevalence of underweight, normal weight and overweight/obesity detected in this study are similar with the results reported in a domestic study by Moafi et al, [*Moafi A et al., 2011*] and another study from China by Ren et al, 2015 [*Ren X et al., 2015*]. However, the percentages of the underweight, overweight and obese students found in the current study are notably higher than those reported in a previous Iranian study [*Nojomi M ,Najamabadi S, 2006*] and as high as the values resulted in a study by Peltzer et al., 2014 [*Peltzer K et al., 2014]*. Moreover, lower prevalence of underweight, but, higher prevalence of overweight and obesity among university students have been reported in US [*Quick V et al., 2015*] , Serbia [*Gazibara T et al., 2013*] , Cameroon [*Niba L L et al., 2017*] , United Arab Emirates [*Radwan H et al., 2019*], Saudi Arabia [*Makkawy E et al., 2021*], Egypt [*El Ansari W et al., 2013*] and Italy [*Gallè F et al., 2019*].

These differences could be attributed to sociocultural and ethnical disparities, which may affect the lifestyle, intake habits and health behavior of the students, discrepancy in sampling techniques, sample size, how the data were collected and considered weight categorization in the studies [*Niba L L et al., 2017*].

The results showed that mean age and mean weight, but not mean height, in three weight categories were different. Nutrition disorders progress with age in university students, which intern can lead to weight gain/loss of them. Also, that the mean weights were different showing the BMI categories were correctly selected.

In bivariate relationship analysis there was not found any association of weight status with sociodemographic variables in university students. However, using multivariate binary logistic regression model, it was revealed that the age, sex, father's occupation and number of educational terms were associated with the underweight occurrence among the studied students. These results may be described as bellow: That the odds of underweight decreased with age, may be due to that the knowledge and practice about nutrient materials can be

increased with age among university students. So, in older age they might alter their intake behaviors towards gaining weight. In consistent with this idea in a previous study it was shown that overweight increased with age group in university students [*Nojomi M ,Najamabadi S, 2006*]. Supporting our result considering gender effect, several studies have reported that prevalence of underweight in female students was higher than male students [*Yahia N et al., 2008; Qin X et al., 2018; Gallè F et al., 2019*]. The reason for the higher prevalence of underweight in female students might be that they tended to consider a thinner body shape as ideal, overestimated their own body weight and be more concerned with weight control than male students. Moreover, since females experience the monthly period, the significant higher prevalence of underweight in their group was predictable. In addition, higher body composition including fat mass and lean body mass in men than women may be another reason for different BMI in the two gender conditions [*Qin X et al., 2018*]. Furthermore, we detected that father's occupation not an employee was a risk factor for underweight in students. University students are supported by family income. In developing countries employers have more income than unemployed individuals. So, students with fathers not an employee might get less money and consequently had less access to adequate nutrient foods. Shortage in food intake can result in presence of malnutrition in students.in addition, as a novelty, in the current study it was shown that the risk of underweight presence increased with the number of educational terms in students. The possible reason may be with the number of educational terms, increased academic burden and unhealthy eating behaviors led to underweight occurrence in university students [Gan WY *et al., 2011*]. Supporting this result, in a previous study it was reported that the risk of weight disorder was higher in undergraduate students than graduate students [*Chen Y et al., 2020*].

Although this study prepares some relevant information on the prevalence of weight abnormality and contributing factors of underweight occurrence among university students, but has some limitations. The results of the present study were obtained using a sample from just one university which may not be a representative of all university students in Iran. Furthermore, in this cross-sectional study just associated variables with underweight were detected and inference of causative determinants was not intended.

CONCLUSION:

In the present study, a high prevalence of underweight and overweight/obesity among university students were detected. The prevalence of underweight was higher among both female students and younger students. Higher number of educational terms and father's occupation as not an employee were the risk factors of underweight presence among university students. Consequently, it is necessary to provide informative programs for improving physical health condition through promoting healthy diets and behaviors accompanying with adequate financial resources considering the university students which are at expose of malnutrition.

ACKNOWLEDGMENT: The authors acknowledge the University, and students who participated in this study.

REFERENCES

1. *Althumiri, N. A., Basyouni MH; AlMousa N; AlJuwaysim MF; Almubark RA; BinDhim NF; Alkhamaali Z; Alqahtani SA;* (2021). Obesity in Saudi Arabia in 2020: Prevalence, Distribution, and Its Current Association with Various Health Conditions. Paper presented at the Healthcare. https://doi.org/10.3390/healthcare9030311
2. *Anderson, A. S., Good DJ* (2017). Increased body weight affects academic performance in university students. Preventive medicine reports, 5, 220-223.
3. *Ataíde Lima RP; de Carvalho Pereira D; Pordeus Luna R; Gonçalves M; de Lima R; Filho M, et al.,* (2015). BMI, overweight status and obesity adjusted by various factors in all age groups in the population of a city in Northeastern Brazil. International journal of environmental research and public health, 12(4), 4422-4438. https://doi.org/10.3390/ijerph120404422
4. *Baig M; Gazzaz ZJ; Gari MA; Alattallah HG; AlJedaani KS; Mesawa AT; Alhazmi, AA* (2015). Prevalence of obesity and hypertension

among University students' and their knowledge and attitude towards risk factors of Cardiovascular Disease (CVD) in Jeddah, Saudi Arabia. Pakistan journal of medical sciences, 31(4), 816. doi: 10.12669/pjms.314.7953

5. *Biswas, T., Garnett SP, Pervin S, Rawal LB* (2017). The prevalence of underweight, overweight and obesity in Bangladeshi adults: Data from a national survey. PloS one, 12(5), e0177395.

6. *Bray, GA; Jablonski KA; Fujimoto WY; Barrett-Connor E; Haffner S; Hanson RL; et al.* (2008). Relation of central adiposity and body mass index to the development of diabetes in the Diabetes Prevention Program. The American journal of clinical nutrition, 87(5), 1212-1218. https://doi.org/10.1093/ajcn/87.5.1212

7. *Caballero B.* (2005). A nutrition paradox—underweight and obesity in developing countries. N engl j med, 352(15), 1514-1516.

8. *Campbell P. T.* (2014). Obesity: a certain and avoidable cause of cancer. The Lancet, 384(9945), 727-728.

9. *Chen Y; Liu Xi; Yan Ni; Jia W; Fan Y; Yan H; Ma Lu; Ma, L,* (2020). Higher academic stress was associated with increased risk of overweight and obesity among college students in china. International journal of environmental research and public health, 17(15), 5559. https://doi.org/10.3390/ijerph17155559

10. *Cheng, C.-H.; Ho C-C; Yang C-F; Huang Y-C; Lai C-H; Liaw Y-P* (2010). Waist-to-hip ratio is a better anthropometric index than body mass index for predicting the risk of type 2 diabetes in Taiwanese population. Nutrition Research, 30(9), 585-593. https://doi.org/10.1016/j.nutres.2010.08.007

11. Chumlea, W. C., Guo SS (1999). Body mass and bone mineral quality. Current opinion in rheumatology, 11(4), 307-311.

12. *Cilliers, J., Senekal M, Kunneke E* (2006). The association between the body mass index of first-year female university students and their weight-related perceptions and practices, psychological health, physical activity and other physical health indicators. Public Health Nutrition, 9(2), 234-243.

13. *Cutillas, A. B., Herrero E, de San Eustaquio A, Pérez-Llamas SZ* (2013). Prevalencia de peso insuficiente, sobrepeso y obesidad, ingesta de energía y perfil calórico de la dieta de estudiantes universitarios de la Comunidad Autónoma de la Región de Murcia (España). Nutrición Hospitalaria, 28(3), 683-689.

14. *El Ansari, W., Labeeb S, Moseley L, Kotb S, El-Houfy A* (2013). Physical and psychological well-being of university students: Survey of eleven faculties in Egypt. International journal of preventive medicine, 4(3), 293.

15. *El Ansari W, Stock C.* (2010). Is the health and wellbeing of university students associated with their academic performance? Cross sectional findings from the United Kingdom. International journal of environmental research and public health, 7(2), 509-527.

16. *El Ansari W, Stock C, Snelgrove S, Hu X, Parke S, et al.* (2011). Feeling healthy? A survey of physical and psychological wellbeing of students from seven universities in the UK. International journal of environmental research and public health, 8(5), 1308-1323.

17. *Franssen, R; Monajemi H; Stroes ESG; Kastelein JJP,* (2011). Obesity and dyslipidemia. Medical Clinics of North America, 95(5), 893-902. https://doi.org/10.1016/j.mcna.2011.06.003

18. *Gallè F., Sabella E.A., Da Molin G., Liguori G, Montagna MT Orsi GB Valerio G, Napoli C,* (2019). A cross-sectional study investigating lifestyle and weight perception of undergraduate students in southern Italy. BMC Public Health, 19(1), 1-7. DOI https://doi.org/10.1186/s12889-019-7695-z

19. *Gazibara T., Tepavcevic DBK, Popovic A, Pekmezovic T* (2013). Eating habits and bodyweights of students of the University of Belgrade, Serbia: A cross-sectional study. Journal of health, population, and nutrition, 31(3), 330.

20. *Herrera, H., Rebato E, Arechabaleta G, Lagrange H, Salces I, Susanne C* (2003). Body mass index and energy intake in Venezuelan University students. Nutrition Research, 23(3), 389-400. https://doi.org/10.1016/S0271-5317(02)00541-9

21. *Jingya, B., Ye H, Jing W, Xi H, Tao H* (2013). Quantitative analysis and comparison of BMI among Han, Tibetan, and Uygur university students in Northwest China. The Scientific World Journal, 2013.
22. *Lin S; Cheng TO Liu X, Mai J, Rao X Gao X, Deng H, Shi M,* (2006). Impact of dysglycemia, body mass index, and waist-to-hip ratio on the prevalence of systemic hypertension in a lean Chinese population. The American journal of cardiology, 97(6), 839-842. https://doi.org/10.1016/j.amjcard.2005.09.133
23. *Makkawy E, Alrakha AM, Al-Mubarak AF, Alotaibi HT, Alotaibi NT, Alasmari AA, Altamimi T,* (2021). Prevalence of overweight and obesity and their associated factors among health sciences college students, Saudi Arabia. Journal of Family Medicine and Primary Care, 10(2), 961.
24. *Mikolajczyk R.T., Brzoska P., Maier C., Ottova V Meier S, Dudziak U, Ilieva S, El Ansari W* (2008). Factors associated with self-rated health status in university students: a cross-sectional study in three European countries. BMC Public Health, 8(1), 1-10. DOIhttps://doi.org/10.1186/1471-2458-8-215
25. *Mikolajczyk R.T., Maxwell A.E., El Ansari W. Stock C, Petkeviciene J, Guillen-Grima F,* (2010). Relationship between perceived body weight and body mass index based on self-reported height and weight among university students: a cross-sectional study in seven European countries. BMC Public Health, 10(1), 1-11. https://doi.org/10.1186/1471-2458-10-40
26. *Moafi A, Rahgozar S, Ghias M, Vahdat ahar E, Borumand A Sabbaghi A Sameti A, Hashemi M,* (2011). A study on body mass index, blood pressure, and red blood cell indices in new entering students of the University of Isfahan. International journal of preventive medicine, 2(4), 280.
27. *Monteiro, M. R. P., Zanirati VF, Andrade ML, Silva RR* (2010). Food behavior, body image and anthropometric indices of university students Comportamento alimentar, imagem corporal e índices antropométricos de universitários. Alimentos e Nutrição Araraquara, 21(3), 341-348.
28. *Montero P., Bernis C, Fernandez V, Castro S* (1996). Influence of body mass index and slimming habits on menstrual pain and cycle irregularity. Journal of Biosocial Science, 28(3), 315-323.
29. *Moretti, G. d. S., Muniz PT, Tavares CM, Brunken GS, de Farias Júnior JC, Farias EdS* (2014). Prevalence of and factors associated with overweight among university students from Rio Branco, Acre-Brazil. Revista Brasileira de Cineantropometria & Desempenho Humano, 16, 406-418.
30. *Musaiger AO, Hammad SS, Tayyem RF, Qatatsheh AA,* (2015). Socio-demographic and dietary factors associated with obesity among female university students in Jordan. International journal of adolescent medicine and health, 27(3), 299-305. https://doi.org/10.1515/ijamh-2014-0029
31. *Niba LL, Atanga MB, Navti LK* (2017). A cross sectional analysis of eating habits and weight status of university students in urban Cameroon. BMC nutrition, 3(1), 1-8.
32. *Nojomi, M., Najamabadi S,* (2006). Obesity among university students, Tehran, Iran. Asia Pacific journal of clinical nutrition, 15(4), 516-520.
33. *Nube M., Van Den Boom GJM* (2003). Gender and adult undernutrition in developing countries. Annals of human biology, 30(5), 520-537.
34. *Peltzer K; Pengpid S; Samuels T.; Özcan N; Mantilla C; Rahamefy O; Wong M; Gasparishvili* A (2014). Prevalence of overweight/obesity and its associated factors among university students from 22 countries. International journal of environmental research and public health, 11(7), 7425-7441. https://doi.org/10.3390/ijerph110707425
35. *Qin X, Chen L, Liu X Zheng S, Wang X,* (2018). Factors affecting body mass index in overweight/obese university students, Gansu, China: a cross sectional study. Southeast Asian Journal of Tropical Medicine and Public Health, 49(4), 685-695.
36. *Quick V; Byrd-Bredbenner C; Shoff S; White AA.; Lohse B; Horacek T et al.,* (2015). Concordance of self-report and measured height

and weight of college students. Journal of Nutrition Education and Behavior, 47(1), 94-98. https://doi.org/10.1016/j.jneb.2014.08.012

37. *Radwan H.; Hasan H.A.; Ismat H.; Hakim H.; Khalid H.; Al-Fityani L.; Mohammed R.; Ayman A.* (2019). Body mass index perception, body image dissatisfaction and their relations with weight-related behaviors among university students. International journal of environmental research and public health, 16(9), 1541. https://doi.org/10.3390/ijerph16091541
38. *Ren X; Chen Y; He L; Jin Y; Tian Li; Lu Mi; Lu W et al.,* (2015). Prevalence of underweight, overweight and obesity in university students from the region of Anhui (China). Nutrición Hospitalaria, 31(3), 1089-1093.
39. *Sirang Z., Bashir H.H., Jalil B, Khan SH, Hussain SA, Baig A et al.,* (2013). Weight patterns and perceptions among female university students of Karachi: a cross sectional study. BMC Public Health, 13(1), 1-8. https://doi.org/10.1186/1471-2458-13-230
40. *Sogari G, Velez-Argumedo C, Gómez MI, Mora C* (2018). College students and eating habits: A study using an ecological model for healthy behavior. Nutrients, 10(12), 1823.
41. *Thurber, C. A., Walton EA* (2012). Homesickness and adjustment in university students. Journal of American college health, 60(5), 415-419.
42. *Patterson-Silver Wolf D.A., VanZile-Tamsen, C., Black, J. Billiot SM, Tovar M* (2013). A comparison of self-reported physical health and health conditions of American Indian/Alaskan Natives to other college students. Journal of community health, 38(6), 1090-1097. https://doi.org/10.1007/s10900-013-9718-5
43. *Gan WY, Mohd Nasir MT, Zalilah MS, Hazizi AS* (2011). Differences in eating behaviours, dietary intake and body weight status between male and female Malaysian University students. Malaysian journal of nutrition, 17(2), 213-228.
44. *Yahia N., Achkar A., Abdallah A., Rizk S* (2008). Eating habits and obesity among Lebanese university students. Nutrition journal, 7(1), 1-6. DOI https://doi.org/10.1186/1475-2891-7-32
45. *Zaccagni L., Masotti S., Donati R., Gualdi-Russo E* (2014). Body image and weight perceptions in relation to actual measurements by means of a new index and level of physical activity in Italian university students. Journal of translational medicine, 12(1), 1-8. doi.org/10.1186/1479-5876-12-42

THE NEW ARMENIAN MEDICAL JOURNAL
Vol.16 (2022). No 2

CONTENTS

THE NEW ARMENIAN MEDICAL JOURNAL

Vol.16 (2022). No 2

The Journal is founded by
Yerevan State Medical
University after M. Heratsi.

Rector of YSMU

Armen A. Muradyan

Address for correspondence:

Yerevan State Medical University
2 Koryun Street, Yerevan 0025,
Republic of Armenia

Phones:

(+37410) 582532 YSMU
(+37410) 580840 Editor-in-Chief

Fax: (+37410) 582532

E-mail: namj.ysmu@gmail.com, ysmiu@mail.ru

URL: http//www.ysmu.am

Our journal is registered in the databases of Scopus, EBSCO and Thomson Reuters (in the registration process)

SCOPUS EBSCO THOMSON REUTERS

Copy editor: Tatevik R. Movsisyan

Printed in "VARM" LLC
Director: Ruzanna Arakelyan
Armenia, 0018, Yerevan,
Tigran Mec 48, 43
Phone: (+374 91) 19 29 00,
E-mail: armana6@mail.ru