

## Research Paper

## Investigating the Dietary Pattern of Iranian Medical Sciences Students: A Cross-sectional Study



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## ABSTRACT

**Background and Purpose:** This study investigates the dietary patterns of medical sciences students in Iran.

**Materials and Methods:** This cross-sectional study was performed on 265 students living in dormitories of Semnan University of Medical Sciences in 2020. The participants were selected by the cluster sampling method. The data collection tool was a two-part questionnaire. The first part included demographic and anthropometric variables and the second part was the food frequency questionnaire. The data were entered into the SPSS software, version 26 and independent sample t-test, one-way analysis of variance, Pearson correlation coefficient and the chi-squared test were used for data analysis.

**Results:** Among the participants, 64% were girls. The majority were single (93.6%) and 57.7% had a monthly family income of more than \$100. Also, 32(18.7%) and 36(27.4%) of women and men were overweight or obese, respectively. There was a significant correlation between cereals food group and age ( $r=0.150$ ,  $P=0.014$ ), vegetable food group and the length of stay in the dormitory ( $r=0.137$ ,  $P=0.026$ ), fruit food group and arm circumference ( $r=0.165$ ,  $P=0.007$ ) and the miscellaneous food group with arm circumference ( $r=0.124$ ,  $P=0.044$ ) and body mass index ( $r=0.121$ ,  $P=0.049$ ). Also, the frequency of consumption of vegetables and salts and seasonings groups in women was significantly higher than in men ( $P<0.05$ ). The frequency of fruit consumption in married students was significantly higher than in single participants ( $P<0.05$ ). The frequency of consumption of the vegetable group in students with household incomes above \$100 was significantly higher than below \$100 ( $P<0.05$ ).

**Conclusion:** Despite the same diet plan for students in dormitories, there is a difference in the frequency of consumption of food groups among students. Considering these factors is recommended to improve students' food consumption patterns. Also, it is suggested that the necessary knowledge be given through public media, and public education, especially in universities, to improve eating habits following the recommendations of the food pyramid guide.

**Keywords:** Dietary pattern, Cross-sectional study, Medical student, Iran

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## Introduction

**D**iet and nutrition play a critical role in human life and health from birth to death. The type of food consumed can endanger or promote a person's health [1, 2]. Youth health behaviors affect their health and consequently the health and development of society. Proper diet and physical activity are among the most important preventive health behaviors for young people [3]. The period of being a student and living in a dormitory can change a person's diet and behavioral habits. Therefore, food hygiene and the promotion of healthy food in universities are important goals in promoting student nutrition. Improper diet at a young age is one of the predisposing factors for the onset of chronic diseases during middle and old age. A youthful life is a golden opportunity to improve one's nutrition and health; therefore, choosing the right food is essential to ensure the optimal health of young people [4-6].

Students' food consumption patterns undergo major changes that affect their nutritional status due to their tendency to skip main meals, follow low-calorie diets, and not consume certain types of high-value foods. Also, changes in student lifestyle, such as excessive drinking of tea and coffee to stay up at night to study, use of dormitory, or fast-food meals due to lack of time and excessive consumption of high-fat or high-sodium foods in university and dormitory canteens can eventually lead to obesity [7, 8]. Other effective factors in this change are consumption patterns, gender, body weight, length of student period and nutritional patterns formed before entering university. Studies have shown that the food consumption pattern of young people after entering university tends to change toward ready meals, consumption of junk snacks and an overall reduction in the consumption of healthy and nutritious foods [8-10].

A large part of Iran's population is comprised of young people with a high proportion of are students. These students are exposed to severe social and cultural and especially nutritional, risks as they move into a new environment, find new friends, or enter a new city or country [11-13]. Studies show that unhealthy behaviors in various dimensions, including poor diet, high consumption of fast foods, and low physical activity have led to an increase in the prevalence of problems such as overweight and obesity in students [14-16]. Most of these health problems are preventable and can be avoided with health promotion programs, including the promotion of healthy eating behaviors and lifestyle modifications [16]. Therefore, considering the above ex-

planations and the importance of recognizing students' dietary patterns for proper nutritional planning and correcting incorrect patterns, the present study investigates the dietary patterns of students living in dormitories of [Semnan University of Medical Sciences](#) (Iran).

## Materials and Methods

This cross-sectional study was designed to investigate the nutritional status of students living in dormitories of [Semnan University of Medical Sciences](#) in 2020. The sample size required for the present study was calculated at 265 students. The sampling method was the probability proportional to the size sampling method. [Semnan University of Medical Sciences](#) had 3 student dormitories and we randomly selected the samples depending on the population living in each dormitory (proportional to size). The inclusion criteria consisted of having a history of more than two months in the dormitory and a willingness to participate in the study. Meanwhile, the exclusion criteria were having diseases that require a special treatment regimen, having a special diet for weight loss, and fitness and reluctance to participate in the study.

Data collection was done by a medical student. The data collection tool was a two-part questionnaire. The first part included demographic variables and socio-economic status (degree and field of study, length of stay in the dormitory, parents' education, parents' monthly income, ethnicity, marital status, parents' occupation, number of children in the family, and birth rank). The second part was the food frequency questionnaire which included 140 questions containing all food groups. This questionnaire has already been tested for validity and reliability in Iran [7]. This questionnaire is a selection of foods that people have usually consumed over the past year. Two numbers should be recorded in the questionnaire, the first is the number of times consumed (number of times per day, week, month and year) and the second is the amount of food consumed each time. To determine the average daily consumption of each type of food, the product of the number of times consumed per food was adjusted to the standard coefficient (fixed coefficients of 0.14, 0.032 and 0.0027 were used to convert week to day, month to day and year to day, respectively) and items were classified into 10 nutritional groups as follows: 1) Cereals: Bread, rice, pasta, etc. 2) Dairy: Yogurt, milk, cheese, etc. 3) Meat and its substitutes: Red meat, white meat (chicken and fish), meat products (sausages), eggs, legumes, nuts, etc.

4) Vegetables: Different types of raw vegetables, stewed vegetables, lettuce, cabbage, cucumber, tomato, onion, etc. 5) Fruits: Different types of fresh fruits, dried fruits, natural juices, etc. 6) Fats: Solid and liquid oils, butter, cream, mayonnaise, etc. 7) Sugars and sweets: Sugar, honey, jam, candy, transportation, etc. 8) Drinks: Juices of home and industrial syrups, all kinds of drinks, all kinds of coffee, tea, drinks, etc. 9) Salts and seasonings: Salt, sauce and tomato paste, pomegranate paste, lemon juice, vinegar, pickles, lemons, barberry, chips, puff pastry, etc. 10) Miscellaneous: Pizza, French fries, etc.

Subsequently, anthropometric indices (height, weight, waist circumference, arm circumference and hip circumference) by a medical student in the dormitory were evaluated as follows: Weight with minimal clothing and without shoes was done with a digital scale with an accuracy of 100 g Standing height without shoes, heels glued together, hips and shoulders were measured along a straight line against the meter attached to the wall with an accuracy of 0.5 cm waist circumference was measured standing in the distance between the last rib and the iliac head during a normal exhalation. Hip circumference was calculated by measuring the circumference of the widest part of the hip with an inelastic meter. Finally, the hand was placed down at rest to measure arm circumference. After determining the middle of the arm (between acromion and olecranon), the hand was placed at a right angle and the arm circumference was measured with an inelastic meter.

The data were analyzed using the Stata software, version 14. Mean±SD, number and percentage were calculated for descriptive analyses. Then, the independent samples t-test, one-way analysis of variance, Pearson correlation coefficient, and chi-squared test were used for data analysis. Meanwhile,  $P < 0.05$  were considered statistically significant.

## Results

Table 1 shows the demographic and anthropometric characteristics of the studied students. Mean±SD of age, body mass index (BMI), waist circumference, arm circumference and hip circumference were 21.52±2.46, 22.95±3.47, 80.31±8.77, 28.20±3.48 and 98.44±8.38, respectively. Also, 170(64%) of the students were girls and 117(44.2%) were studying medicine. The majority of students were single (93.6%) and 153(57.7%) of their monthly family income was more than \$100. Also, 10.5% of female students and 3.01% of male students had a waist circumference  $\geq 88$  and  $\geq 102$  cm, respectively. Furthermore, 32(18.7%) and 36(27.4%) of women and men were overweight or obese, respectively.

Table 2 shows a correlation between the frequency of consumption of different food groups and demographic and anthropometric characteristics in the students. There was a significant correlation between the cereal's food group and age ( $r=0.150$ ,  $P=0.014$ ). There was a significant correlation between the length of stay in the dormitory and the vegetable food group ( $r=0.137$ ,  $P=0.026$ ). In addition, a significant correlation was observed between arm circumference and the fruit food group ( $r=0.165$ ,  $P=0.007$ ). There was also a significant correlation between arm circumference ( $r=0.124$ ,  $P=0.044$ ) and BMI ( $r=0.121$ ,  $P=0.049$ ) in the miscellaneous food group.

Table 3 shows the relationship between the consumption frequency of different food groups with gender, marital status and monthly income level. The frequency of consumption of vegetables ( $0.12 \pm 0.08$  vs  $0.09 \pm 0.06$ ) and salts and seasonings ( $0.40 \pm 0.32$  vs  $0.30 \pm 0.17$ ) groups in women was significantly higher than in men ( $P < 0.05$ ). The frequency of fruit consumption in married students was significantly higher than in single ones ( $0.36 \pm 0.80$  vs  $0.18 \pm 0.16$ ;  $P < 0.05$ ). In addition, the vegetable group consumption frequency was significantly higher in students with household incomes above \$100 than below \$100 ( $0.12 \pm 0.08$  vs  $0.10 \pm 0.06$ ;  $P < 0.05$ ).

Table 4 shows the relationship between the consumption frequency of different food groups with father's education, mother's education, and field of study. Accordingly, no statistically significant relationship was observed between the consumption frequency of different food groups with the father's education, the mother's education, and the field of study ( $P > 0.05$ ).

## Discussion

The present study investigated the dietary patterns of medical sciences students in Semnan City, Iran. The results of our study showed that 10.5% of female students and 3.01% of male students had a waist circumference  $\geq 88$  and  $\geq 102$  cm, respectively. Similarly, 32(18.7%) and 36(27.4%) of women and men were overweight or obese, respectively. We observed a significant correlation between cereals food group and age ( $r=0.150$ ,  $P=0.014$ ), vegetable food group and the length of stay in the dormitory ( $r=0.137$ ,  $P=0.026$ ), fruit food group and arm circumference ( $r=0.165$ ,  $P=0.007$ ) and the miscellaneous food group with arm circumference ( $r=0.124$ ,  $P=0.044$ ) and BMI ( $r=0.121$ ,  $P=0.049$ ). Also, the frequency of consumption of vegetables and salts and seasonings groups in women was significantly higher than in men ( $P < 0.05$ ). The frequency of fruit consumption in

**Table 1.** Demographic characteristics and anthropometrics of the students under study

Variables		Mean±SD	Min	Max
Age (y)		21.52±2.46	18	37
BMI (kg/m <sup>2</sup> )		22.95±3.47	15.85	34.15
Waist circumference (cm)		80.31±8.77	63	109
Arm circumference (cm)		28.20±3.48	21.60	41
Hip circumference (cm)		98.44±8.38	80	121
Duration of stay in the dormitory (month)		24.78±18.36	75	3

  

Variables		No. (%)	
Sex	Female	170(64)	
	Male	95(36)	
Field of study	Medical	117(44.2)	
	Non-medical	148(55.8)	
Marital status	Single	248(93.6)	
	Married	17(6.4)	
Income level (\$)	≤100	112(42.3)	
	>100	153(57.7)	
Father's education	None_academic	140(52.8)	
	Academic	125(47.2)	
Mother's education	None_academic	166(62.6)	
	Academic	99(37.4)	
Waist circumference (cm)	Female	<88	152(82.5)
		≥88	18(10.5)
	Male	<102	92(96.09)
		≥102	3(3.01)
BMI (kg/m <sup>2</sup> )	Female	<18.5	14(8.3)
		18.5–24.9	124(73)
		25–29.9	25(14.7)
		≥30	7(4)
	Male	<18.5	5(5.1)
		18.5–24.9	64(67.5)
		25–29.9	18(19)
		≥30	8(8.4)

**Table 2.** Correlation between frequency of consumption of different food groups and demographic and anthropometric characteristics in the students

Variables	Age		Stay in Dormitory		BMI	
	r*	P	r	P	r	P
Cereals	0.150	0.014	0.105	0.088	-0.023	0.715
Dairy	-0.086	0.164	-0.011	0.885	0.075	0.225
Fats	-0.021	0.731	0.108	0.079	-0.106	0.086
Vegetables	0.032	0.604	0.137	0.026	-0.058	0.345
Fruits	-0.036	0.562	0.058	0.351	0.014	0.816
Meat and its substitutes	0.019	0.761	0.113	0.067	-0.033	0.590
Drinks	0.015	0.809	-0.017	0.786	0.051	0.410
Sugars and sweets	-0.004	0.944	-0.089	0.148	0.028	0.655
Salts and seasonings	-0.068	0.269	0.004	0.942	-0.052	0.401
Miscellaneous	0.090	0.144	-0.034	0.576	0.124	0.044

  

Variables	Waist Circumference		Arm Circumference		Hip Circumference	
	r	P	r	P	r	P
Cereals	-0.004	0.948	0.058	0.343	-0.014	0.082
Dairy	0.096	0.120	0.083	0.177	0.090	0.142
Fats	-0.061	0.321	-0.061	0.322	-0.083	0.177
Vegetables	0.001	0.977	-0.025	0.688	-0.005	0.936
Fruits	-0.001	0.983	0.165	0.007	0.047	0.447
Meat and its substitutes	-0.007	0.098	0.037	0.548	0.017	0.483
Drinks	0.056	0.361	0.065	0.293	0.105	0.087
Sugars and sweets	0.015	0.804	0.030	0.625	0.043	0.491
Salts and seasonings	-0.046	0.456	-0.025	0.683	-0.007	0.903
Miscellaneous	0.092	0.137	0.121	0.049	0.077	0.212

\*Pearson correlation coefficient.

married students was significantly higher than in single ones ( $P < 0.05$ ). In addition, the frequency of consumption of the vegetable group in students with household incomes above \$100 was significantly higher than below \$100 ( $P < 0.05$ ).

In this study, the frequency of consumption of vegetables and salts and seasonings groups in girls was significantly higher than in boys. In line with this finding, the study by Abdolahi et al. in Tabriz City, Iran showed

that the consumption of fruits, vegetables, dairy products and nuts decreased more in boys than in girls when entered university. Also, the consumption of canned foods in boys was significantly higher than in girls [17]. Zamanian et al. in examining the nutritional status of students living in dormitories of [Shahid Beheshti University of Medical Sciences](#) observed that the consumption of vegetables, fruits, and meat and its condiments is significantly higher in female students than in male students as well [1]. After studying the dietary patterns

**Table 3.** Relationship between consumption frequency of different food groups with gender, marital status and monthly income level

Variables	Sex	Mean±SD	P*	Marital Status	Mean±SD	P	Income Level (\$)	Mean±SD	P
Cereals	Male	0.24±0.11	<0.001	Married	0.20±0.05	0.630	≤100	0.21±0.08	0.417
	Female	0.19±0.07		Single	0.21±0.09		>100	0.20±0.09	
Dairy	Male	0.41±0.23	0.033	Married	0.41±0.26	0.475	≤100	0.39±0.26	0.323
	Female	0.36±0.20		Single	0.37±0.21		>100	0.37±0.17	
Fats	Male	0.19±0.13	0.357	Married	0.22±0.14	0.527	≤100	0.21±0.14	0.569
	Female	0.21±0.14		Single	0.20±0.14		>100	0.20±0.13	
Vegetables	Male	0.09±0.06	0.012	Married	0.12±0.08	0.442	≤100	0.10±0.06	0.032
	Female	0.12±0.08		Single	0.11±0.07		>100	0.12±0.08	
Fruits	Male	0.17±0.16	0.318	Married	0.36±0.80	0.003	≤100	0.17±0.18	0.263
	Female	0.20±0.30		Single	0.18±0.16		>100	0.20±0.30	
Meat and its substitutes	Male	0.150.09	0.144	Married	0.12±0.05	0.332	≤100	0.14±0.10	0.774
	Female	0.14±0.09		Single	0.14±0.09		>100	0.15±0.08	
Drinks	Male	0.54±0.35	0.864	Married	0.61±0.28	0.520	≤100	0.54±0.67	0.707
	Female	0.53±0.57		Single	0.53±0.51		>100	0.52±0.32	
Sugars and sweets	Male	0.23±0.14	0.725	Married	0.25±0.13	0.480	≤100	0.23±0.20	0.465
	Female	0.22±0.19		Single	0.22±0.18		>100	0.22±0.14	
Salts and seasonings	Male	0.30±0.17	0.006	Married	0.34±0.20	0.779	≤100	0.37±0.38	0.879
	Female	0.40±0.32		Single	0.36±0.28		>100	0.36±0.18	
Miscellaneous	Male	0.15±0.15	0.557	Married	0.12±0.09	0.591	≤100	0.14±0.14	0.946
	Female	0.14±0.12		Single	0.14±0.13		>100	0.14±0.13	

\*Independent sample t-test.

of university students in the UK, Sprake et al. found that female students were more inclined to follow a vegetarian pattern, while boys were more inclined to consume ready meals, red meat and alcohol [18]. In contrast, in the study of Sajadi et al. on students of [Babol University of Medical Sciences](#), the consumption of vegetables and snacks between male and female students was not statistically significant [19]. Likewise, the study of Gazibara et al. in Belgrade did not find a significant difference between the consumption of meat, fruits, and vegetables in girls and boys [20]. Reasons for differences in the results of these studies may be attributed to differences in the characteristics of the subjects, different eating habits in different geographical areas, the time of sampling of students, or the season of study implementation.

In this study, the prevalence of obesity and overweight was higher in men than women (27.4% vs 18.7%), which was consistent with several studies conducted in this field. For example, in a systematic review and meta-analysis by Sarokhani et al. in Iran, the prevalence of obesity in male students was higher than in female students (pooled prevalence: 11% vs 8%) [21]. Similarly, the study by Habibi et al. in evaluating the nutritional status of students of [Kurdistan University of Medical Sciences](#) showed that 19% and 11.6% of boys and girls suffer from overweight, respectively [22]. Perhaps the reason for overweight and obesity in men is the increase in girls' sensitivity to obesity and adherence to certain diets. Many studies have shown that the use of unhealthy weight control methods and body dissatisfaction is generally higher among girls than boys [23-25].

Table 4. Relationship between consumption frequency of different food groups with father's education, mother's education and field of study

Variables	Father's Education	Mean±SD	P <sup>*</sup>	Mother's Education	Mean±SD	P	Field of Study	Mean±SD	P
Cereals	Non-academic	0.20±0.08	0.569	Non-academic	0.20±0.07	0.513	Medical	0.22±0.10	0.193
	Academic	0.21±0.10		Academic	0.21±0.11		Non-medical	0.20±0.08	
Dairy	Non-academic	0.36±0.23	0.272	Non-academic	0.35±0.22	0.010	Medical	0.38±0.19	0.922
	Academic	0.39±0.19		Academic	0.42±0.20		Non-medical	0.37±0.23	
Fats	Non-academic	0.20±0.14	0.995	Non-academic	0.20±0.13	0.914	Medical	0.20±0.12	0.856
	Academic	0.20±0.14		Academic	0.20±0.16		Non-medical	0.20±0.15	
Vegetables	Non-academic	0.10±0.07	0.995	Non-academic	0.11±0.07	0.169	Medical	0.12±0.07	0.112
	Academic	0.12±0.08		Academic	0.12±0.08		Non-medical	0.10±0.07	
Fruits	Non-academic	0.17±0.18	0.425	Non-academic	0.20±0.30	0.497	Medical	0.20±0.33	0.391
	Academic	0.20±0.32		Academic	0.18±0.15		Non-medical	0.18±0.17	
Meat and its substitutes	Non-academic	0.13±0.09	0.097	Non-academic	0.14±0.09	0.113	Medical	0.15±0.08	0.178
	Academic	0.15±0.09		Academic	0.15±0.10		Non-medical	0.14±0.10	
Drinks	Non-academic	0.55±0.62	0.627	Non-academic	0.54±0.58	0.650	Medical	0.52±0.40	0.870
	Academic	0.51±0.32		Academic	0.51±0.32		Non-medical	0.53±0.60	
Sugars and sweets	Non-academic	0.21±0.14	0.275	Non-academic	0.21±0.13	0.120	Medical	0.22±0.14	0.785
	Academic	0.24±0.20		Academic	0.25±0.22		Non-medical	0.23±0.20	
Salts and seasonings	Non-academic	0.36±0.19	0.635	Non-academic	0.38±0.33	0.213	Medical	0.35±0.17	0.461
	Academic	0.37±0.35		Academic	0.33±0.17		Non-medical	0.37±0.34	
Miscellaneous	Non-academic	0.14±0.14	0.751	Non-academic	0.15±0.14	0.292	Medical	0.13±0.12	0.667
	Academic	0.15±0.12		Academic	0.13±0.12		Non-medical	0.14±0.14	

\*Independent sample t-test.

In the present study, the vegetable group consumption frequency in students with household incomes above \$100 was significantly higher than those below \$ 100. This finding is in line with studies conducted in this field. For example, the study of Zamanian et al. aimed to determine the predictors of fruit and vegetable consumption in the population aged 18-70 years in Iran and showed the economic situation of the household is one of the most important predictors of the amount of fruit and vegetables consumed by family members so that with increasing household socio-economic level, the amount of fruit and vegetable consumption of family members also increases [26]. In the non-communicable disease cohort study in Ravansar in Kermanshah Province, Iran, Amini et al. observed that people with adequate consumption of fruits and vegetables were in a class with high socioeconomic status. Finally, this study showed that the residence and socio-economic status of the household played the most crucial role in the consumption of fruits and vegetables inequality in western of Iran [27]. In another study on 9317 urban households from all the provinces of Iran, the variables of income, family size, and the education level of children and parents were related to the consumption of fruits and vegetables in Iranian households directly [28]. Therefore, the socio-economic status of the student's family should be considered an important factor in improving the student's nutritional status.

Meanwhile, this study showed the frequency of fruit consumption is significantly higher in married students than in single ones. Studies by Riediger et al. in Canada [29] has reported that fruits and vegetables are more frequently consumed by married people than by single or divorced people. Another study in Iran showed that vegetable consumption was higher in families with children than in families without children [30]. However, the study by Zamanian et al. showed no significant relationship between marital status and consumption of fruits and vegetables [26]. Accordingly, married people care more about their health and nutrition than single people; it may be due to their increased hope in life in the presence of their spouse or children.

## Conclusion

Despite the same diet plan for students in dormitories, there is a difference in the frequency of consumption of food groups among students. Paying attention to these factors is recommended to improve students' food consumption patterns. Also, it is suggested that the necessary knowledge be given through public media, and public education, especially in universities, to improve eating habits following the recommendations of the food pyramid guide.

## Study strengths and limitations

This study faced limitations that need to be addressed. Firstly, perhaps the most important limitation of this study is the cross-sectional nature of the study because these studies measure exposure and outcome simultaneously and a detailed investigation of cause-and-effect relationships is not possible due to the lack of temporal relationship between exposure and outcome. Secondly, the food frequency questionnaire is not the most appropriate option for absolute measurement of dietary intake; however, it does allow food group intake ranking. Thirdly, in this study, we have included students studying in the different disciplines of medical sciences in an Iranian province; however, to provide a national profile of students' dietary patterns, it is necessary to assess the nutritional status of the medical sciences and non-medical students in other provinces of Iran to minimize the possibility of selection bias. Lastly, several questionnaire questions were related to the past, so recall bias cannot be ignored.

## Ethical Considerations

### Compliance with ethical guidelines

This study was approved by the Ethics Committee of the [Semnan University of Medical Sciences](#) (Code: IR.SEMUMS.REC.1398.230). This study was performed according to the principles expressed in the Declaration of Helsinki.

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### Authors contributions

Conceptualization, data collection and data analysis: Elahe Ghods, Batool Tayefi Nasrabadi and Azam Doustmohammadian; Study design: Reyhaneh Chekini and Kamyar Mansori; Writing and final approval: All authors.

### Conflict of interest

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