

# The Impact of Fast Food Consumption on the Development of General and Central Obesity

*El impacto del consumo de comida rápida en el desarrollo de la obesidad general y central*

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## Abstract

**Background and objectives:** Fast food consumption among adolescents and young people is increasing. Consumption of these foods is associated with a high intake of energy and fat resulting in overweight and obesity. This study aimed to investigate the relationship between fast food consumption and general and central obesity among Zahedan University of Medical Sciences students.

**Materials and methods:** A cross-sectional study was carried out on a simple random sampling method on 351 students of Zahedan University of Medical Sciences (151 boys and 200 girls). Demographic data and fast food consumption were completed through interviews with students, and Body mass index and waist circumference were used as indicators of general and central obesity in students, respectively.

**Results:** The prevalence of general and central obesity among students was 18.5% (28.5% boys and 11% girls) and 7.7% (8.6% boys and 7% girls), 47.6% (51.7% boys and 44.5% girls) more than 2 times a week and 48.1% occasionally (45% boys and 50.5% girls) consumed at least one type of fast food. There was a significant relationship between fast food consumption with both general types of obesity ( $p = 0.028$ ) and central ( $P = 0.014$ ).

**Conclusions:** Findings of the study indicated that fast food consumption and consequently general and central obesity were high. Therefore, the necessity of interventions such as continuous nutrition education programs to improve the nutritional literacy of young people and students is required.

**Key words:** Fast food, students, general obesity, central obesity, nutrition .

## Resumen

**Antecedentes y objetivos:** El consumo de comida rápida entre adolescentes y jóvenes está aumentando. El consumo de estos alimentos se asocia a una ingesta elevada de energía y grasas que provoca sobrepeso y obesidad. Este estudio tenía como objetivo investigar la relación entre el consumo de comida rápida y la obesidad general y central entre los estudiantes de la Universidad de Ciencias Médicas de Zahedan.

**Materiales y métodos:** Se realizó un estudio transversal con un método de muestreo aleatorio simple sobre 351 estudiantes de la Universidad de Ciencias Médicas de Zahedan (151 chicos y 200 chicas). Los datos demográficos y el consumo de comida rápida se completaron mediante entrevistas con los estudiantes, y se utilizaron el índice de masa corporal y el perímetro de cintura como indicadores de obesidad general y central en los estudiantes, respectivamente.

**Resultados:** La prevalencia de obesidad general y central entre los estudiantes fue del 18,5% (28,5% chicos y 11% chicas) y del 7,7% (8,6% chicos y 7% chicas), el 47,6% (51,7% chicos y 44,5% chicas) más de 2 veces por semana y el 48,1% ocasionalmente (45% chicos y 50,5% chicas) consumían al menos un tipo de comida rápida. Se observó una relación significativa entre el consumo de comida rápida y los tipos generales de obesidad ( $p = 0,028$ ) y central ( $p = 0,014$ ).

**Conclusiones:** Los resultados del estudio indicaron que el consumo de comida rápida y, en consecuencia, la obesidad general y central eran elevados. Por lo tanto, se requiere la necesidad de intervenciones tales como programas continuos de educación nutricional para mejorar los conocimientos nutricionales de jóvenes y estudiantes.

**Palabras clave:** Comida rápida, estudiantes, obesidad general, obesidad central, nutrición.

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## Introduction

Convenience food can be defined as food that is prepared quickly and is usually consumed outside the home<sup>1</sup>, which includes different kinds of sandwiches: hamburgers, cheeseburgers, fried shrimp, hot dogs, chicken nuggets, French fries, pizzas, sausages and hot dogs<sup>2</sup>. Reasons for eating convenience food include easy and fast access, low cost, good taste, and dietary diversity<sup>3</sup>. Consumption of convenience foods has increased worldwide over the past decades. In Iran, 2% of household income is spent on convenience foods<sup>4</sup>.

Studies have shown that most teenagers and youth have improper nutritional patterns and consumption of high-fat, high-salt, sweet and fried foods have increased among them. Increasing consumption of these foods is associated with receiving high energy and fat which leads to increased body fat percentage, overweight, and obesity<sup>5,6</sup>.

The prevalence of obesity in the world is increasing rapidly so it has become a serious epidemic disease and it is estimated to be the fifth leading cause of death in the world<sup>7</sup>. Based on the report of WHO in 2016, 15% of people over the age of 18 are overweight (39% women and 40% men) and 13% suffer from obesity (15% women and 11% men). In general, the global prevalence of obesity has almost tripled between 1976 and 2016. The main cause of overweight and obesity is an energy imbalance between calories received and calories consumed; this imbalance is due to increasing consumption of high-energy and high-fat foods, increasing sedentary lifestyle, and urbanization<sup>8</sup>. Obesity is a risk factor for diseases such as specific cancers, high blood pressure, type 2 diabetes, changes in blood lipid levels, metabolic syndrome, cardiovascular disease, respiratory problems, and stroke<sup>7</sup>. One of the main causes of obesity can be a change in the diet, one of which is an increase in the use of convenience foods<sup>7</sup>.

Evidence shows that students are more prone to unhealthy dietary habits due to replacing fruits and vegetables with convenience food and non-alcoholic beverages<sup>9</sup>, especially medical students consume more convenience foods due to higher educational occupations and as a result, they are prone to overweight and obesity<sup>10</sup>. In studies conducted in Iran; 52.6% of medical students of Shahid Beheshti University ate 1-2 times a week and 72.4% of Qom students ate at least one type of convenience food per week or month [18]. Among medical students in India, more than 90% of students ate convenience foods, and among them, 34.05% suffered from overweight and obesity<sup>11</sup>. In the Michigan-US study on adults over 18 years of age; the risk of obesity was 60% among those who ate convenience foods 2 to 3 times a week and 81% among those who ate 3 or more meals<sup>12</sup>.

Due to the increasing tendency of teenagers and youth, especially students, to eat convenience food and its

relationship with overweight, obesity, and subsequent diseases, efforts for identifying nutritional behaviors associated with overweight and obesity, including the frequency of consumption of convenience foods in this stratum of society can help control and prevent general and central obesity, and other related diseases caused by their consumption<sup>9,13</sup>. Therefore, in the current study, the relationship between convenience food consumption and general and central obesity in students of Zahedan University of Medical Sciences was investigated and solutions were provided to improve the diet of students.

## Materials and methods

The current study is a cross-sectional (descriptive-analytical) study that was conducted on 351 students of different faculties of Zahedan University of Medical Sciences (200 girls and 151 boys) by a simple random sampling method. In this way that 111 students from the medical faculty (50 boys and 61 girls), 48 from dentistry (26 boys and 22 girls), 57 from paramedical (25 boys and 32 girls), 45 from health (15 boys and 30 girls), 32 from rehabilitation (15 boys and 17 girls) and 58 from Nursing and Midwifery students (20 boys and 38 girls) of Zahedan university were selected based on the list of students in each faculty according to the population of the faculties and separately for girls and boys. After satisfying the students, the information form including demographic information (age, sex, residence status, marital status, field of study), anthropometrics, and eating convenience food was completed through interviews with students. In preparing the convenience food questionnaire, a questionnaire whose validity and reliability had been previously confirmed in a study was used<sup>6</sup>. The sample size was calculated at 351 people using the Morgan table.

For determining anthropometric indices; Weighing was done using a standard scale with the least possible coverage and without shoes, with an accuracy of 0.1 kg, and measuring height was done with a stature meter with an accuracy of 0.1 cm, while the person is barefoot and he/she was placed next to the stature meter so that the back of his/her legs, buttocks, shoulders and back of his/her head was completely tangential to the stature meter.

Waist circumference was measured in its narrowest area and in the position where the person was at the end of his normal exhalation and the abdominal muscle was without contraction using an inelastic tape meter with an accuracy of 0.1 cm. Body mass index (BMI) was calculated by dividing weight (kg) by height squared (m<sup>2</sup>). BMI classification was determined according to the WHO recommended grouping as follows: BMI <18.5 was low weight, 18.5-24.9 had normal weight, and BMI > 25 kg/m<sup>2</sup> was overweight and obese<sup>9</sup>. Waist circumference according to WHO criteria were considered central obesity for men and women as >102 and >88, respectively.

SPSS-16 software was used for statistical analysis. Descriptive and analytical statistical methods (Chi-square tests and one-way analysis of variance) were used for data description.

This study has been approved by the Research Council of Zahedan University of Medical Sciences with the code of ethics committee code IR.ZAUMS.REC.1397.76.

## Results

The present study was conducted on 351 male and female students that quantitative and qualitative findings of the study and the relationship between the data and anthropometric variables and consumption of convenience food are shown in the below tables. **Table I** shows the mean and standard deviation of the variables of age, weight, height, BMI, and waist circumference.

The frequency of eating convenience food and BMI and waist circumference in male and female students was determined and the findings have been shown in **tables II** and **III**. There was a significant relationship between eating convenience food and demographic

characteristics such as residential status ( $p=0.01$ ) and mother's education ( $p=0.014$ ), while there was no significant relationship between eating convenience food with gender, marital status, and father's education educational grade ( $p>0.05$ ). It was observed that 49.3% of the students living in dormitories ate convenience food permanently and 48.9% of them sometimes ate convenience food. 49.06% of students who had mothers with higher education (diploma and higher grades) ate convenience food permanently and 47.4% of them sometimes ate convenience food.

The highest frequency of convenience food foods in students is related to pizza (18.3%), hamburgers (9.2%), fried potatoes (5%), sausages (4.7%), fried chicken (4.4%), and (36.9%) was also a combination of 2 or 3 convenience food.

The relationship between eating convenience food and students' anthropometric indices was determined by the Chi-square test. According to (**Table IV**) there was a significant statistical relationship between the consumption of convenience food and waist circumference ( $p = 0.014$ ) and body mass index ( $p = 0.028$ ).

**Table I:** Demographic and anthropometric characteristics of students of Zahedan University of Medical Sciences (n =351).

Variable	M ± SD	Variation range
Age (year)	21.48±2.76	17-40
Height (cm)	167.91±9.32	149-197
Weight (Kg)	61.73±13.9	3-35.130
Body mass index (kg /m <sup>2</sup> )	21.77±3.91	14.39-19.68
Waist (cm)	77.37±11.06	57-122

**Table II:** Frequency distribution of eating convenience food among Students of Zahedan University of Medical Sciences by gender.

Consume ready meals	Women	Men	Total
Permanently	89 (25.4%)	80 (22.8%)	169 (48.1%)
Sometimes	101 (28.8%)	66 (18.8%)	167 (47.6%)
Not consume	10 (2.8%)	5 (1.4%)	15 (4.3%)
Total	200 (57%)	151 (43%)	351 (100%)

**Table III:** Frequency distribution of Body Mass Index (BMI) and waist circumference in students of Zahedan University of Medical Sciences by gender.

Body mass index	Women	Men	Total	p. value
Lightweight	55 (27.5 %)	18 (11.9%)	73 (20.8%)	0.0001
Normal	123 (61.5%)	90 (59.6%)	213 (60.7%)	
Overweight and obesity	22 (11%)	43 (28.5%)	65 (18.5%)	
Total	200 (100%)	151 (100%)	351 (100%)	
Waist				0.358
Normal	186 (93%)	138 (91.4%)	324 (92.3%)	
Central obesity	14 (7%)	13 (8.6%)	27 (7.7%)	
Total	200 (100%)	151 (100%)	351 (100%)	

**Table IV:** Frequency distribution of BMI and waist circumference by eating convenience food in students of Zahedan University of Medical Sciences.

Body mass index	Permanently	Sometimes	Not consume	Total	p. value
Lightweight	28 (8%)	40 (11.4%)	5 (1.4%)	73 (20.8%)	0.028
Normal	100 (28.5%)	103 (29.3%)	10 (2.8%)	213 (60.6%)	
Overweight and obesity	41 (11.7%)	24 (6.8)	0	65 (18.5%)	
Total	169 (48.2%)	167 (47.5%)	15 (4.3%)	351 (100%)	
Waist					0.014
Normal	147 (41.9%)	162 (46.2%)	15 (4.3%)	324 (92.3%)	
Overweight and obesity	20 (5.7%)	7 (2%)	0	27 (7.7)	
Total	167 (47.6%)	169 (48.2%)	15 (4.3%)	351 (100%)	

## Discussion

The results of this study showed that 47.6% of students ate at least one type of convenience food more than 2 times a week and 48.1% of them sometimes (monthly or every few months). The prevalence of eating convenience food did not show a statistically significant difference between the two sexes, but eating convenience food was higher in male students (22.8% permanently and 18.8% sometimes) than in female students (25.4% permanently and 28.8% sometimes).

The prevalence of eating convenience food in the studied students was higher than that eating convenience food in the students studied by Asadi et al in Tehran with a prevalence of 18% in boys and 11% in female students<sup>14</sup> and it was less than the consumption in students of Qom universities with a frequency of 72.4%<sup>15</sup>. In the study of Saudi female students, 74.5% of students ate convenience food 1-2 times a week<sup>8</sup>, which is more common than the prevalence of consumption in Zahedan students.

There was a statistically significant relationship between students' living status (dormitory or non-dormitory) with eating convenience food so eating convenience food was more prevalent among students living in dormitories. Also, there was a significant relationship between eating convenience food and mother's education, so with the increase in maternal education, the prevalence of eating convenience food among students increased. It seems that the increasing the level of the mother's education is associated with the possible employment of the mother outside the home; as a result, lack of enough opportunity to prepare and cook food at home, and also due to the mother's employment, the higher income of the family increases the possibility and desire to eat convenience food in the family<sup>16</sup>.

The main reasons for eating convenience food among students include easy access to these foods, lack of sufficient skills in preparing food, and the desired taste of convenience food<sup>1,9</sup>. It seems that the above reasons have been effective in eating fast food in the students of the present study.

Convenience foods are low in micronutrients, low in fiber, high in energy density, high in glycemic response, and high in sugar<sup>14</sup>, which can increase daily energy intake and thus lead to overweight and obesity. Numerous studies have shown that eating convenience food is directly related to obesity and overweight due to high energy intake<sup>14,17</sup>. Excessive consumption of convenience food is associated with increasing the risk of chronic diseases. Obesity is a risk factor for many chronic diseases such as diabetes, cardiovascular disease, hypertension, etc<sup>17</sup>.

Obesity, especially central obesity has also a high prevalence in different age and sex groups in Iran. In Tehran, the prevalence of central obesity between the

years 1999-and 2001 increased from 63.1% to 79.5% in men and from 67.1% to 82.1% in women, respectively<sup>18</sup>.

In the study of Mortazavi and Shahrakipour in 2003-2004, the prevalence of overweight and obesity in students of Zahedan University of Medical Sciences was 12.9% and 1.3%, respectively, and the prevalence of central obesity in male students was 3.1% and in female students was 39.5%. Was<sup>19</sup>. In the current study, the prevalence of overweight and general obesity in students of this university was 18.5%, respectively, and the prevalence of central obesity in male and female students was 8.6% and 7%, respectively, which shows an increase in prevalence compared to the previous study.

In the current study, there was a statistically significant relationship between convenience food and general and central obesity, which was in line with the study of Shah Tahir et al. in terms of the relationship with general obesity<sup>19</sup>, which showed a significant relationship between eating convenience food and general obesity and in terms of the relationship with central obesity, it is consistent with the study of Francis et al in Jamaica<sup>20</sup> that a statistically significant relationship was observed between the eating convenience food and central obesity.

The findings of the current study show high consumption of convenience food and consequently overweight and general and central obesity in students. It seems that by teaching appropriate nutritional patterns and emphasizing the consumption of healthy foods instead of eating convenience food we can be effective in controlling and preventing overweight and obesity in different age and sex groups<sup>21</sup>.

It is recommended that nutrition interventions and education in the universities and schools of the country should be performed at different times and continuously, in this way, it can be effective in institutionalizing healthy eating habits that are effective in preventing many non-communicable diseases related to nutrition including obesity and obesity-related diseases.

## Conclusion

The findings of the present study showed that the prevalence of general and central obesity among students was 18.5%, 7.7%, and 47.6%. Findings of the study indicated that fast food consumption and consequently general and central obesity were high. Therefore, the necessity of interventions such as continuous nutrition education programs to improve the nutritional literacy of young people and students is required. It is recommended that nutrition interventions and education in the universities and schools of the country should be performed at different times and continuously, in this way, it can be effective in institutionalizing healthy eating habits that are effective in preventing many non-communicable diseases related to nutrition including obesity and obesity-related diseases.

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## Declaration of competing interest

The authors declared no potential conflicts of interest to the research, authorship, and/or publication of this article.

## Availability of data

Data is available from the authors on reasonable request.

## Authors contributions

Study concept and design: MN(Mehrdad Naghizadeh); acquisition of data: MA(Mehdi Ahmadi) and MN; analysis and interpretation of data: MA, MN ; drafting of the manuscript:MN and SJ(Saber Jafari maskouni); ; critical revision of the manuscript: ZM(Zinat Mortazavi) and MN; statistical analysis: SJ; and study supervision: ZM, MNand MA.

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