

Determinants of Fast-Food Consumption Pattern and Causes of Tendency towards Ready-to-eat Food in Iranian Secondary School Students: A Cross-sectional Study

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Abstract

Background: The prevalence of fast-food consumption in students has increased worldwide, causing multiple complications. Therefore, the present study aimed to assess fast-food consumption pattern and causes of tendency to ready-to-eat food in Iranian secondary school students.

Methods: This cross-sectional investigation was carried out among 600 students, 13-18 years old, selected by cluster sampling method from five districts of Khoy, Iran. Data were collected by demographic information, semi-quantitative Food Frequency Questionnaire (FFQ) and causes of tendency towards ready-to-eat food questionnaires. Content and face validity of the questionnaire was proved by the faculty members of Khoy University of Medical Sciences. Data were analyzed using descriptive and inferential statistics through SPSS version 19.

Results: Our results showed that 68.6% of the participants had a low fast-food consumption pattern. The main reasons for the tendency toward ready-to-eat food were “the good taste of these foods” (40.2%), and “compulsion and necessity if there is no food at home” (40.2%). There was a significant statistical association between gender ($P=0.03$), occupational status of mother ($P=0.02$), parents’ education ($P=0.05$), family’s decision to avoid fast-food restaurant ($P=0.001$), number of fast-food restaurants in the home to school path ($P=0.001$), and sports activities ($P=0.03$) as well as between the weight, awareness, and BMI ($P=0.001$) with fast-food consumption pattern.

Conclusions: Fast-food consumption pattern among students is mainly low possibly due to the awareness of students of the fact that fast-food consumption is an unwholesome dietary behavior as it augments weight and other hazard of diseases related to diet.

Keywords: Fast-food, Food pattern, Tendency, Students

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1. Introduction

The spread of chronic diseases such as obesity, heart disease and adult diabetes in recent years has considerably increased due to a change in dietary habits and physical activity levels of individuals in the society (1). The change in dietary habits has been associated with the progress of science and technology in many communities (2).

Food habits such as irregular consumption of large meals and snacks, eating at fast-food restaurants, skipping meals and dieting among teens are seen more frequently than other age groups. The factors contributing to these habits include increased peer influence, reduced family influence, media advertisements, working outside and taking on responsibilities that lead to spending less time with the family (3).

Fast-foods are foods that are quickly prepared and sold in cafeterias, school shops, and fast-food restaurants. Thus, they are not homemade foods. Different types of sandwiches, hamburgers, cheeseburgers, fried shrimps and fish and chicken, hot dogs, meat or chicken steak, potato fries and all kinds of pizza are common fast-foods (2, 3). Ready-to-eat foods are those that are not cooked or heated before eating. These foods include salads, cooked meat, smoked fish, desserts, sandwiches, cheese, and foods that are eaten cold (2). Eating these foods causes a lack of a variety of vitamins, mineral salts, and fibers. Since these foods contain an amount of calorie, fat, sugar, and salt higher than the standard level, they increase the risk of cardiovascular diseases (4).

The pattern of food consumption refers to the amounts, proportions, variety and frequency of

consumption of different foods and drinks in the diet (1). During the past 30 years, eating fast-foods and ready-to-eat foods has increased in the diet of the people of the world (5). Eating prepared foods has become a strong social factor for teenagers, and according to the recent report of the disease center, more than one third of children and teenagers eat fast-food on a given day (6). There are many reasons for the tendency to consume ready-to-eat foods in teenagers including reduced family influence and persistent peer influence, low price, easy access, lack of time, deliciousness, meeting place of teenagers, media advertisements as well as many restaurants near schools. The environment and atmosphere of these restaurants are attractive for children and adolescents who have no desired environment for eating (2).

Most of the secondary school students use high-fat diets and carbonated beverages that contain a high calorie. Moreover, their diet contains a less amount of fruit and vegetable which causes obesity. Thus, trying to change the nutritional behavior of people including children and adolescents will be helpful in reducing obesity and other diseases (5).

A study in the U.S. reported an association between receiving fast-foods and learning in children (7). The Ohio University researchers have concluded that eating too much fast-foods causes academic failure in skills such as reading, mathematics, and sciences. In this research, the students who ate too much fast-food obtained scores 20% less than those who had not used fast-foods (8). The study conducted by Fazelpour and co-workers in Iran, found that a significant association between increased consumption of fast-foods and the amount of anxiety among students in Tehran, Iran (9). Ebadi and colleagues examined the predictors of fast-food consumption in students based on the theory of planned behavior and concluded that sandwich and snack are popular foods among the students and high fast-food consumption takes up BMI and weight (10). According to Shirzadeh and co-workers, the prevalence of overweight and obesity in students was 20.5% and 21%, respectively (11).

It seems that if fast-foods and ready-to-eat foods are prepared with lower energy density and a greater amount of fiber, they can be more effective in reducing obesity (6).

Independent teenagers have more food choices outside home. Being affected by peers and friends (especially close friends) is increasing as well. On the other hand, their trust to the ability of parents and adults has reduced. It should be noted that this age range is a period with the potential to correct nutritional deficiencies and to compensate developmental deficiencies of the previous stages of life. Thus, this period can be used as an appropriate opportunity to solve previous nutritional deficiencies and forming nutritional habits (3).

Nowadays, due to the high consumption of fast-foods and prepared foods, it seems necessary to pay attention to the harms of these foods for health. Schools are one of the most important formal and organized institutions which can develop children's mental health in the society by providing a healthy environment. Therefore, it is necessary to pay special attention to the nutrition of students. Health care providers can have an active role in training appropriate nutrition habits to kids and adolescents along with teachers; they can also provide their desired plans. Accordingly, they can help children and teenagers form positive nutritional behaviors, maximize growth and development, and improve the health of children and families by providing nutritional recommendations (2). Given the wrong eating habits, weight disorders, life style changes, and the lack of comprehensive studies in this regard in Iran as well as authentic research evidence (12, 13), this study was designed to investigate fast-food consumption pattern and causes of tendency to ready-to-eat foods in Iranian secondary school students.

2. Methods

2.1. Study Design and Data Collection

This cross-sectional study was conducted on 13-18-year old students who were selected through a multi-stage cluster sampling method from five districts of Khoy, Iran. The sample size was determined according to the study by Amani and colleagues, taking into account 40% fast-food consumption more than once a week, with an accuracy of 3% and type 1 error of 5% (4). Based on the one study in West Azarbaijan province, the total number of students was 582,330 (14), and with an estimation of 10% attrition, the final sample size was determined to be 600. The inclusion criteria

for the study were students between the ages of 13-18 years who studying in schools. The exclusion criteria were kidney, heart, gland, and diabetes diseases, and receiving a special treatment regime.

The cluster sampling method was used in five different districts of Khoy (North, South, East, West and Center) and then one girl's and one boy's school were randomly selected from each cluster. Then, within the schools, students were selected by a simple random sampling method based on their student number.

In order to collect data, upon the approval of the ethics committee of Khoy University of Medical Sciences, the necessary administrative correspondence was carried out and the letters of permission required to start the research process were obtained and presented to Khoy Education Department and the relevant schools.

The researchers went to the selected schools outside school hours and obtained permission from the school management. Then, they distributed an informed consent form to the students to be signed by both themselves and their parents at home. Also, the objectives of the study and how to complete the questionnaires were explained. The study participants were explained that their personal information will remain confidential, and they have the right to withdraw at any stage of the study. After completing the questionnaires, they were returned to the school counselor with prior coordination so that the researchers could receive the questionnaires.

2.2. Measures

Data collection tools were demographic characteristic and a Food Frequency Questionnaire (15). Weight and height in demographic characteristic were measured by trained researchers. Students' weight was measured with a German digital scale with an accuracy of 0.1 kg without wearing shoes and with minimal clothing, and standing height without shoes was recorded, while the feet are together and the hips, shoulders and back of the head are in contact with the profile of the caliper with an accuracy of 1 cm. To determine overweight and obesity, the percentiles of the Center for Disease Control were used, that normal weight is between the 5th percentile and less than the 85th percentile, overweight is between the

85th percentile and less than the 95th percentile, and obesity is defined as the percentile equal to or above the 95th for age and gender (16). For each student, Body Mass Index (BMI) was calculated by dividing weight in kilograms by the square of height in square meters.

Food Frequency Questionnaire (FFQ) contains 147 food items including various food groups (fats, proteins, hydrocarbons, fruits and vegetables, dairy products, and grains) and the average food consumption in the past year is determined from it. In this study, through consultation with a nutritionist, columns related to fast-foods and ready-to-eat foods were used. This questionnaire was prepared with 42 fast-food items (common fast-foods). These items are prepared foods from fast-food restaurants and include all kinds of burgers, sausages and hotdogs, all kinds of pizzas, pita and calzones, meat dumplings, fried chicken, fish and mushrooms and fried shrimp, fried potatoes, types of donors and fillet steak are meat or chicken. In this form, the columns of non-consumption, consumption per day, week, month, and year and the amount consumed each time are written, and the students filled these columns according to the average amount consumed. In FFQ, ready-to-eat foods are listed on an ordinal scale as 'low consumption: less than once a week', 'moderate consumption: 4 to 2 times a week' and 'high consumption: more than 2 times a week' (15).

The validity of FFQ has been confirmed in study of García and colleagues and its reliability coefficient were obtained to be 0.87 using the intraclass correlation coefficient (ICC) method (15). Of course, face validity and content validity of the questionnaire were again examined by 10 faculty members of nursing and nutrition at Khoy University of Medical Sciences, Khoy, Iran, and necessary modifications were applied. The reliability of FFQ in 20 students was obtained with a Cronbach's alpha coefficient of 0.9 which is a high reliability. Simultaneous observation was used to estimate the reliability of scales and stadiometer. Thus, the weight and height of 10 students were measured by two observers separately and the correlation coefficient between them was 0.97.

The causes of tendency towards ready-to-eat food questionnaire includes 20 items, developed by the researchers based on previous domestic and foreign studies (3, 5) and in the form of an

answer sheet. Participants could mark more than one of the 20 reasons for tendency. For scoring the questionnaire, the selected options were coded as 1 and the options that were not selected were coded as 2. The face validity and content validity were confirmed by 10 faculty members of Nursing and Nutrition, and Cronbach’s alpha coefficient was determined to be 0.86.

2.3. Statistical Analysis

Descriptive statistics of frequency and percentage were used to analyze the data on demographic characteristics, fast-food consumption pattern, and tendency towards ready-to-eat food. Chi-square test was used to investigate the association in consumption pattern of the study participants according to their socio-demographic characteristics. SPSS version 19 was used for data analysis. P value less than 0.05 was used as the significance level.

3. Results

3.1. Demographic Data

In this study, 315 female students (52.5%) and 285 male students (47.5%) at first and second grade high schools were analyzed. The mean age of the students was 15.63±1.07. Most of the participants (479 people: 79.9%) belonged to District 3 and the second grade. For each student, the fast-food consumption pattern was examined and each of them was placed in one of the categories of lowly consumed, moderately consumed, and highly consumed (Table 1).

3.2. Association between Socio-demographic Variables and Fast-food Consumption Pattern

As seen in Table 2, there is a significant statistical association between gender (P=0.03), occupational status of mother (P=0.02), parents’ education (P=0.05), family’s decision to avoid fast-food restaurants (P=0.001), number of fast-food restaurants in the home to school path (P=0.001), and sports activities

(P=0.03) with fast-food consumption pattern. Fast-food consumption pattern in male students (11.1%) was almost twice than that of the female students (6.7%). In addition, fast-food consumption pattern was reduced in parents who also had a bachelor’s degree or higher (father: 7% and mother: 2.6 %), with an increased lowly consumed pattern (father: 73.9% and mother: 76.1%). A significant association was found between fast-food consumption and occupational status of mother and was found that mothers living at home (tailor, chef, and artwork) had a high consumption pattern (24.2%). Moreover, as the number of fast-food restaurants in the school to home path and sports activities increase, the fast-food consumption pattern also increases. Families that prevented adolescents from going to fast-food restaurants experienced a low fast-food consumption pattern (75.7%).

According to Table 3, the variance analysis test showed a significant difference between weight (P=0.03), awareness score (P=0.001), and BMI (P=0.001) with fast-food consumption pattern. As the consumption pattern increases to “high consumption pattern”, BMI and weight also increase. In addition, when participants’ awareness increases, lowly consumption pattern increases.

3.3. Association between Demographic Characteristics and Causes of Tendency Toward Ready-to-eat Foods

The main reasons for the tendency toward ready-to-eat food among students are “good taste of these foods” (40.2%), “compulsion and necessity if there is no food at home” (40.2%), “spending free time among peers” (33.4%), “the different and delicious appearance of these foods” (30.3), “interest in consuming ready-to-eat food and snacks” (22.1%), “the glamor of restaurants” (18.5%), “their prices are reasonable compared with traditional foods” (16.2%), “preferring these foods to homemade foods” (15.7%), “the commonness of these foods in society” (14.4%) and “having a lot of pocket money per day” (14.2%) were reported (Table 4).

Table 1: Absolute frequency distribution and a percentage of fast-food consumption pattern among students (n=600)

Fast-food consumption pattern	Lowly consumed		Moderately consumed	Highly consumed		
	Rarely or not used	Once a month	Once every two weeks	Once a week	Three to five times a week	Everyday
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
	240 (40)	124 (20.5)	48 (8.1)	130 (21.7)	48 (8.1)	10 (1.6)

Table 2: Association between demographic characteristics (qualitative) and fast-food consumption pattern among students

Variable	Fast-food consumption pattern			Statistical indices
	Lowly consumed	Moderately consumed	Highly consumed	
District	Frequency (%)	Frequency (%)	Frequency (%)	
1	75(69.1)	24(22.2)	10(8.8)	$X^2=3.77$
2	64(67.7)	23(25.1)	7(7.2)	$P=0.87$
3	123(70.8)	37(21.1)	14(8.1)	
4	83(71.2)	22(18.8)	12(10.1)	
5	71(66.7)	25(23.7)	10(9.7)	
Gender				
Female	226(70.1)	75(23.2)	21(6.7)	$X^2=7.02$
Male	190(68.4)	57(20.4)	31(11.1)	$P=0.03$
Academic level				
First grade high school	104(73.3)	26(18)	12(8.8)	$X^2=2.05$
Second-grade high school	315(68.8)	102(22.4)	41(8.8)	$P=0.35$
Occupational status of the mother				
Working out of home	62(71.8)	18(21)	6(7.3)	$X^2=10.77$
Working at home (chef and tailor)	14(60.6)	4(15.2)	6(24.2)	$P=0.02$
Housewife	340(69.3)	109(22.3)	41(8.4)	
Occupational status of the father				
Employed	234(70.1)	79(23.7)	21(6.3)	$X^2=11.07$
Self-employed	393(68)	132(22.8)	53(9.2)	$P=0.08$
Unemployed	31(81.6)	2(5.3)	5(13.2)	
Retired	77(70.6)	20(18.3)	12(11.0)	
Mother education				
Illiterate	28(81.1)	5(13.2)	2(5.7)	$X^2=12.20$
Under high school	145(69.3)	47(22.1)	18(8.5)	$P=0.05$
High school and associate degree	190(66.6)	65(22.8)	30(10.6)	
Bachelor and higher	53(76.1)	15(21.4)	2(2.6)	
Father education				
Illiterate	19(82.5)	4(17.5)	0(0)	$X^2=15.12$
Under high school	140(69.3)	39(19.4)	23(11.4)	$P=0.01$
High school and associate degree	133(65.7)	53(25.9)	17(8.3)	
Bachelor and higher	98(73.9)	25(19.1)	9(7)	
Family prevents adolescents going fast-food restaurants				
Yes	150(75.7)	27(13.6)	21(10.7)	$X^2=20.45$
No	266(66.3)	104(25.8)	32(7.9)	$P=0.001$
Number of fast-food restaurants in home to school path				
No	122(84.4)	17(11.7)	6(3.9)	$X^2=44.97$
One restaurant	55(67.1)	26(31.6)	1(1.3)	$P=0.001$
Two restaurants	44(60)	18(25.2)	11(14.8)	
Three or more than three restaurants	203(67.7)	65(21.6)	32(10.7)	
Performing special exercises				
Yes	232(69.5)	67(20)	35(10.5)	$X^2=6.93$
No	184(69.1)	65(24.4)	17(6.6)	$P=0.03$
Monthly income of family				
I have no information	243(69)	83(23.7)	26(7.3)	$X^2=5.044$
No income	8(100)	0(0)	0(0)	$P=0.28$
Less than 10000000 Rials	41(72.8)	10(17.4)	5(9.8)	
Between 10000000 and 20000000 Rials	76(71.8)	21(19.7)	9(8.5)	
More than 20000000 Rials	50(63.9)	16(20.3)	12(15.8)	
Pocket money (weekly)				
30000 to 250000 Rials	266(65.5)	115(28.3)	26(6.2)	$X=44.23$
260000 to 470000 Rials	76(56.1)	58(42.5)	2(1.3)	$P=0.000$
480000 to 700000 Rials	18(31.5)	38(66.3)	1(2.2)	

Table 3: Association between demographic characteristics (quantitative) and fast-food consumption pattern among students

Variable	Fast-food consumption			Statistical indices
	Low consumption (Mean±SD)	Moderate consumption (Mean±SD)	High consumption (Mean±SD)	
Age (year)	15.36±1.13	15.63±1.07	15.72±1.15	F=8.06 P=0.001
Weight (kg)	61.85±13.97	62.22±14.46	65.96±14.94	F=3.519 P=0.03
Height (cm)	168.78±10.01	169.13±11.54	170.59±17.71	F=1.103 P=0.33
Awareness score	4.89±2.71	3.71±2.99	3.02±2.92	F=28.56 P=0.001
BMI	21.59±3.84	21.60±3.62	23.65±12.09	F=6.90 P=0.001

BMI: Body Mass Index; SD: Standard Deviation

Table 4: Association between demographic characteristics and causes of tendency* toward ready to eat foods in students

Variable	Frequency (%)	Sex	Father's education	Mother's education	Father's job	Mother's job
	P ^{aa}					
The good taste of these foods	241 (40.2)	^a 0.001	0.003 ^a	0.11	^a 0.001	0.001 ^a
Spending free time among peers	206 (34.4)	^a 0.001	0.54	0.87	0.01 ^a	^a 0.001
The different and delicious appearance of these foods	206 (30.3)	0.10	0.21	0.78	0.007	0.01 ^a
Interest in consuming ready-to-eat food and snacks	132 (23.1)	^a 0.001	0.11	0.001 ^a	0.23	0.002 ^a
The commonness of these foods in society	248 (14.4)	^a 0.001	^a 0.001	0.42	0.49	0.07
The glamor of restaurants (their good appearance)	111 (8.5)	0.002 ^a	0.002 ^a	0.70	^a 0.001	0.002 ^a
Their prices are reasonable compared to traditional foods	97 (16.2)	0.66	^a 0.001	0.002 ^a	0.12	0.003 ^a
Preferring these foods to homemade foods	94 (15.7)	0.40	0.78	0.06	0.03 ^a	^a 0.001
Ensuring the hygiene of prepared foods	81 (13.5)	0.29	^a 0.001	0.007	0.02 ^a	0.17
Compulsion and necessity if there is no food at home	240 (40.1)	0.004 ^a	0.10 ^a	^a 0.001	0.02 ^a	0.27
Having a lot of pocket money per day	85 (14.2)	0.001 ^a	^a 0.001	0.08	^a 0.001	^a 0.001
The proximity of the school to ready-made food and snack centers	38 (6.4)	0.07	0.40 ^a	0.79	^a 0.001	^a 0.001
The proximity of the home to ready-made food and snack centers	42 (7.1)	0.001 ^a	^a 0.001	0.46	0.006	0.47
The existence of a buffet inside the school	58 (9.8)	^a 0.001	0.99	0.17	0.01 ^a	0.17
Get used to eating these foods	30 (5.1)	0.33	0.75	0.008 ^a	0.03 ^a	0.03 ^a
Having a sense of competition with classmates in eating these foods	27 (4.5)	0.14	0.002 ^a	0.02 ^a	0.26	0.02 ^a
Mother's employment	14 (2.4)	0.08	0.01 ^a	0.04 ^a	0.01 ^a	0.18
Media advertising	13 (2.3)	0.30	0.39	0.93	0.02 ^a	0.34
Mother's inappropriate cooking	10 (1.7)	0.46	0.004 ^a	0.06	0.002 ^a	0.49
The high quality of these foods	15 (2.6)	0.001 ^a	0.15	^a 0.001	0.14	0.07

^aIt was possible to choose more than one cause. ^{aa}Using chi-square test (P<0.05)

The chi-square test outcome indicated statistically significant difference by gender (P=0.001), father's education level (P=0.001), and parents' occupation (P=0.001) with "having a lot of pocket money per day", «the glamor of restaurants», and «good taste of these food», "proximity of the home to ready-made food and snack centers", "compulsion and necessity if there is no food at home", "preferring these foods to homemade foods" as well as between the parents' education level (P=0.001) and the

mother's occupation (P=0.001) with tendency toward ready-to-eat foods (Table 4).

4. Discussion

This study sought to determine the factors influencing the consumption of fast-food and the trend towards ready meals among students, because it is vital to understand why students tend to consume these foods. The study results

demonstrated that the highest consumption pattern among students is lowly consumed pattern. As reported by Pourabbasi and colleagues, fast-food consumption in Iranian children is high and this amount makes increasing energy density, cholesterol and saturated fat intake, decreased intake of micronutrients required for body, and increasing the risk of overweight and obesity (17). Study of Ashdown-Franks and colleagues also found that the overall prevalence of fast-food consumption and carbonated soft drink consumption were 49.3 and 43.8%, respectively (2). The inconsistency between findings of our study with other studies might be due to the type of culture, advertising and their awareness of disadvantages of these foods.

Our study showed significant association between fast-food consumption pattern and gender. According to the previous studies, gender plays a role in adolescents' dietary behaviors, with increased consumption of fast-foods in boys (18, 19). Also, a significant association was found between gender and type of fast-food selection, portion size, frequency of consumption, need to know about food safety, being influenced by advertisements, food poisoning and its reaction, and not consuming fast-food (18). Other studies reported that male individuals had higher consumption of fast-food than female ones and 23.6% of male individuals and 22.8% of female ones consume fast-foods more than three times a week (5, 19). The findings of these investigations are consistent with our study. However, research has recommended that gender differences in the pattern of fast-food consumption may be related to internal and external motivations, whereby girls emphasize more external motivations in their eating habits; e.g., eating healthier, changing eating habits around boys, and being thin. In contrast, boys focus more on intrinsic motivation; e.g., gaining independence, eating for pleasure, and pursuing physical performance gains (20).

We found that education level tends to tilt consumption towards healthier foods, and fast-food consumption pattern is reduced as the parental education level is increased. According to other studies, eating foods high in sugar and fat was associated with parents' low level of education (7, 12). Specifically, individuals with upper secondary or higher levels of education, consume healthier foods than those with lower secondary

education or lower levels of education (21), these results were in line with the results of the present study. It is expected that increasing the level of parents' education will increase the awareness of the importance of healthy eating for adolescents and create a negative attitude towards the use of damaging meals in families.

Our study discovered a significant association among pattern of fast-food use and mother's occupation. Results showed that mothers working at home have a high fast-food consumption pattern. According to Amani and colleagues, the highest fast-food consumption was obtained among employees, employed people, university students (4). Inconsistent with our results, Oliveira and Raposo reported that fast-food consumption was seen highly in young people, the employed, and those who had an academic education (22). The highly use of fast-foods by women working at home might be more due to the good taste, cost-effectiveness, popularity of these foods in our community and in some cases, inevitability and the lack of time to prepare a homemade food. Also, the mother's awareness of complications regarding fast-food consumption can affect consumption pattern.

In the present study, a significant difference was found among the measure of the students' pocket money and tendency to ready-to-eat and fast-food consumption. The availability of pocket money received by teenagers affects the pattern of fast-food consumption. The more pocket money, the more fast-food they consume (23). More than 60% of participants in the age group of 16 and 18 years spend all their pocket money on fast-food (2).

In the present study, a significant association was found among the tendency and consumption patterns with the number of fast-food restaurants on home to school path. As studies have shown, the availability of unhealthy food or beverages in or around schools negatively affects food choices in the absence of parental supervision (2, 24). A study conducted by Peres and colleagues showed that fast-food consumption is higher among teenagers who have more restaurants around their homes (25). Also, Azeredo and co-workers stated that there is an association between the vicinity of fast-food restaurants with obesity. Their results showed that the likelihood of obesity in people who are living in the vicinity of the fast-food markets is

1.8 times higher compared with those who are not living in the vicinity of the fast-food markets (26). A new survey found that in high-income countries, unhealthy food retail establishments are on the rise and tend to be clustered around schools (27). Therefore, the food environments around schools can play an important role in the diet of teenagers.

Our study showed that by increasing the activity of professional sports, fast-food consumption increases. As reported by Fryar and colleagues, sports team involvement was a strong risk factor for increased fast-food consumption among male individuals (27). One previous study found that adolescents who participated in team sports with the main competition season in the winter had lower odds of daily fruit and vegetable consumption than those in individual summer sports (28). According to the results, it can be said that people who play professional sports potentially do not have enough time to eat at home due to sports participation.

The fast-food consumption pattern did not show a significant difference according to the family income. The study carried out by Fryar and colleagues recommended that low socioeconomic status (SES) girls reported more fast-food consumption compared with high SES girls (27). But other surveys presented that as the level of family income increases, the amount of fast-food consumption in adults increases (22, 23). On the other hand, hours spent at work and household income show an association with one's probability of consuming fast-food (29). Mumena and co-workers reported that families with lower monthly income had a significantly higher rate of fast-food use (30). French and colleagues presented that higher-income families expend more dollars per month both in home and eating out consider to lower income families (31). The inconsistent results might be due to the low price of fast-foods compared with other traditional foods in Iran such that all people in every group and every economic level can use these types of foods.

This study showed that BMI and weight increases after increasing the consumption pattern due to a high consumption pattern. This finding was in line with the study conducted by Jakobsen and colleagues that showed BMI and waist circumference increases to consume fast-foods, but they found no association between the consumption of fast-foods and hip circumference

and height (32). Bhat analysis also found that the most common cause of higher BMI is the types of foods sold in restaurants and grocery stores (33).

In line with the study conducted by Mirkarimi and colleagues, no significant association was found among fast-food use patterns and age of the students (34).

According to the results of this study, as most of the participants were aware of the side effects of fast-foods and they have been educated on nutrition in schools, and also considering the culture of West Azerbaijan, we hope that fast-food and ready-to-eat food consumption would be reduced in future so as to improve people's health.

Regarding the causes of tendency towards ready foods, the previous studies conducted were consistent with the findings of our study. The color and taste of ready foods as well as their quick preparation were among the reasons for the tendency towards such foods (10, 17). In another study, the speed of preparation, easy access, and good taste are mentioned as the main reasons for the tendency to consume ready foods, although other reasons include company with friends and consumption for fun (35). Also, access to ready foods and the proximity of the place of residence or school to the restaurant play a role in increasing the use of these foods (36). In a survey, the main reasons for the consumption of ready-made foods were taste, easy access and cheapness (37).

In the present study, working parents increased the tendency to consume ready-made foods. It can be said that parents prefer these foods due to their job position, lack of time, not having enough time to prepare traditional foods. Since the development in the use of prepared foods reduces the consumption of useful foods, including various sources of fiber, it seems that giving necessary training to students and their parents, as well as replacing suitable foods with high nutritional value, can limit the consumption of ready foods.

4.1. Limitations

One of the limitations of this study was the use of FFQ and concerns about filling the questionnaire by the students considering their age. Because students were encouraged to buy fast-food with cash allowance and maybe they did not want their

parents to know about this. We tried to moderate and control the confounding effects. Participants were assured that the results of this study would be used anonymously. Also, different definitions of fast-food in different cultures can be seen as another limitation of this study. In this study, we tried to write the names of fast-food based on common names in West Azerbaijan region.

5. Conclusions

According to this study, fast-foods and ready-to-eat food consumption pattern in Khoy, Iran is mostly “lowly consumed” and its reason can be the kind of the culture of the region, recent efforts in the field of education to make students aware of healthy nutrition and efforts of the officials to produce healthy raw products. Therefore, an increased awareness on nutrition in the different groups of people in the community can be useful in line with the reduction of consumption index and replacing fast-food and ready-to-eat food with indigenous and local foods that have a high nutritional value.

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Authors' Contribution

Masumeh Akbarbegloo: Substantial contributions to the conception and design of the work, acquisition, analysis, and interpretation of data for the work, reviewing the work critically for important intellectual content. Esmael Abdollahnejad: Contribution to the design of the work, drafting the work and reviewing it critically for important intellectual content. Arina Karimzad: Collaboration in data collection, entering data into SPSS and preparing the final draft of the paper. All authors have read and approved the final manuscript and agree to be accountable for all aspects of the work, such as the questions related to the accuracy or integrity of any part of the work.

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Ethical Approval

This study was in line with the ethical principles of the Declaration of Helsinki. Also, this study was reviewed and approved by the ethics committee of Khoy University of Medical Sciences, Khoy, Iran with the code of IR.KHOY.REC.1402.041. An informed consent form explaining the objectives of the research and ensuring anonymity and confidentiality of the participants was included in the questionnaire.

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