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Original Article

Knowledge and attitude towards health and food safety among students of Tabriz University of Medical Sciences, Tabriz, Iran

Parvin Dehghan[1], Fatemeh Pournaghi-Azar[2], Saber Azami-Aghdash[3], Yousef Sohraby-Silabi[1], Hassan Dadkhah[4], Hossein Mohammadzadeh-Aghdash*[1]

[1] *Nutrition Research Center, Department of Food Science and Technology, School of Nutrition and Food Sciences, Tabriz University of Medical Sciences, Tabriz, Iran*

[2] *Dental and Periodental Research Centre, Tabriz University of Medical Sciences, Tabriz, Iran*

[3] *Road Traffic Injury Research Center, Tabriz University of Medical Sciences, Tabriz, Iran*

[4] *Department of Management, School of Humanities, Bonab Branch, Islamic Azad University, Bonab, Iran*

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Abstract

Introduction: Health and food safety is one of the most important issues of nutrition science. The present study aims to examine the knowledge and attitude towards health and food safety among students of Tabriz University of Medical Sciences, Tabriz, Iran.

Methods: This study was conducted through cross-sectional approach on 300 students of Tabriz University of Medical Sciences who were selected through stratified random sampling method, using a validated and reliable researcher-made questionnaire. Data were analyzed by SPSS.

Results: More than 50% of students had high attitude and knowledge towards health and food safety and washing hands before cooking. Further, more than 60% of students had low attitude on other related items such as unimportance of food additives in food safety. Besides, more than 50% of students had low knowledge about best temperature to store cooked food which is between 5 to 65 °C and the most appropriate plastic containers to keep food healthy. About 87.3% of students had good knowledge about diseases that could be transmitted through food. That there was a significant relationship between students' attitude and taking courses related to health and food safety (P = 0.010). There was also a significant relationship between students' knowledge and their college (P = 0.001) and major (P = 0.020).

Conclusion: Results obtained revealed that students from some colleges and some majors had low knowledge of health and food safety. It is therefore necessary to hold training programs through workshops or to include courses in the curriculum of majors that lack such credits.

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Introduction

Annually millions of people in the world suffer from food-borne diseases through consumption of contaminated food. Increasing outbreaks of transmitted diseases indicate the expansion of public health problems in low- and middle-income countries which threaten consumers' health and affect their economy by imposing medical expenses.[1] In recent years considering the increased prevalence of food-borne diseases, the science of health and food safety has attracted great attention.[2] Every year, more than 30% of the population of high-income countries suffer from food-borne diseases.[3] According to the reports, for example, food-borne diseases have sickened up to 76 million in the United

* **Corresponding Author:** Hossein Mohammadzadeh-Aghdash, Email: hosein.safety@gmail.com

States among which 325000 cases have been hospitalized and 5000 ones have led to death. Although few studies have been done in this regard in low- and middle-income countries, evidence suggests that they are struggling with severe problems caused by spread of these diseases.[4,5]

Health and food safety is a science that prevents humans from being infected with chronic and acute food- and water-borne diseases.[6] Cross-contamination, disregarding hand washing, improper food storage and inadequate cooking have an important role in food-borne diseases.[7]

Previous studies on epidemiology of food-borne diseases show that consumers behavior such as eating raw (uncooked) or lightly cooked foods and poor sanitary conditions, knowledge and attitude towards health and food safety play an important role in the prevalence of food-borne diseases.[8-10]

According to the Majowicz et al.'s study,[11] people's knowledge of health and food safety can prevent them from being infected with many diseases and hinder contamination of food and the environment. Young et al.[12] performed a study in a Canadian university and reported that more than 53% of students had low knowledge about eating raw foods that causes food-borne diseases. Unklesbay et al.[13] conducted an investigation on knowledge and attitude towards food safety among students of Tehran University of Medical Sciences, Tehran, Iran, and found that students who had passed food-related courses had much higher level of knowledge and attitude than others. According to the study done by Askarian et al. in Shiraz, Iran, there was a significant difference between knowledge and attitude towards health and food safety.[14]

Students of medical science universities have an important role in Iranian health system in regard to prevention of diseases especially food-borne diseases. In this regard, their knowledge and attitude towards health and food safety must be studied.

According to the results of literature review, so far there has been no study on the assessment of knowledge and attitude toward health and food safety among students of Tabriz University of Medical Sciences, Tabriz, Iran. In this regard, the aim of this study was to assess the knowledge and attitude of students of Tabriz University of Medical Sciences towards health and food safety.

Methods

In this cross-sectional study, the population consisted of all students studying at Tabriz University of Medical Sciences. To carry out this study, students' information regarding college, field of study, level, year of entry and gender were received from university's educational department.

Morgan table was used to calculate the sample size. According to the population, a sample size of 320 students was calculated which was raised up to 20% to increase the strength of the study and reduce attrition. Thus, finally a sample of 384 was calculated. To select students from each college, quota sampling method was used. Quota sampling is a non-probability sampling technique wherein a certain proportion is considered for each class or subgroup of the population. To this end, available individuals and units are selected in proportion to the number of each of the classes or groups constituting the population. To collect the data, a self-made questionnaire was used which was designed through literature review and similar studies.[15]

Questionnaire's validity was confirmed by 15 experts of food science and technology as well as educational authorities. The reliability of the questionnaire was calculated through test-retest method by 30 students ($\alpha = 0.80$). The questionnaire contained three main parts. First, demographic and education information (6 items), second, questions related to attitude (9 items) and third, questions on knowledge (13 items).

Study was run after questionnaire became ready. Our researchers visited different schools and distributed the questionnaires among students and then collected them after completion.

Table 1. Educational and demographic characteristics of participants (n = 300)

Variable	Variable levels	n (%)	Variable	Variable levels	n (%)
College status	Medicine	49 (16.3)	Section	Undergraduate	175 (58.3)
	Nutrition	29 (9.7)		Masters	68 (22.7)
	Health	37 (12.3)		PhD	54 (18.0)
	Paramedical	25 (8.3)	Field of study	Medical	28 (9.3)
	Dentistry	30 (10.0)		Health professional	24 (8.0)
	Management and medical information	29 (9.7)		Nursing	32 (10.7)
	Nursing	32 (10.7)		Dentistry	13 (4.3)
	Rehabilitation	19 (6.3)		Nutrition	16 (5.3)
	New Science	32 (10.7)		Physiotherapy	12 (4.0)
	Pharmacy	18 (6.0)		Other	175 (58.3)
Gender	Male	172 (57.3)	Year of entry to the Tabriz University of Medical Sciences	1389	5 (1.7)
	Female	127 (43.7)		1390	9 (3.0)
Passing courses related to health and food safety	Yes	123 (41.7)		1391	36 (12.0)
	Not	172 (58.3)		1392	97 (32.3)
				1393	76 (25.3)
				1394	69 (23.0)
				1395	1 (0.3)

The inclusion criterion for this study was having passed at least one semester at Tabriz University of Medical Sciences and the exclusion criterion was student's unwillingness to answer the questionnaire.

Informed consent was obtained from all participants. They also were given the right to withdraw from the study at any stage of the study. Participants were assured that their information and remarks would be kept confidential and anonymous. Further, an ethical approval was obtained from the Ethics Committee of the Tabriz University of Medical Sciences.

To analyze the data, descriptive statistics (mean, frequency, percentage) and statistical tests such as chi-square, one-way analysis of variance (ANOVA) and Students' t-test were used trough SPSS software (version 16, SPSS Inc., Chicago, IL, USA). A significance level of 0.05 was considered for the statistical tests.

Results

Of 384 questionnaires distributed, 300 ones were returned and analyzed (response rate 78.1%). Male students comprised 53.8% of the sample. In addition, 58.3% of the sample was undergraduate students. The mean age ± standard deviation (SD) was 24.0 ± 3.5. Other educational and demographic features of participants are shown in table 1.

Student's responses to items on attitude and knowledge of health and food safety are presented in tables 2 and 3, respectively. According to students' answers, over 70% of them had high attitude towards health and food safety and more than 50% of them threw away food bulging cans.

Table 2. Results of assessing attitude towards health and food safety among students of Tabriz University of Medical Sciences

Items	Strongly agree	Agree	Disagree	Strongly disagree
Being aware of health and food safety is of great importance.	218 (72.7)	79 (26.3)	2 (0.7)	1 (0.3)
It is essential to wash our hands with soap and water before cooking.	192 (64.0)	97 (33.3)	11 (3.7)	0 (0)
Reheating food ensures its safety.	90 (30.0)	98 (32.7)	95 (31.7)	17 (5.7)
Canned foods with bulging lids should be thrown away.	175 (58.3)	89 (29.7)	28 (9.3)	8 (2.7)
Food additives are not much important in safety of foods.	25 (8.3)	63 (21.0)	124 (41.3)	87 (29.0)
Raw foods can be kept next to the cooked foods.	33 (11.0)	65 (21.7)	135 (45.0)	65 (21.7)
Pasteurized milk can be stored for 24 hours at room temperature.	33 (11.0)	78 (26.0)	124 (41.3)	65 (21.7)
Putting bread in recycled bags makes no problem.	28 (9.3)	58 (19.3)	115 (38.3)	98 (32.7)
Drinking raw milk has a high risk of causing food poisoning.	116 (38.7)	121 (40.3)	44 (14.7)	19 (6.3)

Table 3. Results of assessing knowledge of health and food safety among students of Tabriz University of Medical Sciences

Items	True	False
We check manufacture and expiry date of food products when shopping.	297 (98.7)	3 (1.0)
Fever and vomiting are of symptoms of food-borne diseases.	262 (87.3)	37 (12.3)
The proper temperature to keep food in the fridge is 2-5 °C.	242 (80.7)	57 (19.0)
Botulism is transmitted through canned food.	270 (90.0)	30 (10.0)
There is no need to put pasteurized milk in the refrigerator to keep it safe.	97 (32.3)	203 (67.7)
Milk and meat spoil quickly.	268 (89.3)	32 (10.7)
Mince (ground) meat gets spoiled more quickly.	74 (91.3)	26 (8.7)
Keeping bread in the refrigerator prevents it from going stale.	219 (73.0)	81 (27.0)
It is more suitable to keep food cans in the fridge at a temperature of below zero.	159 (53.0)	141 (47.0)
Meat becoming slimy is a sign of its spoilage.	229 (76.3)	71 (23.7)
The best temperature to store cooked foods is between 5 to 65 °C.	130 (43.3)	170 (56.7)
Plastic containers are much healthier to store foods.	82 (27.3)	218 (72.7)
Staphylococcus aureus can be transmitted to the food through rashes of hands and face and nasal discharge.	215 (71.7)	85 (28.3)

A small percentage of students were aware of the facts that raw foods can be kept next to cooked dishes and pasteurized milk can be stored for 24 hours at room temperature. They also had good attitude towards health and food safety and low attitude towards the effect of food additives on its safety, and had little knowledge about suitability of plastic containers for food storage. The results suggested that over 50% of students had low knowledge about the best temperature for storing cooked food which is between 5 to 65 °C. More than 80% of students had high knowledge of food-borne diseases. According to the results, there was a significant relationship between students' attitude on health and food safety and passing courses related to this topic (P = 0.010). Students' knowledge of health and food safety was also significantly related to their school (P = 0.001) and field of study (P = 0.020) (Table 4).

Discussion

The results suggested that students had high knowledge of health and food safety in some factors and low knowledge in some others. On the other hand, over 50% of students had high attitude towards being informed of health and food safety and washing hands before cooking. Moreover, more than 60% of them scored low on attitude in other items such as unimportance of food additives in food safety.

In this study, we found that 87.3% of students had enough knowledge about food-borne diseases. According to other studies done on high school students in the United States, they had acceptable knowledge on diseases transmitted through food.[13]

The results of our study revealed that as level of education increases, students' knowledge towards health and food safety gets higher which corresponds with the research of Jahed et al. in Tehran.[16] Over 95% of students that participated in our study stated that they always check food products label when shopping.[16] Marietta et al. conducted an investigation on food safety in the University of Missouri, Columbia, Missouri, US and found that 90% of students take a look at production and expiry date written on the label of food products first when buying their food supply.[17]

Table 4. Results of assessing the relationship between students' demographic and educational information and total scores of their attitude and knowledge of health and food safety

Demographic and educational information	Attitude	Knowledge
	P	P
Gender	0.700	0.520
College	0.130	0.001*
Degree level	0.410	0.260
Field of study	0.280	0.020*
Year of entry	0.100	0.270
Passing courses related to health and food safety	0.010*	0.870

*Significant at level of P-value < 0.05.

In the present study, 45% of students had negative attitude toward the fact that raw foods can be kept next to cooked meals and 20% of them believed that drinking raw milk has no risk of causing food poisoning. According to the findings of another survey carried out in Taif University, Saudi Arabia, more than 50% of students had little knowledge regarding raw foods that cause food poisoning.[18] Raw and contaminated foods contain harmful microorganisms which can cause food-borne diseases when transmitted to healthy foods.[19]

Most students participated in this study believed that it is vital to wash hands with soap and water before cooking. Poor hand washing definitely results in the retention of viral pathogens and bacteria on our hands through touching raw materials.[20] Further, more than 70% of students believed that being aware of health and safety issues is of great importance. Study performed by Sockett illustrated that many people know nothing about the basic rules of food hygiene.[21] According to the survey done by Majowicz et al. in Ontario high school students of American, there was a significant difference between students' knowledge and attitude towards health and food safety.[22]

Results obtained in this study imply that students who had passed courses related to health and food safety had better knowledge and attitude in this regard. According to the results of studies done by Garayoa et al.[23] among Spanish University students and Lin and Sneed[24] in Midwestern Iowa State University showed those who had passed courses and received training on health and food safety had higher knowledge and attitude than the rest of the participants. The study carried out by Unklesbay et al. in the University of Missouri illustrated that students who had passed food-related courses had much higher knowledge and attitude and even better performance than other students.[13]

The main limitations of current study are that it was accomplished only in Tabriz University of Medical Sciences and on the young people and the educated society and also lack of cooperation by a number of students. Consequently, the results of this study cannot be generalized to the society.

Conclusion

According to the results obtained, students from some colleges have low knowledge of health and food safety. Also considering the relationship between students' knowledge and attitude towards health and food safety and public health enhancement, it is recommended to include training programs through workshops or college courses in the curriculum of different medicine majors that lack such credits. These programs need to contain some practical information regarding microbiology of food borne diseases and proper food storage methods. An acceptable training program has to include training about protection against food borne diseases, as well as change in bad eating habits.

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Authors' Contribution

Parvin Dehghan, Fatemeh Pournaghi-Azar, Saber Azami-Aghdash, Yousef Sohraby, Hassan Dadkhah, and Hossein Mohammadzadeh-Aghdash contributed to study concept and design.

Data was acquired by Saber Azami-Aghdash, Yousef Sohraby Silabi, Hassan Dadkhah, and Hossein Mohammadzadeh-Aghdash. Analysis and interpretation of data was performed by Parvin Dehghan, Fatemeh Pournaghi-Azar, and Saber Azami-Aghdash. Saber Azami-Aghdash and Hossein Mohammadzadeh-Aghdash drafted the manuscript. Parvin Dehghan and Fatemeh Pournaghi-Azar critically revised the manuscript for important intellectual content. Statistical analysis was performed by Parvin Dehghan, Fatemeh Pournaghi-Azar, and Saber Azami-Aghdash. Parvin Dehghan, Fatemeh Pournaghi-Azar, Saber Azami-

Aghdash, Yousef Sohraby Silabi, Hassan Dadkhah, and Hossein Mohammadzadeh-Aghdash provided administrative, technical, and material support. Parvin Dehghan and Hossein Mohammadzadeh-Aghdash supervised the study.

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Conflict of Interest

Authors have no conflict of interest.

Ethical Approval

Ethical approval was obtained from the regional ethics committee of Tabriz University of Medical Sciences.

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