



## Relationship between awareness and attitude with health and food safety among students of Urmia University, Urmia, Iran

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### Abstract

**Introduction:** Healthy life style and food safety are among the most crucial elements in promoting community health. This cross-sectional study was conducted to assess the awareness and attitudes of the students of Urmia University, Urmia, Iran, regarding health and food safety.

**Methods:** The questionnaire used was designed in three parts (demographic, attitude, and awareness) and it was completed by 384 students. Data were analyzed using SPSS software.

**Results:** Results showed that over 80% of the students had positive attitude towards health and food safety. In addition, almost 50% of the subjects had low awareness on the most appropriate plastic containers to keep food healthy. Findings indicated that there was a significant difference between the students' attitudes and their academic level ( $P = 0.008$ ). No significant differences were found among students' awareness and attitude considering gender and passing the food safety course.

**Conclusion:** As the study findings revealed, training programs and workshops related to health and food safety could be effective, specially for freshmen students.

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### Introduction

In recent years, numerous food-borne disease outbreaks have occurred worldwide affecting both the public health and the environment. However, the advent of proper sanitation could significantly reduce the risks. Although the public are more aware and sensitive towards food safety and health issues in modern societies, there are still many problems in terms of food contamination and the prevalence of food poisoning in different countries.<sup>1,2</sup> Food poisoning and diarrhea are the most important causes of morbidity and mortality worldwide.<sup>3</sup> The information on health and food safety

could prevent the outbreaks of food-borne diseases and protect the environment from contamination.<sup>4</sup> Food safety was recognized as a high priority issue in World Organization for Animal Health (OIE) strategic plan in 2001-2005. Food Safety is not only important for consumers' health, but also for food industry and regulatory authorities.<sup>2</sup> Food-borne illnesses are usually caused by bacteria, viruses, parasites, or chemical substances which enter the body through contaminated food or water, indicating the spread of public health problems in developed and developing countries. However, these problems have significant

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economical effects in developing countries. The World Health Organization (WHO) describes food-borne diseases as one of the most important health issues worldwide.

Contaminated food which contains bacteria, viruses, parasites, or chemical substances cause more than 200 diseases from diarrhea to different cancers.<sup>2</sup> In developing countries, food-borne and water-borne diarrheal diseases lead to estimated 2 million deaths, especially among children.<sup>4</sup> Different studies have been conducted worldwide regarding the knowledge and attitude of university students towards health and food safety.<sup>5-8</sup> Countries around the world are taking steps to improve food safety and decrease the incidence of foodborne illnesses. Studies have shown that people's awareness has an important role in improving nutritional status. Therefore, this study has been accomplished aiming to evaluate the awareness and attitude of students of Urmia University towards health and food safety.

**Methods**

In this cross-sectional study, 30 students from Urmia University were investigated (P = 0.500, d = 0.05), and the sample size was calculated to be 384 using equation 1:

$$n = \frac{Z^2 p(1 - p)}{d^2} \quad \text{Equation 1}$$

The number of samples was determined by stratified random sampling method from different faculties of Urmia University, and finally 384 students were elected. Data were collected by a questionnaire that was previously used in similar studies.

This study was conducted on the basis of

previous studies with some modifications. The questionnaire contained 25 core statements with three sections: section 1 on demographic information (such as gender, academic level and passed courses related to health and food safety); section 2 on health and food safety attitude (9 questions); and section 3 on health and food safety awareness (13 questions). The researchers in the present study attended different faculties, distributed the questionnaires among the students, and then collected them after completion. The inclusion criterion for this study was to pass at least one semester at Urmia University and the exclusion criterion was the unwillingness of the students to answer the questionnaire. Besides, informed consent was obtained from all participants and they were also given the right to quit at any stage of the study. Participants were also assured that their information and remarks would be kept confidential and anonymous. 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 in SPSS software (version 16, SPSS Inc., Chicago, IL, USA).

**Results**

Demographic characteristics of the participants are presented in table 1. In terms of gender, females and males accounted for 240 (62%) and 144 (38%) of the participants, respectively. Approximately half (49%) of the respondents were undergraduates and 51% were postgraduates. Over 80% of the students did not pass any courses related to health and food safety.

**Table 1.** Demographic characteristics of students in Urmia University, Urmia, Iran

Variable	Variable levels	n (%)	Knowledge (mean ± SD)	Attitude (mean ± SD)
Gender	Male	144 (38)	1.40 ± 0.11	2.11 ± 0.44
	Female	240 (62)	1.39 ± 0.13	2.24 ± 0.32
	P		0.179	0.058
Section	Undergraduate	190 (49)	1.41 ± 0.12	1.37 ± 0.19
	Masters	194 (51)	2.26 ± 0.38	2.22 ± 0.38
	PhD	0 (0)	-	-
	P		0.008*	0.288
Passing courses related to health and food safety	Yes	74 (19)	1.37 ± 0.14	2.18 ± 0.35
	No	310 (81)	1.40 ± 0.13	2.26 ± 0.39
	P		0.080	0.102

SD: Standard deviation, \*Significant at level of P-value < 0.05.

**Table 2.** Results of assessing knowledge of health and food safety among students of Urmia University, Urmia, Iran

Question number	Items	True [n (%)]	False [n (%)]
1	We check manufacture and expiry date of food products when shopping.	351 (91)	33 (9)
2	Fever and vomiting are of symptoms of food-borne diseases.	293 (76)	91 (24)
3	The proper temperature to keep food in the fridge is 2-5 °C.	282 (73)	102 (27)
4	Botulism is transmitted through canned food.	283 (74)	101 (26)
5	There is no need to put pasteurized milk in the refrigerator to keep it safe.	113 (29)	271 (71)
6	Milk and meat spoil quickly.	345 (90)	39 (10)
7	Mince (ground) meat spoils more quickly.	263 (68)	121 (32)
8	Keeping bread in the refrigerator prevents it from going stale.	297 (77)	87 (23)
9	It is more suitable to keep food cans in the fridge at a temperature of below zero.	142 (37)	242 (63)
10	Meat becoming slimy is a sign of its spoilage.	243 (63)	141 (37)
11	The best temperature to store cooked food is between 5 to 65 °C.	140 (36)	244 (64)
12	Plastic containers are much healthier to store foods.	61 (16)	323 (84)
13	Staphylococcus aureus can be transmitted to food through rashes of hands and face and nasal discharge.	219 (57)	165 (43)

The responses of the students to the questionnaire regarding health and food safety have been summarized in tables 2 and 3, respectively. There was a significant difference between the academic level and the students' attitude ( $P = 0.008$ ). Nevertheless, no statistically significant difference was observed between the students' attitude, gender, ( $P = 0.058$ ) and their attendance in food safety courses ( $P = 0.102$ ) ( $P \geq 0.050$ ).

### Discussion

Based on the questionnaires, almost 68% of the students were aware of different causes of meat spoilage and 71% of them were not familiar with how to refrigerate meat. Food-borne diseases are accompanied by more risks in vulnerable groups, i.e. children, older people, and pregnant women. In this study, it was discovered that 76% of the students were well knowledgeable on food-borne diseases. According to a study by Byrd-Bredbenner et al.<sup>9</sup> on adults in the USA, 60% of the

participants have enough knowledge on food-borne diseases. She et al.<sup>10</sup> examined college students' knowledge and attitude in Yangzhou Polytechnic College, China, and the results were indicative of their good level of awareness (42.2%) on food-borne parasitic diseases.

In the present study, the majority of the students (91%) checked the products label when shopping. Kim and Lee<sup>11</sup> reported that most consumers pay attention to the production and expiration date of food products. In addition, 36% of the respondents mentioned that they were unaware of the correct temperature to store the cooked food, which is between 5 to 65 °C, and 64% of them did not answer it correctly. Regarding food poisoning, 74% of the students knew about the botulism from canned food.

In a study by Tavakoli et al.<sup>12</sup> on the state of botulism poisoning in Iran during 2003-2007, they have showed that considerations such as public health education, not applying

**Table 3.** Results of assessing attitude for health and food safety among students of Urmia University, Urmia, Iran

Question number	Statements	Strongly agree	Agree	Disagree	Strongly disagree
1	Being aware of health and food safety is of great importance.	83	16	1	0
2	It is essential to wash our hands with soap and water before cooking.	71	26	1	2
3	Reheating food ensures its safety.	17	27	32	24
4	Canned foods with bulging lids should be thrown away.	47	34	10	9
5	Food additives are not much important in safety of foods.	21	34	28	17
6	Raw foods can be kept next to the cooked foods.	6	24	36	34
7	Pasteurized milk can be stored for 24 hours at room temperature.	10	21	33	36
8	Putting bread in recycled bags makes no problem.	8	23	31	38
9	Drinking raw milk has a high risk of causing food poisoning.	48	33	9	10

traditional and insanitary methods in food processing, adequate heating during consumption, lack of using non-pasteurized dairy products, and regular health monitoring and supervision could prevent the occurrence of this hazardous food poisoning.

Over 80% of the students have positive attitude (correct answering) on their first statements, and were aware of the importance of health and safety issues. Hassan and Dimassi<sup>13</sup> have assessed the knowledge and attitude towards food safety at a Lebanese American University, in which the students knew a little about food safety. About question number 2 regarding "Washing hands with soap and water before cooking food is necessary", 71% of people had positive attitude. Garayoa et al.<sup>14</sup> reported that 13.5% of pre-graduate students in Spain washed their hands with soap and water before food preparation.

Almost 36% of the students disagree with keeping raw and cooked food together. In a study conducted in Shiraz, Iran, by Askarian et al.,<sup>15</sup> almost all of (99.1%) the respondents had an opinion about keeping raw foods separate from cooked foods. Many viral and bacterial infections are caused by lack of washing the hands, specially when working with raw materials.<sup>16</sup> Less than 20% of the respondents believed that drinking raw milk is risk-free. Raw and contaminated foods contain noxious microorganisms which can cause food-borne illnesses.

The findings of this study suggested that more educated students had an increased attitude level towards food safety, which was in agreement with the results of different studies.<sup>17-19</sup>

### Conclusion

Public awareness towards health and food

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safety issues can prevent many food-borne diseases. The results of the study showed that there is a significant difference between the awareness and attitude towards food safety and human health among students. It is therefore suggested considering training programs and courses related to health and food safety for the students.

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### Authors' Contribution

Ali Ehsani, Nasim Zolfaghari-Firouzsalar, Hajar Zolfaghari, Maryam Azizi-Lalabadi, and Arezou Khezerlou contributed to study concept and design. Data were acquired by Hajar Zolfaghari, Nasim Zolfaghari-Firouzsalar, and Arezou Khezerlou. Analysis and interpretation of data were performed by Ali Ehsani and Mahmood Alizadeh-Sani. Arezou Khezerlou drafted the manuscript. Ali Ehsani and Maryam Azizi-Lalabadi critically revised the manuscript for important intellectual content.

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### Conflict of Interest

Authors have no conflict of interest.

### Ethical Approval

This study was conducted at Tabriz University of Medical Sciences, Tabriz, Iran. Participants in the plan were assured that their information would be confidential and written informed consent was obtained from each subject.

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