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**Original Article**

# Students' Knowledge and Attitude of Hygiene and Food Safety at Shahid Sadoughi University of Medical Sciences in Yazd, Iran

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## Abstract

**Introduction:** Today, transmitted diseases through food and food poisoning have been considered as a public health problem in many countries. Lack of knowledge concerning hygiene and food safety can increase the risks associated with the consumed foods. Hence, the present study aimed to determine the students' knowledge and attitude of hygiene and food safety in Shahid Sadoughi University of Medical Sciences in Yazd.

**Materials & Methods:** This study is a cross-sectional survey in which 358 students were selected, out of 5400 students of different Schools of Shahid Sadoughi University of Medical Sciences in Yazd, via stratified random sampling method. In order to glean the study data, a questionnaire was applied, which were then analyzed applying Mann- Whitney and Kruskal-Wallis tests.

**Results:** The mean score of knowledge has been reported in a low level within 33% of students and the mean score of attitude has been demonstrated to be at a good level within 63.4% of students. Most students revealed a low knowledge level regarding the proper procedures for food storage and food-borne diseases. Moreover, 28.5% of students had a history of food poisoning, whose knowledge and attitude levels were significantly less than those of students who had no history of food poisoning ($P \leq 0.001$).

**Conclusions:** As the study findings revealed, training programs in the form of workshops and courses related to hygiene and food safety can be effective for the students in increasing students' knowledge especifically lower grades students. These programs should contain practical information about microbiology of transmitted diseases through food and proper food storage methods.

**Keywords:** Attitude; Food Safety; Knowledge, Students

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## Introduction

Hygiene and food safety are considered as important principles in the disease prevention and protect the environment from contamination as well [1]. Food hygiene is the action taken to ensure that food is handled, stored, prepared and served in such a way, and under such conditions, as to prevent – as far as possible – the contamination of food [2]. Nowadays, transmitted diseases through food or food poisoning have been regarded as a public health problem in many countries [3]. Every year, millions of people in the world suffer from transmitted diseases through consumption of contaminated food [4]. World Health Organization considers the diseases caused by food contamination as an important public health problem in the contemporary world [5]. Even in countries with developed systems of hygiene and food safety as the United State, significant cases of deaths caused by food-transmitted diseases can be found [6, 7]. Every year, millions of people are faced with risk of food borne diseases [8]. According to the World Health Organization, annually, more than 30 percent of the population in different countries suffers from the food-transmitted diseases. However, many cases of food poisoning due to the individual and low prevalence are not listed in the reports of World Health Organization [9]. Although the number of food-borne diseases cannot be well estimated, it was reported that 1.8 million people are killed annually due to pollution of water and food [9]. A large number of people in less developed countries are poisoned due to lack of health knowledge as well as food storage under unhealthy conditions [1]. Different studies have demonstrated that three key factors have a major role in food poisoning including knowledge, attitude and behavior of consumers as well as food producers [7, 10]. The low knowledge and attitude among consumers and food manufacturers can destroy every effort in order to maintain and improve the standards of food safety [11, 12].

The adolescents and youth need enough nutrients in order to have an optimal growth [13]. The study results have revealed that young people in the age group of 18-29 years are more exposed to the risks of food-related diseases compared to the other age groups [14, 15]. In a study carried out by Hassan and Dimassi concerning determination of students' knowledge and attitude in Lebanon in regard with hygiene and food safety, the results showed a low level of knowledge within these students [16]. In another study conducted among 82 cooking students in Turkey, although the students knew the importance of hygiene and food safety issue, they demonstrated no knowledge in regard with this field [8]. The findings of another study conducted among student from Tehran University of Medical Sciences in 2012 indicated that 68% of students had good knowledge and 31% had average knowledge regarding hygiene and food safety [1]. Several studies indicate that health education could play an important role in improving the knowledge and health performance [17].

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Therefore, this study aimed to determine students' knowledge and attitude in Shahid Sadoughi University of Medical Sciences in Yazd with respect to hygiene and food safety.

## Materials and Methods

In this cross-sectional study, 30 students were surveyed out of 5400 students from Shahid Sadoughi University of Medical Sciences in Yazd and primary estimation was obtained P=0.5. Then, according to d=0.05, the sample size was 358, which was determined from the following equation:

$$n=\frac{NZ^2P(1-P)}{Nd^2+Z^2P(1-P)}$$

In this study, 358 students were selected via stratified random sampling method from different Schools of Shahid Sadoughi University of Medical Sciences depending on the number of students in each School. In other words, more samples were taken from Schools which have more students Based on this sampling method, 130 students from Public Health school, 58 students from Paramedical school, 52 students of Medical school, 56 students from Nursing school, 31 students from dental school and 31 students from the Pharmacy school were selected. The study data were collected by a questionnaire that used in the previous studies [1]. Since there were some changes in this questionnaire and a pilot study was primarily conducted on 30 students in order to retest the reliability, the reliability of the questionnaire was reported 0.74 via Cronbach's Alpha content analysis. The questionnaire consisted of demographic questions, knowledge questions (19 questions) and attitude questions (10 questions). Regarding knowledge questions, a correct answer to each question was assigned 1 point and incorrect answer was given zero point. The total score of knowledge questions was among 0-19 and thus score less than 7 was reported weak, 7 to 13 as mediocre and more than 13 as a good score. Moreover, attitude questions represented a Likert Scale as strongly disagree (score 1), disagree (score 2), undecided (score 3), agree (score 4) and strongly agree (score 5). The total score in attitude was among 10-50, which the score less than 20 was reported as a low level, 20-35 represented a mediocre level and more than 35 was a Good level. After collecting the questionnaires, the data were entered into the statistical SPSS software ( ver18) and then were analyzed applying Mann-Whitney and Kruskal-Wallis tests.

## Results

The results of the present study revealed that among 358 students, the majorities (62%) were females, and 48% were undergraduate students. Moreover, 36.6% of students were reported to study in the Health School. Demographic characteristics of the students are presented in Table(1).

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**Table 1**: The mean score of knowledge and attitude of students at Shahid Sadoughi University of Medical Sciences in Yazd according to their demographic characteristics

| Demographic variables | | Frequency (percent) | Knowledge score | | Attitude score | |
|---|---|---|---|---|---|---|
| | | | median | mean±SD | Median | mean±SD |
| **Gender** | male | 136 (38) | 189.14 | 8.84±2.80 | 176.49 | 36.36±7.17 |
| | female | 222 (62) | 173.59 | 8.42±2.44 | 181.35 | 35.97±8.90 |
| | **Significant level** | | *P=0.164 | | *P=0.666 | |
| **Age (year)** | Low than 21 | 110 (30.7) | 166.05 | 8.31±2.45 | 156.31 | 34.31±8.52 |
| | 21 to 24 | 124 (34.6) | 170.65 | 8.30±2.79 | 164.58 | 35.03±8.40 |
| | More than 24 | 124 (34.6) | 200.28 | 9.09±2.43 | 214.99 | 38.81±7.24 |
| | **Significant level** | | **P=0.019 | | **P≤0.001 | |
| **School** | Health | 130 (36.3) | 186.87 | 8.73±2.56 | 173.71 | 35.73±8.31 |
| | Paramedical | 58 (16.2) | 177.88 | 8.50±2.73 | 169.85 | 36.12±6.69 |
| | medical | 52 (14.5) | 209.93 | 9.46±2.42 | 214.94 | 39.55±4.40 |
| | Nursing | 56 (15.6) | 165.46 | 8.10±3.07 | 176.64 | 35.26±9.83 |
| | dentistry | 31 (8.7) | 152.56 | 7.96±1.99 | 178.86 | 35.87±8.77 |
| | Pharmacy | 31 (8.7) | 152.79 | 8.13±1.87 | 168.16 | 33.77±10.87 |
| | **Significant level** | | **P=0.062 | | **P=0.190 | |
| **Educational level** | BM | 172 (48) | 169.32 | 8.29±2.87 | 157.84 | 34.51±8.25 |
| | MA | 77 (21.5) | 187.85 | 8.66±2.53 | 196.18 | 37.57±7.48 |
| | PhD | 109 (30.4) | 189.73 | 8.96±2.28 | 201.90 | 37.63±8.45 |
| | **Significant level** | | **P=0.195 | | **P≤0.001 | |
| **Food poisoning History** | yes | 102 (28.5) | 141.15 | 7.58±2.75 | 111.51 | 29.25±10.09 |
| | no | 256 (71.5) | 194.78 | 8/98±2/41 | 206.59 | 38/86±5/40 |
| | **Significant level** | | *P≤0.001 | | *P≤0.001 | |

*****Mann- Whitney Test

******Kruskal-Wallis Test

With regard to the non-normal distribution of data, the study results showed that increasing age, led to an increase in the knowledge , which this relationship was proved to be statistically significant (p=0.019). However, regarding knowledge level as well as gender, no significant relationship was detected between the schools and educational level (p≥0.05). Furthermore, a significant relationship was observed between age and education level (P≤0.001), whereas no significant relationship was observed between gender and educational level (P≥0.05) The study results revealed no significant relationship between knowledge and attitude with the schools (p≥0.05). The study results also demonstrated that 28.5% of the

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students had a history of food poisoning, and a significant relationship was reported between the students' knowledge and attitude levels, food poisoning history and absence of food poisoning background (P≤0.001).

**Table 2**. Frequency and percentage of students' correct and incorrect answers to knowledge questions at Shahid Sadoughi University of Medical Sciences in Yazd

| knowledge Questions | Correct answers percent (number) | Wrong answer percent (number) |
|---|---|---|
| 1. Do you consider production and expiration date when you buy some foods? | 76.3(273) | 23.7(85) |
| 2. Are fever and vomiting the symptoms of food poisoning? | 71.8(257) | 28.2(101) |
| 3. Should the refrigerator temperature be below 5 ° C? | 56.4(202) | 43.6(156) |
| 4. Is botulism transferred through canned food? | 68.6(245) | 31.6(113) |
| 5. Do botulism symptoms appear immediately after eating canned puffy? | 64.8(232) | 35.2(126) |
| 6. Is refrigerator more suitable than storage cans? | 62.6(224) | 37.4(134) |
| 7. Is there any need to use the refrigerator for storage of sterilized milk? | 43.3(155) | 56.7(203) |
| 8. Does sterilized milk have preservative materials? | 63.4(227) | 36.6(131) |
| 9. Can milk and meat be corrupted quickly? | 27.1(258) | 27.7(99) |
| 10. Is minced meat corrupted faster? | 60.6(217) | 36.4(141) |
| 11. Is the slimy surface of meat represented as the symptoms of rotten meat? | 51.7(185) | 48.3(173) |
| 12. Is it true the use of healthy cheese that storage in the refrigerator and has passed its expiration date? | 36(129) | 64(229) |
| 13. Is it true the use of moldy cheese if correction (removing the mold) and kept in the refrigerator? | 35.2(126) | 64.8(232) |
| 14. Is it true the use of moldy tomato paste and jam if correction (removing the mold) and kept in the refrigerator? | 67.6(242) | 32.4(116) |
| 15. Are plastic containers suitable for food storage in terms of health? | 76.3(273) | 23.7(85) |
| 16. Is the use of plastic containers in the microwave correct? | 80.4(288) | 19.6(70) |
| 17. Does Staphylococcus was entering in the food through that blisters on the hands and face and nasal mucus? | 46.4(166) | 53.6(129) |
| 18. Is washing eggs before putting them in the refrigerator correct? | 66.5(238) | 33.5(120) |
| 19. Is eating moldy bread correct? | 79.3(284) | 20.7(74) |

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Table 2 shows that the lowest level of knowledge among students in regard with questions 12, 13, 7 and 17, respectively. Most of the students represented the lowest knowledge level concerning food-borne diseases as well as the proper procedures for food storage.

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**Table 3**. Mean scores of knowledge and attitude of students at Shahid Sadoughi University of Medical Sciences in Yazd

| variable | Frequency(number) | Range | SD±mean | score (percentage) | | |
|---|---|---|---|---|---|---|
| | | | | good | mediocre | low |
| knowledge | 358 | 0-19 | 2.59±8.583 | 3.6 | 63.4 | 33 |
| Attitude | 358 | 10-50 | 8.28±36.123 | 7 | 39.4 | 63.4 |

The study results indicated that the mean score of knowledge was reported low within 33% of the students and the mean score of attitude was reported good in 63.4% of the students (Table 3).

**Table 4**. Poisoning Frequency caused by a variety of School foods in students of Shahid Sadoughi University of Medical Sciences in Yazd

| Type of food | number | percent |
|---|---|---|
| Vegetables | 11 | 10.7 |
| Canned foods | 23 | 22.3 |
| Dairy products | 13 | 12.6 |
| Meat products (such as Hamburger, sausage and etc) | 18 | 17.5 |
| Moldy bread | 12 | 11.7 |
| Fast foods | 9 | 8.7 |
| A variety of salads (Olivier salad, Fasl and etc.) | 17 | 16.5 |

Moreover, the study results indicated that among students who had a history of food poisoning, the highest poisoning was related to the canned foods (Table 4).

## Discussion

There are always attention and concern about hygiene and food safety in food production industry and consumers and also legislator organizations [18]. The mean score of knowledge and attitude in this study were 8.58±2.59 and 36.12±8.28 respectively. The mean score of knowledge in 33% of students were low, mediocre in 63.4% of students and good in 3.6% of students. Moreover, the mean score of

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attitude in 63.4% of students was reported good, it was mediocre in 29.6% of students and it was low in 7% of students . Jahed et al. examined the students' knowledge and attitude at Tehran University of Medical Sciences concerning hygiene and food safety, who reported that 68% were good in knowledge and 31% were mediocre. Moreover, the students revealed a good attitude in regard with food safety [1]. Giritlioglu et al. assessed cooking students' knowledge and practice regarding personal hygiene and food safety at two universities in Turkey, who concluded that although hygiene and food safety are viewed as an important factor among students, they did not reveal any sufficient knowledge in this field [8]. In Hassan and Dimassi's study, Lebanese students' low knowledge was reported about food hygiene [16]. Comparing results of similar studies with findings of the present study, lack of sufficient knowledge was revealed concerning hygiene and food safety, though the attitude towards hygiene and food safety was demonstrated to be at a good level. As a result, hygiene and food safety is regarded as an important factor among students, though they do not have a sufficient knowledge in this regard. It should be noted that medical and health students, who have passed some courses in this field, demonstrate more information than other students. Hence, the health and food safety courses for students who have not experienced this course can be effective in increasing students' knowledge.

In the current study, most students had the lowest knowledge level with respect to the proper procedures for food storage and transmitted diseases through food. As a matter of fact, these study findings were consistent with those of Sanlier, Sharif et al., and Byrd-Bredbenner et al. [4, 19, 20]. Designing an appropriate training program seems to be essential entailing beneficial content in hygiene and food safety fields.

The findings of the present study proposed that students' knowledge and attitude levels increased due to an increase in age that was consistent with findings of Sanlier, Osaili et al., and Sharif et al. Moreover, several studies indicated that the importance of personal health and health issues were increasing along with increasing age and gaining experience, [19-21].

Knowledge and attitude were demonstrated to be higher in Master's and PhD students in this study compared to other students that are consistent with the findings of different studies [19-23]. It seems that postgraduate students-particularly medical students pay more attention to their hygiene and food safety issues as their education level was increased.

The study results revealed that of knowledge and attitude levels of students who had history of food poisoning were lower than students who had not experienced food poisoning. Moreover, the history of food poisoning was reported high within students with lower ages. Therefore, it can be stated increased age and education level resulted in an increase in knowledge and attitude about hygiene and food safety and as a result, the number of food poisoning cases will decrease in the students [20, 24]. Moreover, within the students who had a history of food poisoning, the maximum of food poisonings

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were related to the canned foods. According to Tavakoli et al, the botulism food poisoning from canned foods is getting increased in Iran [24]. Therefore, a lack of knowledge about food poisoning from canned foods demands to be taken into consideration in Iran.

## Conclusion

Low knowledge of hygiene and food safety among students at Shahid Sadoughi University of Medical Sciences can increase the risks associated with the consumed foods of students and the incidence of different types of food poisoning. Therefore, training programs in the form of workshops and courses related to hygiene and food safety for the students- specifically lower grades students- can be effective in increasing students' knowledge. These programs need to contain some practical information concerning microbiology of transmitted diseases through food and proper food storage methods. An acceptable training program has to include the training about health protection against health-related diseases, and food safety, as well as the change in wrong food habits.

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