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The Effect of Education on Knowledge, Attitude, and Practice of the Catering Staffs about Food Hygiene and Safety in Yazd City

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ABSTRACT

Background: Millions of people worldwide suffer from foodborne diseases every year. So, these diseases are recognized as one of the most common problems worldwide. The purpose of this study was to investigate the effect of education on knowledge, attitude, and practice of catering staffs about food hygiene and safety in Yazd City, Iran. **Methods:** This quasi-experimental study was conducted among 55 employees of catering in Yazd in 2018. The cluster random sampling method was applied to select the participants. Data collection tool was a questionnaire containing four parts of demographic, knowledge, attitude, and practice data. Prior to the intervention, all participants were asked to complete the questionnaire. Later, they were provided with the necessary training for 8 hours in four consecutive weeks. Two months after the intervention, the participants were asked to complete the same questionnaire again. **Results:** The mean score of before and after the intervention of the participants' knowledge, attitude, and practice were 19.32 ± 3.15, 22.69 ± 4.99, 13.20 ± 1.74, 25.07 ± 3.51, 35.21 ± 2.64 and 17.40 ± 3.48, respectively. prior to and after the intervention, respectively. Based on the findings, the participants' mean score of knowledge, attitude, and practice increased significantly after the educational course ($P < 0.05$). A significant difference was also observed between the mean scores of practice and work experience before and after the intervention ($P < 0.05$). **Conclusions:** According to the results, the educational content should be revised and implementation of the acquired knowledge should be improved in order to achieve the desired level of knowledge, attitude, and practice. In addition, education on food hygiene should be continuous and meticulously planned.

Keywords: *Education; Knowledge; Attitude; Practice; Food safety; Catering*

Introduction

Nowadays, food hygiene and safety play an important role in protecting human health and preventing diseases (Célérier and Vallée, 2017, Derakhshan *et al.*, 2018). Food hygiene includes

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kitchen, individuals, utensils, storage, packing, food distribution, and food borne diseases' hygiene (Falasconi *et al.*, 2015). These problems are recognized as the most common challenges in the food industry, since they cause millions of foodborne diseases worldwide each year (Fusi *et al.*, 2016). Foodborne transmissible diseases indicate the prevalence of public health problems in both developing and developed countries, but they have a greater impact on the developing countries (Jahed *et al.*, 2016, Marzban *et al.*, 2019a). The World Health Organization (WHO) has introduced foodborne illnesses as the most important health problems in the contemporary world (Kate *et al.*, 2014, Rezaee *et al.*, 2018). Many infectious as well as some non-communicable diseases can be transmitted to humans through water and food, some of which cause high mortality and may affect a wide range of society in a short period of time (Marzban *et al.*, 2019b).

The human health issue is often investigated by food hygiene and safety through food safety frameworks. It should be noted that food hygiene factors can be effective in all stages of food preparation from production to consumption (Loring and Gerlach, 2009). In less developed countries, large numbers of people are poisoned due to the lack of hygiene awareness and unsanitary food storage. The prevalence of foodborne illnesses is high in the developing and developed countries (Drew and Clydesdale, 2015, Kamadjeu, 2017). Evidence suggests that most foodborne diseases are caused by microorganisms. Outbreaks of such diseases endanger the lives of many people each year and cause social and economic problems, especially in the developing countries (Mullan *et al.*, 2015, Rothbart, 2016).

Consumers' concerns about food hygiene and safety are growing. Based on a U.S. study, approximately 48 million foodborne illnesses occur annually, which engage about 128,000 hospitalizations and cause 3,000 deaths. Among all foodborne diseases, 9.4 million cases are caused by 31 types of the microbial agents in food and 38.4 million others are due to other indeterminate factors (Centers for Disease Control Prevention, 2011). According to the WHO's estimate in 2017, approximately 2 million people died from diarrhea, which was mostly caused by drinks and foods (Arif and Ahmad, 2011). Food poisoning places a heavy burden on the health and economic system of countries. The cost-per-case of this disease is estimated from $ 1626 to 1068 based on two different study models (the disease costing model and the US Centers for Disease Control and Prevention) (Scharff, 2012).

In this regard, the catering staff are required to become aware of the importance of food hygiene and safety. They need to know about the risks that some foods or practices may cause to their health. In order to reduce food poisoning in the community, food producers should be provided with information about food safety (Hislop and Shaw, 2009). Exposure of asymptomatic infected people with the food items is very dangerous (Eslami *et al.*, 2015). Although most people have an acceptable knowledge in the field of health, their knowledge about the key role of microbial contamination is insufficient (Ansari-Lari *et al.*, 2010). Since many food workers have inadequate levels of health information, continuous and periodic training is required in this industry (Çakıroğlu and Uçar, 2008). Moreover, the sharp difference between people's awareness and health behavior can lead to outbreaks of food poisoning (Finch and Daniel, 2005).

In order to evaluate the training provided to the catering staffs, we investigated the effect of education on knowledge, attitude, and practice of catering staffs with regard to food hygiene and safety in Yazd city.

Materials and Methods

Participants and design: The present quasi-experimental study was carried out in Yazd in 2018. The cluster random sampling method was applied and 5 catering companies were selected randomly from the total of 15 in Yazd city. At the end, census method was applied and 45 employees were selected from these 5 companies.

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Measurements: Data were collected through a researcher-made questionnaire. Its validity was confirmed by 6 experts in health education, nutrition, and food hygiene and its reliability was confirmed by Cronbach's alpha index (0.82). The questionnaire consisted of 3 parts. Demographic characteristics consisted of information about the participants' age, gender, education, work experience. Knowledge questions consisted of 29 items that should be answered on a 3-point Likert scale, where the correct answer received one point and the wrong answer got zero point. These items were about foodborne disease, ways to get food poisoning, personal hygiene, utensils, storage, packing, and distribution. Attitude questions consisted of 10 items that should be answered on a five-point Likert scale. Attitude questions dealt with the importance of personal hygiene, kitchen, utensils, and food poisoning. Practice questions consisted of 17 items, where correct answers received 1 score and false responses got no score. Questions were about how to prevent food poisoning, adherence to the principles of personal hygiene, utensils, storage, packing, and distribution.

The obtainable scores by each individual in the dimensions of knowledge, attitude, and practice could be within the ranges of 0-29, 10-50, and 0-17, respectively. Participants' awareness scores of below 10, 10-20, and higher than 20 showed poor, moderate, and good levels of awareness in, respectively. In the attitude section, scores of lower than 17, 17-34, and higher than 34 represented poor, moderate, and good levels of attitudes. In the practice section, scores of less than 7, 7-14, and higher than 14 indicated poor, moderate, and good levels of practice in participants.

Prior to the intervention, all participants were asked to complete the questionnaire. Later, they were provided with the necessary training by a food hygiene expert for 8 hours in four consecutive weeks. Two months after the intervention, the participants were asked to complete the same questionnaire again. The training program included principles such as kitchen hygiene, personal hygiene, utensils, storage, packing, food distribution, and foodborne diseases.

Individuals with the following criteria could enter the study: working in caterings canters of Yazd and attending the program until the end of the study. Exclusion criteria were lack of participation in training program. Prior to the study, all participants were explained about the study procedure and goals. As a result, individuals who were willing to participate in the study were included.

Data analysis: The data were coded and analyzed in SPSS 24 using descriptive statistics, t-test, ANOVA, and paired t-test. Significance level was set at 0.05.

Ethical considerations: This study is derived from a research project No. 4427 in the Student Research Committee of Yazd Shahid Sadoughi University of Medical Sciences. The study was ethically approved under the code number of Ir.ssu.rec.1396.97.

Results

The staff's mean age was 49.37 ± 9.89 years. Of the staff, 37 (67.30%) were male 23 (41.80%) were in the age range of 30-40 years, 16 (29.10%) had diploma, and 27 (49.10%) had less than 10 years of work experience. A significant difference was observed between mean score of the practice variable and work experience ($P = 0.01$) (**Table 1**).

A significant difference was observed between the mean score of practice and work experience ($P < 0.001$) (**Table 2**).

As T**able 3** shows, the intervention was effective on knowledge, attitude, and practice of the staff. The paired *t-test* showed a significant difference between the participants' knowledge, attitude, and practice before and after the intervention in the experimental group.

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Table 1. Frequency distribution and mean (± SD) of the staff's knowledge, attitude, and practice according to demographic variables before intervention

Variables	N (%)	Knowledge	Attitude	Practice
Age (year)				
< 30	12 (21.80)	39.75 ± 5.02	20.83 ± 4.30	11.75 ± 0.86
30-40	23 (41.80)	39.69 ± 6.39	22.82 ± 4.26	11.08 ± 1.99
40-50	13 (23.60)	40.76 ± 5.03	24.92 ± 6.17	10.69 ± 2.09
50 <	7 (12.70)	42.28 ± 5.52	21.18 ± 5.25	11.57 ± 1.13
P-value[a]		0.73	0.18	.04
Gender				
Male	18 (33.70)	40.94 ± 5.23	22.43 ± 5.42	11.08 ± 1.92
Female	37 (67.30)	38.94 ± 6.29	23.22 ± 4.03	11.44 ± 1.33
P-value		0.21	0.54	0.42
Education level				
Illiterate	6 (10.90)	42.00 ± 6.00	24.33 ± 4.45	10.00 ± 2.89
Secondary school	10 (18.20)	40.90 ± 4.84	22.10 ± 6.17	11.30 ± 1.63
High school	14 (25.50)	39.35 ± 6.03	22.21 ± 5.25	11.64 ± 0.92
Diploma	16 (29.10)	39.68 ± 2.03	21.87 ± 3.84	11.43 ± 1.62
Academic	9 (16.40)	41.00 ± 4.84	24.44 ± 7.25	10.77 ± 0.86
P-value		0.85	0.66	0.34
Work experience (year)				
< 10	27 (49.10)	39.85 ± 5.59	19.59 ± 4.69	11.51 ± 1.22
10-20	18 (23.70)	41.16 ± 5.40	24.72 ± 4.98	5.27 ± 2.44
20 <	10 (18.20)	39.90 ± 6.47	23.30 ± 4.24	12.00 ± 0.01
P-value		0.73	0.07	0.01

[a]: ANOVA test

Table 2. Frequency distribution and mean (± SD) of staff's knowledge, attitude, and practice in terms of demographic variables after intervention

Variables	N (%)	Knowledge	Attitude	Practice
Age (year)				
< 30	12 (21.80)	41.25 ± 3.38	35.16 ± 2.69	31.41 ± 4.52
30-40	23 (41.80)	40.65 ± 3.18	35.17 ± 2.67	31.73 ± 3.12
40-50	13 (23.60)	42.53 ± 3.92	35.69 ± 2.75	30.61 ± 2.39
50 <	7 (12.70)	39.42 ± 3.64	34.57 ± 2.67	31.71 ± 4.75
P-value[a]		0.24	0.24	0.84
Gender				
Male	18 (33.70)	41.00 ± 3.52	22.43 ± 5.42	90.94 ± 3.67
Female	37 (67.30)	41.22 ± 3.57	23.22 ± 4.03	32.33 ± 2.93
P-value		0.82	0.54	0.42
Education level				
Illiterate	6 (10.90)	42.16 ± 3.18	34.83 ± 3.37	31.83 ± 5.07
Secondary school	10 (18.20)	39.10 ± 2.68	35.80 ± 2.57	31.40 ± 3.59
High school	14 (25.50)	41.28 ± 3.62	35.21 ± 2.51	30.85 ± 2.31
Diploma	16 (29.10)	41.37 ± 3.75	35.31 ± 2.84	31.73 ± 3.93
Academic	9 (16.40)	41.66 ± 3.80	34.66 ± 2.50	32.00 ± 3.53
P-value		0.39	0.91	0.95
Work experience (year)				
< 10	27 (49.10)	41.25 ± 3.13	19.59 ± 4.69	10.14 ± 3.72
10-20	18 (23.70)	40.61 ± 3.66	24.72 ± 4.98	13.66 ± 3.54
20 <	10 (18.20)	41.40 ± 4.42	23.30 ± 4.24	31.60 ± 2.91
P-value		0.79	0.07	< 0.001

[a]: ANOVA test

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Table 3. Comparison of mean (± SD) of staff's knowledge, attitude, and practice before and after the intervention

Variables	Before	After	P-value[a]
Knowledge	19.32 ± 3.15	25.07 ± 3.51	0.007
Attitude	22.69 ± 4.99	35.21 ± 2.64	< 0.001
Practice	13.20 ± 1.74	17.40 ± 3.48	< 0.001

[a]: Paired t-test

Discussion

The mean scores of the staff's knowledge about food hygiene were 19.32 ± 3.15 and 25.07 ± 3.51 before and after the intervention, respectively. This shows that the scores improved 5.75 scores. The results of this study were consistent with the findings of other studies (Eslami *et al.*, 2015, Marzban *et al.*, 2019b, Pirsaheb *et al.*, 2010, Rezaee *et al.*, 2018). Based on the findings, sufficient information and awareness is the first essential and key element in creating hygienic behaviors. Therefore, providing the food staff with the needed information is one of the most important strands in preventing foodborne illnesses in the society.

The mean scores of attitude toward food hygiene were 22.69 ± 4.99 and 35.21 ± 2.64 before and after the intervention, respectively. The results of the study by Marzban (Marzban *et al.*, 2019b), Rezaei (Rezaee *et al.*, 2018), Lee (Lee *et al.*, 2017), and Fraser (Fraser and Simmons, 2017) were consistent with this study. However, our results were inconsistent with those of Jahed (Jahed *et al.*, 2016), Singh (Singh *et al.*, 2016), and Akabanda (Akabanda *et al.*, 2017). Attitude, as the most prominent concept of social psychology, has a special place, so that having a positive attitude is a necessity for success in any profession. Without having appropriate levels of attitude and sensitivity to prevent foodborne illnesses, it is impossible to expect proper practice in preparation, distribution, and maintenance of food.

The mean scores of the staff practice in the field of food hygiene were 13.20 ± 1.74 and 17.40 ± 3.48 before and after the intervention, respectively. Our finding are in agreement with the results of the research conducted by Hazavehei (Hazavehei *et al.*, 2015), Medeiros (Medeiros *et al.*, 2001), and Zan (Zan *et al.*, 2017). However, these findings contradicted with those reported by Scheib (Scheib *et al.*, 2018) and Zhou (Zhou *et al.*, 2016). The catering health is very important, because the smallest mistake can have dangerous consequences. Personal hygiene, public health, and the environment are important factors in food catering. Successful food companies are well aware that increased levels of hygiene improve satisfaction and productivity. Therefore, the good level of practice in employees of this sector is beneficial both to the health of the community and to the national economy.

A statistically significant difference was observed between the mean scores and standard deviations of practice and work experience before and after the intervention. This finding is in agreement with the results of the study by Zanin (Zanin *et al.*, 2017) and Rossi (Rossi *et al.*, 2017), but contradicted with the results reported by Ovca (Ovca *et al.*, 2018) and Ismail (Ismail *et al.*, 2016). Based on the findings of this study, increase of experience improves the individuals' practice. Therefore, it is recommended to use the experience of highly experienced staff in establishing the necessary training programs for the catering staff.

The mean and standard deviation of the participants' knowledge, attitude, and practice were significantly different before and after the intervention. This confirms the impact of food health education. Rezaee (Rezaee *et al.*, 2018), Pirsaheb (Pirsaheb *et al.*, 2010), Rezaei (Rezaee O *et al.*, 2012), and Wang (Wang *et al.*, 2015) showed that food health education was significantly effective in target groups, which is in agreement with the results of the present study.

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Conclusion

Food hygiene guarantees healthy eating and is a key element in proper nutrition. Despite the significant effect of education on knowledge, attitude, and practice of the staff, this level of knowledge, attitude, and practice was negligible due to the spent cost and time. Therefore, it is necessary to review the educational content and its implementation until it reaches the desired level. In this regard, is the authorities are recommended to continue the food hygiene education using educational aids and other training facilities in the catering centers. The educational contents should be designed in coordination with the health centers and the Food and Drug Administration.

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Conflict of interest

There was no conflict of interest in this study.

Authors' contributions

Marzban A and Rahmanian V participated to the conception and designing the study. Marzban A, Barzegaran M, and Shirdeli M participated to drafting of manuscript: Barzegaran M, Jafari F participated to data gathering and case selection. All authors read the manuscript and verified the final version of manuscript.

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