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Original Article

The Effect of Guild Training Courses on the Health Knowledge and Performance of Operators of Food Preparation and Distribution Centers in Zarand in 2021

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Abstract

Background: The present study aimed to investigate the effect of guild training courses on the health knowledge and performance of food operators in food preparation and distribution centers in Zarand, Kerman, Iran in 2021.

Methods: This quasi-experimental (uncontrolled) study was conducted on 120 food operators in food preparation and distribution centers in Zarand. The data were collected using the Health Knowledge and Performance Questionnaire. The questionnaire was completed at the time of enrollment and in the final evaluation phase. The food operators' performance was evaluated two weeks before and one month after the completion of the training course in the food operators' workplace through questions and checklists. The knowledge and performance scores for the participants ranged from 0 to 100. The collected data were analyzed with SPSS-23 software using paired and independent samples *t* tests, analysis of variance (ANOVA), and Pearson correlation test.

Results: The participants' mean age was 36.73±8.92 years. The mean scores of health knowledge were 65.70±21.60 and 89.62±12.12 before and after the training course, respectively, showing a statistically significant increase in the post-training phase ($P<0.001$). Moreover, the mean scores of health performance were 78.70±7.50 and 82.42±6.65 before and after the training course, respectively, indicating a statistically significant increase in the participants' health performance in the post-training phase ($P<0.001$).

Conclusion: The findings revealed that guild training courses are effective in improving the health knowledge and performance of food operators in food preparation and distribution centers. Thus, the potential of guild training courses can be used to raise food operators' and workers' awareness of health-related problems and provide effective solutions.

Keywords: Health, Knowledge, Performance, Training courses, Food, Operators

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Introduction

Education is an activity through which people increase their knowledge or change attitudes and behavior. Effective education will lead to a change in people's behavior in a given field (1). One of the important aspects of education is health education to promote health. Furthermore, since food is one of the main human needs, paying attention to food hygiene education is essential (2). A major part of food hygiene focuses on the health practices in food preparation and distribution businesses and centers that can play a very effective role in food poisoning prevention (3). Food poisoning is more likely to occur if the working conditions and environment or the tools used in the food preparation and supply centers are unhygienic or if food operators and workers in these centers do not comply with health protocols and regulations (4). According to a study in the United States, non-compliance with health standards in food preparation and distribution centers is the cause of 97% of food poisoning at home and work (5). In addition to health-related risks for people, food poisoning imposes a substantial burden on the health system. If food operators have more information about food health, food poisoning probability decreases substantially (6). Furthermore, food operators and handlers in food preparation and distribution centers play a vital role in transmitting diseases to other people in the community. Thus, providing necessary food health training can help them significantly contribute to improving food safety and the quality of services in public spaces and promoting public health (7).

Evidence suggests that food operators are not well aware of basic health principles, especially the role of

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health education in gaining professional knowledge and inducing a sense of participation in the healthcare system (8). Thus, promoting the health knowledge of food operators and handlers is required under Article 1 of the Executive Regulations of the Law Amending Article 13 of the Food, Drink, Cosmetic, and Health Products passed in 2000 by the Islamic Consultative Assembly (9).

Training programs need to be evaluated and evaluation outcomes should be used by officials and planners to make effective decisions and find efficient solutions to improve the existing situation and fix potential problems. Moreover, an integrative evaluation can measure and reveal the effectiveness of educational and training outcomes and show if a given training program has achieved the intended goals (10). Mazloomy Mahmodabad et al examined the effectiveness of guild training courses in 15 provinces in Iran and among 900 health food operators and showed moderate effectiveness of the training courses in terms of food operators' knowledge, attitude, and performance. The findings highlighted the need for promoting the teaching and learning process in each educational area (11). A study by Heydari et al in Shiraz indicated that 96.4% of the participants studied were directly involved in food preparation. There was a significant difference in the health knowledge of the food operators before and after the training course, but no significant difference was observed in the food operators' performance before and after the training course (12). In a study in Mashhad, Rafeemanesh and Nezakati Olfati showed that guild health training courses can be effective in improving the knowledge and performance of food operators and workers in food preparation and distribution centers (13). In a study in Kermanshah, Mirsaheb et al showed the effect of training on health awareness, attitude, and performance of trained food operators (14). Moreover, Burke et al also found that training courses have a significant impact on employees' safety and health performance (15).

Although the training courses offered in institutes have been effective to some extent in creating a noticeable change in people's health knowledge, they have had less impact on people's performance possibly due to ineffective training methods, time constraints, or the failure to apply the instructed materials during supervision by health inspectors (12).

Given the significance of evaluating guild training courses in preventing health problems in the community, this study sought to investigate the effect of guild training courses on the health knowledge and performance of food operators and workers in food preparation and distribution centers in Zarand, Kerman, Iran in 2021.

Methods

This quasi-experimental study was conducted with a pre-test and post-test design and without a control group. The research population included food operators and workers in food preparation and distribution centers who enrolled in the public health training courses organized by Zarand Guild Training Institute in 2021. A total of 30 food operators and workers attended each training course and the study continued for four consecutive courses. Thus, 120 food operators and workers in food preparation and distribution centers in Zarand were selected as the participants in this study using the census method. The inclusion criteria were membership in the food preparation and distribution trade union and consent to participate in the study. The participants who did not complete more than 10% of the items in the Health Knowledge and Performance Questionnaire were excluded from the study. Following the provisions of Article 1 of the Law Amending Article 13 of Food, Drink, Cosmetic, and Health Products, all food operators and workers must enroll in public health training courses held by guild training institutes before starting work in food preparation and distribution centers. The training courses were held for food operators and workers according to the specified content for 24 hours within one week. The content of the educational pamphlet used in guild training is the same for all guild training institutes. The pamphlet provides instructions on health definitions and concepts, personal hygiene principles, rules, and regulations, vector control, waste management, tobacco control, air, water, and sewage sanitation and hygiene, disinfection methods, workplace safety and discipline, and prevention of work-related accidents. The content is instructed by the experts of the Environmental Health and Disease Control Unit of the county health center. After the completion of the training course, the participants receive a public health certificate (9).

The data in this study were collected using the Health Knowledge and Performance Questionnaire (13). The content validity of the questionnaire was confirmed by seven occupational medicine specialists, and its reliability was calculated using Cronbach's alpha of 0.81 (13). The Health Knowledge Questionnaire contains 10 four-choice items with each correct answer being scored 3 (30 scores in total). The items assess food operators' information about food safety, vector control, food storage, health education, and sanitary waste disposal. The performance items measure food operators' performance (12 items) and food workers' performance (8 items). The performance items were categorized into three subscales: building hygiene (only for food operators), personal hygiene, and equipment hygiene. The items in each subscale have been developed based on the content of the Article 13 Checklist. The items were completed and scored after visiting the workplace and observing its conditions. During the observation, each correct performance in each case was scored 0.5 to 2. The total score for food workers is 67 and that of food operators is 70. The total

personal hygiene score for food workers ranges from 0 to 22 and the total score for food operators varies from 0 to 13. The total score on the questionnaire for food workers ranges from 0 to 45 and the total score for food operators ranges from 0 to 47. Moreover, the building hygiene score for food operators varies from 0 to 10 (13). To facilitate the comparison of knowledge and performance scores in different areas, the scores were converted on a scale from 0 to 100.

Since this study was conducted during the COVID-19 pandemic, the training courses were conducted via distance education by providing training booklets and CDs to the participants. The Health Knowledge Questionnaire was completed as a pre-test by the food operators when they visited the occupational health school for enrollment. The questionnaire was re-administered as the post-test to the food operators after a week when they visited the school to attend the exam session. To evaluate the performance of the participants, the researcher visited the food preparation and distribution centers by making prior arrangements with the officials of the institute two weeks before the start of the training course and completed a performance checklist for food operators and workers through questions and observing the health protocols for building hygiene, personal hygiene, and equipment hygiene. One month after the completion of the training course, the researcher again visited the food preparation and distribution centers and completed the performance checklist.

The participants were assured that participation in the study would be voluntary, and non-participation would not affect their work. They were also assured that their data would remain confidential. The collected data were analyzed with SPSS software (version 23). Since the data followed a normal distribution pattern as indicated by the Smirnov-Kolmogorov test, parametric tests were used. The paired and independent samples t-tests, analysis of variance (ANOVA), and Pearson correlation test were used to compare the participants' mean scores (health knowledge and performance) at a significance level of less than 0.05 ($P<0.05$).

Results

The participants in this study were 120 persons including 80 food operators (66.7%) and 40 workers (33.3%). The participants' mean age was 36.73 ± 8.92 (ranging from 18 to 56 years). Table 1 shows other demographic characteristics of the participants:

As shown in Table 2, the mean knowledge score for the food operators before the training course was estimated as 68.75 ± 21.37 (ranging from 10 to 100). The mean knowledge score for the food operators after the training course was equal to 90.63 ± 11.62 (ranging from 40 to 100), showing a significant increase in food operators' health knowledge ($P<0.001$). A comparison of the mean performance scores for the food operators in terms of building hygiene, personal hygiene, equipment hygiene, and the overall performance score before and after the training course showed a significant increase in the mean performance scores after the training course ($P<0.001$).

Table 1. The participants' demographic characteristics

Variable	Categories	Frequency	Percent
Position	Worker	40	33.3
	Food operator	80	66.7
Occupation	Confectionary	11	9.2
	Food store	35	29.2
	Dairy store	1	0.8
	Bakery	16	13.3
	Coffee shop	5	4.2
	Fast food shop	17	14.2
	Kebab and traditional food	5	4.2
	Restaurant and catering	16	13.3
	Butchery	5	4.2
	Vegetable and fruit shop	5	24
	Coffee store	2	1.7
	Dry good store	2	1.7
Occupational category	Food distribution	59	49.2
	Food preparation	61	50.8
Education	Lower education	10	8.3
	Diploma	84	70
	Academic education	26	21.7

As shown in Table 3, the mean knowledge score of the workers before the training course was equal to 59.75 ± 20.93 (ranging from 10 to 90) and the corresponding value was 87.5 ± 12.95 (ranging from 40 to 100) after the training course, showing a significant increase in food workers' knowledge after the training phase ($P<0.001$). Moreover, the mean overall performance score of the workers increased significantly after the training course ($P<0.001$).

The results showed that the mean knowledge score before the training was significantly higher in food operators ($P=0.028$), those engaging in distribution services ($P=0.02$), and those with academic education ($P=0.007$). However, after the training course, the mean knowledge score was significantly higher only in food operators with an academic degree ($P=0.03$).

Furthermore, the mean performance scores of the participants in terms of equipment hygiene showed a significant difference between the distribution and preparation services before and after the training course ($P<0.001$), with those engaging in food preparation gaining higher scores.

The results of Pearson's correlation test showed no significant relationship between the mean score of health knowledge ($r=0.052$; $P=0.57$) and health performance

Table 2. The comparison of the knowledge and performance scores of food operators

Variables	Phase	Mean	Standard Deviation	Range	*P* value
Knowledge	Pre-training phase	68.75	21.37	10-100	<0.001
	Post-training phase	90.63	11.62	40-100	
Building hygiene (only for food operators)	Pre-training phase	80.27	11.26	38.9-94.4	<0.001
	Post-training phase	86.96	10.55	47.22-97.22	
Personal hygiene	Pre-training phase	75.43	12.63	46.15-100	<0.001
	Post-training phase	81.97	11.56	53.85-100	
Equipment hygiene	Pre-training phase	79.26	9.75	55.80-94.84	<0.001
	Post-training phase	84.10	8.63	62.74-94.87	
Overall performance	Pre-training phase	78.87	8.14	55.6-94.90	<0.001
	Post-training phase	81.75	7.52	63.53-94.29	

Table 3. The comparison of the knowledge and performance scores of food workers

Variables	Phase	Mean	Standard Deviation	Range	*P* value
Knowledge	Pre-training phase	59.75	20.93	10-90	<0.001
	Post-training phase	87.50	12.95	40-100	
Personal hygiene	Pre-training phase	81.19	8.81	63.6-97.7	<0.001
	Post-training phase	86.59	8.37	45.5-97.7	
Equipment hygiene	Pre-training phase	76.93	7.56	55-89.5	<0.001
	Post-training phase	82.26	4.98	71.52-92.1	
Overall performance	Pre-training phase	78.27	6.42	64.3-90	<0.001
	Post-training phase	83.62	4.43	73.3-93.1	

($r = 0.048$; $P = 0.59$) with age after the training course.

Discussion

The findings of this study indicated the training program conducted for food operators and workers engaging in different occupations in Zarand increased the health knowledge and performance of the food operators and workers in food preparation and distribution centers. In other words, food operators' knowledge about food safety, vector control, food storage, health education, and sanitary waste disposal and their performance in terms of building hygiene, personal hygiene, and equipment hygiene improved after the training intervention program. Similarly, Sadeghizadeh-Yazdi et al investigated the effect of training courses on the health knowledge, attitude, and performance of restaurant workers and reported that after the implementation of the training courses, the participants had significantly higher health knowledge, performance, and attitude (16). Moreover, Mazloomy Mahmodabad et al examined the effectiveness of training courses in different occupations in 15 provinces in Iran and reported a significant increase in the participants' health knowledge and behavior (11). The study by Heydari et al in Shiraz indicated a significant difference in the health knowledge of the food operators before and after the training course, but unlike the present study, no significant difference was observed in the food operators' performance before and after the training course (12). These conflicting findings could be attributed to the type of training provided, which can affect the effectiveness of the training and the use of different instruments for performance evaluation. In a study in Mashhad, Rafeemanesh and Nezakati Olfati showed a significant increase in food operators' and workers' knowledge and performance in terms of compliance with health standards (building hygiene, personal hygiene, and occupational hygiene). A comparison of knowledge and performance scores between the two groups with a valid certificate (less than 3 years since its issuance) and those without a valid certificate (more than 3 years since its issuance) showed only workers experienced a drop in performance scores over time, while food operators did not show a significant reduction in their knowledge and performance (13). In another study in Kermanshah, Mirsaheb et al showed the effect of training on health awareness, attitude, and performance of trained food operators over time. The results also confirmed the effect of the passage of time on the knowledge, attitude, and performance of trained food operators. Although the food operators' performance improved after 2 years, the training course needs to be re-administered at least after two years to promote their knowledge and attitudes (14).

Tuglo et al also reported that registered and trained mobile food vendors were eight times better in food safety hygiene compared to unregistered ones. The odds for observing health protocols for food safety among

sellers who completed food safety courses was six times, confirming the effectiveness of training courses (17). In another study in Bangladesh, Jubayer et al concluded that the food safety knowledge, attitude, and performance scores of trained food workers were significantly higher than those of untrained workers (18). A study by Has et al in Malaysia also indicated a significant difference in the knowledge and performance scores of food workers in the pre-and post-food hygiene training (19). Adesokan et al reported an association between improved knowledge and behaviors among food service establishments' workers (20). Kirby and Gardiner examined the effectiveness of face-to-face food hygiene training for food operators in England. The results showed a significant difference in the food operators' knowledge and performance between the first visit (before training) and the second visit (after training). There was also a significant difference between the scores of the trained group and the control group, confirming the effectiveness of face-to-face training (21).

Teaching basic healthcare to food operators and workers can promote community health. Community health workers act as a bridge between the health system and the community in providing this type of care. The knowledge and communication skills of employees are the key to people's trust and confidence in the health system and the core element of their success. The findings from this study showed that the health workers performed well in providing health education to food operators and workers. Managers can make a unique contribution to the development of health education programs by helping to increase the scientific, communication, and career motivation of employees and providing hardware and software support in organizing and holding health training courses. Although food operators' and workers' knowledge and performance improve after training, in many cases, their knowledge and performance are not satisfactory and are far from the desired level. Many people in society, especially workers, may not have in-depth health literacy, so it is necessary to use more effective educational methods and get help from experts from healthcare centers to provide effective training to them. In addition, it seems that performing training interventions without increasing food workers' basic health literacy will not be highly effective.

Limitations of the study

This study was conducted with some limitations. First of all, the data were collected using a self-report instrument; thus, the findings might not reflect the participants' actual performance. Moreover, the training courses were held through distance education due to the COVID-19 pandemic, leading to difficulty in collecting the data. The study was conducted without a control group and also in a limited geographical setting. Therefore, the findings should be generalized with caution.

Conclusion

The findings of the present study suggested that guild training courses can be effective in improving the knowledge and performance of food operators and workers in food preparation and distribution centers. This study provided documented evidence about the educational effectiveness of guild training in increasing the health knowledge and performance of food workers. Thus, the potential of guild training institutes can be used to raise food operators' and workers' awareness of health-related problems and provide effective solutions. The insights from this study can contribute to developing more effective guild training programs and interventions. Furthermore, the effectiveness of such interventions can be assessed through long-term follow-up procedures.

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Authors' Contribution

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Methodology: Ahmad Naghibzadeh.
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Competing Interests

The authors declared that they have no conflict of interest.

Ethical Approval

The protocol for the present study was approved with the code IR.KMU.REC.1400.086 by the Ethics Committee of Kerman University of Medical Sciences.

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