



ENHANCING FOOD SAFETY KNOWLEDGE OF FOOD HANDLERS IN KHARAR, PUNJAB

Dr. Jyoti Rani^{1*}, Prabhleen Kaur²

Abstract:

The majority of food handlers lack basic literacy skills and training in food handling techniques, making them carriers of infections like E. coli and Salmonella. This study has been undertaken to enhance the food safety knowledge of food handlers of Kharar, Punjab through food safety guidelines, issued by Food Safety and Standards Authority of India. A survey, before the training of food vendors (pre-test) and a survey after training the food vendors (post-test) were conducted. Results were compared by applying Wilcoxon-Signed rank test; Z and p values were calculated. Questions covered awareness regarding food preparation, handling, storing and serving of food, personal hygiene, cleaning and sanitation, water supply and quality. The results were highly significant, specifically in the area of hand washing technique (39%), precautions to avoid cross-contamination (43%), storage of raw and cooked foods (37%), correct method to clean utensils and equipments (34%). which clearly states that there is more awareness for food safety amongst the food handlers post training.

Keywords: food safety, food borne illness, food handlers, restaurants, knowledge

^{1*2}Assistant Professor, Student Department of Nutrition and Dietetics Chandigarh University

***Corresponding Author:** Dr. Jyoti Rani

*Assistant Professor, Student Department of Nutrition and Dietetics Chandigarh University

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1. Introduction:

In case of large scale of food preparation, it might be handled by numerous people, which increases the chances of contamination of food product. Unintentional food contamination during large-scale cooking, which results in food-borne disease outbreaks, can be dangerous to consumers' health and have negative economic effects on countries. [1-3]. Food-related illnesses have increased in frequency throughout time and have negatively impacted many developing nations' economies as well as their citizens' health. [4]. According to the WHO, (1979, 2008) eating of contaminated food is thought to be responsible for 70% of diarrheal illnesses in underdeveloped nations [5].

Food can spread disease from person to person and serves as a ground for breeding of bacteria that can cause poisoning of food, therefore safety of food between the food dealers and consumers is extremely important. Food Safety in Developed Countries has created criteria for food preparation, the fundamental problem in underdeveloped nations is the simple lack of sufficient access to drinkable water, which is typically a crucial ingredient [6]. WHO (2010), outlined the five essential steps for guaranteeing food safety to establish a standard baseline for food processing. They are as follows. Always keep the area where food is handled clean, keep cooked and raw food separate, food should be cooked thoroughly, food should be stored at a temperature that will kill bacteria, and use raw materials and water that are safe. These five guidelines for producing safe food should be followed by anyone who prepares food [7].

Even in small-scale companies, food safety needs to be guaranteed at every stage of production. The proportion of persons who eat meals away from home has increased recently due to changing lifestyle [8-9]. As a result, there are several little street food vendors thriving on our streets, and over the past few decades, street food has become a staple of the country. Not only they are being valued for their distinctive flavours, but also their contribution to countries' social and cultural legacy, street foods have quite grown their significant and necessity for maintaining the nutritional status of the populace [10-11]. The majority of street food vendors lack basic literacy skills and training in handling techniques, making them carriers of infections including *E. coli*, *Salmonella*, *Shigella*, and other illnesses into food products [11-12].

According to multiple researchers (Ehiri et al., 1995) the majority of managers in the food service industry have a limited understanding of food safety and hygiene. The majority of food industry owners do not provide their personnel with enough training in food safety procedures and expertise [13]. Numerous researchers hypothesised that adequate food safety training for all food handlers will positively affect practises such hand washing in food service establishments that promote personal hygiene and food safety (Bryan, 2002). According to many food safety experts commercial food enterprises must teach their food handlers and monitor their performance [14].

Food borne illnesses are a major, underreported public health issue that have significant financial and health consequences. Food-borne illnesses are a significant global health problem that cause high rates of morbidity and mortality. According to Addis and Sisay (2015), diarrhoea, vomiting, stomach pains, headaches, and nausea are the most typical clinical signs of food transmitted diseases [15]. Around the world, 3-5 billion cases of infectious diarrhoea occur every year, and contaminated food and water are to blame for almost 1.8 million fatalities, mostly in young children. Food can become contaminated from, animals, air, water, plant surfaces, sewage, soil, or from food handlers while processing and handling. Food handlers are a significant cause of food contamination among the various other sources, either as carriers of pathogens or due to inadequate sanitary practises [16]. Numerous food-borne disease outbreaks are linked to people handling food with poor personal hygiene. According to Taulo et al. (2009) and Zain and Naing (2002), among the main contributors in the spread of food-borne diseases are poor environmental sanitation and personal hygiene [17-18].

The effectiveness of the system for preventing food-borne illnesses will depend on the level of food safety controls implemented in food production, processing, and distribution. Some of the crucial factors, particularly for the safety of food for humans, include keeping food clean, cooking food properly, separating cooked and raw food, maintaining food at a safe temperature, and using safe water and raw material [15].

2. Methodology

2.1 Study area

The study was carried out in Kharar, district Mohali, Punjab. Geographical coordinate of

Kharar is 30.74°N 76.65°E and an elevation of 309 metres above the sea level.

2.2 Study Design

A descriptive cross-sectional study design was used to determine the safety practice of food handlers, sanitary conditions of the food preparation area, personal hygiene and quality of the supplied water.

2.3 Source Population

Food handlers working in the Kharar town restaurants were used as the source population.

2.4 Inclusion Criteria

Food handlers who were in direct contact of the food while preparing, handling or serving of food were included.

2.5 Exclusion Criteria

All those people who were not willing to participate or were not in direct contact of the food were excluded from the study.

2.6 Sample size and Sampling technique

From all the restaurants registered in Kharar city, 100 restaurants were selected by simple random sampling technique. One member from each restaurant was selected using lottery method. The non-response rate of this study was zero.

2.7 Data Analysis

For data management and analysis, the survey was coded and entered into the statistical programme SPSS version 27. Wilcoxon-Signed rank test was applied to compare pre-test and post-test results. Z value and p value were calculated. Tables were created to summarise the data and display it.

Table 1 Socio-demographic characteristics of food handlers in Kharar town restaurants

Variables	Categories	Frequency (n=100)	Percent
Sex	Male	89	89
	Female	11	11
Age	<=30	30	30
	31-40	37	37
	41-50	17	17
	51-60	7	7
	61-70	7	7
	>70	2	2
Education	Nil	10	10
	5 th	5	5
	10 th	22	22
	12 th	32	32
	Graduate	23	23
	Post Graduate	8	8
Language	Hindi	46	46
	Punjabi	46	46
	English	8	8

Table 2 Personal hygiene practices of food handlers in Kharar Town at different restaurants

Variable	Categories	Pre		Post		Z value	P value
		n	%	n	%		
Correct Hand washing habit	No	65	65.0	26	26.0	6.245	<0.001**
	Yes	35	35.0	74	74.0		
Activities prohibited in food handling area	No	61	61.0	18	18.0	6.557	<0.001**
	Yes	39	39.0	82	82.0		
Finger nails clean and trimmed	No	48	48	33	33	3.873	<0.001**
	Yes	52	52	67	67		
Discharge from nose	No	100	100	100	100	0.000	1.000
	Yes	0	0	0	0		
Food handlers wearing jewellery	No	29	29	29	29	0.000	1.000
	Yes	71	71	71	71		

Wilcoxon-Signed Rank Test: *p<0.05; Significant; **p<0.001; highly significant

Table 3 Knowledge of food handlers on preparing, handling, storing and serving of Food

Variable	Categories	Pre		Post		Z value	P value
		n	%	n	%		
Precautions to avoid cross-contamination	No	67	67	48	48	4.359	<0.001**
	Yes	33	33	52	52		
Storage of cooked and raw food	No	67	67	30	30	6.083	<0.001**
	Yes	33	33	70	70		
Temperature of cold storage facility	No	59	59	25	25	5.831	<0.001**
	Yes	41	41	75	75		
Reheating of leftover food	No	68	68	14	14	7.348	<0.001**
	Yes	32	32	86	86		
Storage of perishable and non-perishable food together	No	1	1	1	1	0.000	1.000
	Yes	99	99	99	99		

Wilcoxon-Signed Rank Test: *p<0.05; Significant; **p<0.001; highly significant

Table 4 Knowledge of food handlers on cleaning, sanitation, water supply quality and pest control

Variable	Categories	Pre		Post		Z value	P value
		n	%	n	%		
Monitoring the quality of water	No	65	65	32	32	5.745	<0.001**
	Yes	35	35	68	68		
Correct placement of fly traps	No	72	72	44	44	5.292	<0.001**
	Yes	28	28	56	56		
Correct method to wash utensils and equipments	No	67	67	33	33	5.831	<0.001**
	Yes	33	33	67	67		

Wilcoxon-Signed Rank Test: *p<0.05; Significant; **p<0.001; highly significant

Table 5 Sanitary and physical conditions of kitchens of restaurants

Variable	Categories	Pre		Post		Z value	P value
		n	%	n	%		
Floor status	Good	22	22	35	35	4.667	<0.001**
	Average	52	52	56	56		
	Bad	26	26	9	9		
Wall free from dust and spider web	No	27	27	22	22	2.236	.025
	Yes	73	73	78	78		
Wall free from holes and cracks	No	65	65	65	65	0.000	1.000
	Yes	35	35	35	35		
Adequate lighting	No	35	35	35	35	0.000	1.000
	Yes	65	65	65	65		
Adequate ventilation	No	48	48	48	48	0.000	1.000
	Yes	52	52	52	52		
Pest infestation	No	56	56	65	65	3.000	.003
	Yes	44	44	35	35		
Equipments free from cracks	No	34	34	34	34	0.000	1.000
	Yes	66	66	66	66		
Equipments easily cleanable	No	52	52	48	48	2.000	0.46
	Yes	48	48	52	52		
Refuse receptacles covered	No	64	64	55	55	3.000	.003
	Yes	36	36	45	45		

Wilcoxon-Signed Rank Test: *p<0.05; Significant; **p<0.001; highly significant

3. Results

3.1 Socio-demographic characteristics

Table 1 displays the findings of this study's socio-demographic data. Among the food handlers (n=100) included in the study, most food handlers were males (89%) and about 11% were females.

Food handlers aged less than 30 years were 30%, aged between 31-40 were 37%, 41-50 were 17%, 51-60 and 61-70 were 70% each, and more than 70 were 2%.

Most of their educational background about 32% were higher secondary, 23% were graduate, 22%

were secondary, 8% were post graduated, 5% were elementary and 10% of them had no formal education. Most of the food handlers were comfortable in Hindi and Punjabi language, around 49% each, and only 8% were fluent in English.

3.2 Personal Hygiene Practices of Food handlers

The knowledge of the food handlers regarding the timings to massage their hands with hand wash while washing increased from 35% in pre-test to 74% in post-test, and only 39% of the food handlers knew that spitting, smoking, eating, sneezing and coughing is prohibited in food handling area while in post-test 82% had correct knowledge. During the pre-test only 54% of the food handlers were wearing clean clothes and 52% had their nails clean and trimmed, while in post-test number increased to 67%. None of the food handlers had any discharge from the nose and eye during the time of inspection. 71% of the food handlers were wearing jewellery during pre-test and none of them removed it even after the food safety training.

3.3 Knowledge of food handlers on preparing, handling, storing and serving of Food

33% of the food handlers in pre-test knew that raw and cooked food has to be handled separately using separate set of knives and cutting board to avoid cross-contamination and raw foods are kept below the cooked food in the fridge, while during the post-test 52% knew how to avoid cross-contamination and 70% knew the proper placement of food in the fridge. Knowledge of the food handlers regarding cold storage facility and how many times food can be reheated increased from 41% to 75% and 32% to 86% respectively. In 99% of the cases during inspection highly perishable and non-perishable foods were stored together.

3.4 Knowledge of food handlers on cleaning, sanitation, water supply quality and pest control

There was a significant increase in the knowledge of the food handlers from 35% to 68% that quality of the water has to be monitored while collecting at the source, after the collection in containers and during the usage. In pre-test only 28% knew the correct position to place a fly trap, while the number increased to 56% in post-test. Only 33% of the food handlers knew the correct method to clean the utensils and equipments, but after training 67% were cleaning the utensils using proper method.

3.5 Sanitary and physical conditions of kitchens of restaurants

While inspection during pre-test, floor status of the kitchen was good in 22%, average in 56% and bad in 26% of the kitchens, which improved to 35%, 56% and 9% respectively after the training. 27% of the kitchen walls had spider webs, after the training walls were cleaner and number decreased to 22%. 65% of the walls had holes and cracks in them. In 35% of the kitchens adequate lighting and in 48% of the kitchens adequate ventilation was not present. 44% of the kitchens were infested with the pests at the time of inspection before the training and number decreased to 35% after training. In 33% of the kitchens cracks were present in the equipments and in 52% of the cases, equipments were not clean while during inspection post training, in 52% of the kitchen, equipments were found to be clean. In 64% of the kitchen refuse receptacles were not properly covered, post-training number decreased to 55%.

Discussions

This study deals with the personal hygiene practices of food handlers, their knowledge on preparing, handling, storing, serving of food, cleaning, sanitation and pest control of the food preparation area of the restaurants in Kharar town. The overall food hygiene practice of food handlers working in most of Kharar restaurants like trimmed nails, wearing clean clothes and washing their hands, wearing jewellery while handling food were poor during the pre-test. Similar findings were found with poor sanitation conditions which provides less hygienic foods to consumers in different catering establishments in Hawasa city (Mariam et al., 2000), Addis Ababa city (Fisseha et al., 1999), and Mekele city (Kumie and Zeru, 2007), (Haileselassie et al., 2012) [19-22]. This might be the result of inadequate instruction in the knowledge and hygiene requirements that affect the food's microbiological safety [23]. Since most outbreaks are the consequence of improper food handling procedures, hygiene training for food handlers could dramatically improve awareness and understanding of food-borne infections and illnesses [24-25]. One of the reasons of food borne infection and intoxication is unhygienic food handling practices. Another is a lack of understanding regarding food related illness. Various studies on the risk factors for food-borne illnesses have concluded that poor food handling practices are the primary cause of most outbreaks [24-26]. Consumers' health is at risk due to poor hygiene standards and a lack of food safety

procedures among food handlers [27]. According to (Panchal et al., 2013), restaurant patrons may be at risk for food poisoning due to food handlers' lack of understanding about food safety [28]. According to a research conducted in the USA (Howes et al., 1996), households and food service facilities account for 97% of all food-borne diseases [29]. Food handlers operating in Kharar town restaurants were less aware of the importance of food hygiene. Food handlers received training on food hygiene practises such as hand washing with water and soap before handling food, after using the lavatory and after touching unclean objects, clipping fingernails and donning clean clothing and head coverings in order to lower the risks of food borne diseases. Numerous studies have shown that training improves food handlers' knowledge and attitude [27, 29, 30]. Food safety training boosted knowledge and improved attitudes towards hand hygiene practises and overall food safety systems. (Soon et al., 2012) has found that maintaining effective hand washing practises may also benefit from refresher training and long-term reinforcement of healthy food handling behaviours [30]. Numerous studies have demonstrated that more knowledge will result in behavioural changes that improve how food is handled and that other variables, such as employee attitudes, may restrict the advancement of staff practises in food safety [31].

Restaurants are a significant source of food-borne illnesses. The investigation found that more than half of the town's restaurants' kitchens, ceilings, and walls were not cleaned. The study in Hawasa town also revealed that inadequate lighting and ventilation as well as the physical condition of various establishments were not sufficiently considered in the community (Mariam et al., 2000). Restaurant hygiene standards are a crucial factor in lowering the incidence of food related illness.

The study identified the sanitary conditions or facilities of restaurants in Kharar town. More than half of the kitchen did not have proper covered refuse receptacles to dispose waste. Around half of the kitchens in Kharar town were infested with the pests such as flies, cockroaches and rats. Public catering establishments in the cities of Addis Abeba (Fisseha et al., 1999) and Hawassa (Mariam et al., 2000) experienced significant issues with high rates of poor premises condition, insufficient sanitary facilities, and incorrect waste storage and disposal.

Conclusions and Recommendations

Conclusions

Overall in this study, it is identified that the majority of the restaurants' hygiene practices, the layout of the kitchen, and general sanitary facilities were found to be poor. Majorly the personal hygiene of the food handlers like wearing clean clothes, proper hand washing habits, and fingernail trimming was poor. More than half of the food handlers had no knowledge of how to handle raw and cooked food, the temperature of the cold storage, the correct method to store food and how to manage the pest control in the kitchen and food storage area. But post training significant increase in the knowledge of food handlers was seen specifically in the area of hand washing technique (39%), precautions to avoid cross-contamination (43%), storage of raw and cooked foods (37%), correct method to clean utensils and equipments (34%). There was significant increase in the knowledge of the food handlers in all the areas such as personal hygiene, cleaning and sanitation, preparing, handling, serving and storing of food and pest control.

Recommendations

The food hygiene practices and procedures that are performed in different food establishments should be improved to reduce the occurrence of food-borne diseases that are related to poor hygiene practices. Therefore, FSSAI guidelines that are established by the government of India should be followed by the food handlers. The government, nongovernment organisations, and stakeholders should provide food handlers with refresher training on food safety and cleanliness. In the town, regular medical exams for food handlers are also necessary. As a result, the government must focus on adopting quality standard requirements for the sanitation of restaurants.

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