

Food handlers' knowledge, attitude, and practices about safe and hygienic food in Egyptian government hospitals

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Abstract

Objective: to evaluate the food handlers' knowledge, attitude, and practices about safe and hygienic food in Egyptian government hospitals. **Design and sample:** Across sectional descriptive study was used. The study was carried in the governmental hospitals which affiliated to Daqahlia Governorate, Egypt, involving 542 food handlers. A modified questionnaire for Knowledge, attitude and practice of the food handlers was used. **Results:** 57.9 % of the studied participants aged between 18-28 years and 58.3 % are female, 41% of the studied participants worked as sanitation worker and 45.6 % of them had basic education. Besides, all demographic parameters of the study participants were statistically significantly associated with total knowledge, total attitude, and total practice scores. **Conclusion:** The overall food handler knowledge, attitude, and practices are less than half of what they should be.

Keywords: Attitude, food handlers, hygiene, Knowledge, Practice, Egypt

Introduction

Food is essential for survival, but it can only fulfill such a significant function if it is secure enough to be consumed. Food is any consumable substance, whether it is in its natural or artificial form that is consumed by humans and is considered to be good for their health. It's critical for everyone to comprehend the significance of having access to nutritious foods (Zyoud, et al., 2019). Food borne infections are a significant and expanding public health and economic burden in many nations, making it one of the most pervasive issues on the planet. Foodborne illnesses are frequent, ongoing issues that cause significant morbidity and occasionally death (Ulusoy BH, Çolakoğlu, 2018).

A safe food is one that won't make the consumer sick or injured (Zeeshan, et al., 2015). According to Al Suwaidi, Hussein, Al Faisal, El Sawaf, and Wasfy (2015), one of the major public health concerns around the world is the rise in food borne diseases as a result of changing lifestyles, living conditions, and working conditions. These conditions have led to an increase in the number of working women who rely on convenience foods (fast food), as well as greater negligence of food safety and hygiene (WHO, 2012). Ingestion of live pathogens or their toxins in doses adequate to cause illness is the main method of transmission for many diseases (Al-Sakkaf,

2012). Food-borne illnesses are substantially more prevalent in low- and middle-income nations because due to improper food safety training, disregard for hygiene standards, a lack of potable water, and unclean storage (Sanlier, 2009).

The World Health Organization (WHO) also identified five factors linked to the occurrence of these illnesses, including unhygienic practices and inadequate sanitation by food handlers, insufficient cooking techniques, improper storage without taking temperature requirements into account, cross-contamination, and sourcing food from unsafe locations. Food handlers who are involved in food manufacturing and preparation are in charge of the majority of these aspects. All procedures involved in storing, preparing, and preserving food up until ultimate consumption are referred to as "food handling (Hamed and Mohammed, 2019).

In addition, research has shown that food workers carry pathogenic bacteria, making them a likely source of food-borne illnesses such Hepatitis A, noroviruses, typhoidal Salmonella, Staphylococcus aureus, and Shigella sp. in their hands, cuts or sores, mouth, skin, and hair. Food handlers may also expel foodborne organisms including E. coli O157:H7 and non-typhoidal Salmonella during an illness' infectious phase or, less seriously, during its healing phase (Bintsis, 2017).

Food safety, particularly in hospitals, necessitates close attention to all preventive measures to minimize the hazards of

food poisoning, especially in the presence of "consumers" (at-risk hospitalized patients), who frequently are more susceptible than healthy ones. Although nurses and other domestic workers may distribute or serve meals, food-service staff is the primary food handlers in hospital catering. Since they could theoretically introduce germs into foods at any point from purchase through distribution, hospital food-service employees is a possible source of nosocomial foodborne outbreaks. The Five Keys to Safer Food's main takeaways are to: (1) keep things clean; (2) keep raw and cooked food separate; (3) cook fully; (4) keep food at safe temperatures; and (5) utilize safe water and raw materials. The poster's message about good food hygiene has been translated into more than 40 languages and is being disseminated globally (Ehuwa, Jaiswal, and Jaiswal, 2021).

To assess the knowledge, attitude, and practice (KAP) of food handlers in restaurants and other food establishments, several studies were

carried out. Other the intended audience for food safety University students, medical employees, and food handlers were studied by KAP. Additionally, in the wake of the corona virus epidemic, food hygiene is crucial, particularly for patients. In order to discover particular knowledge, attitude, and practice related food safety and cleanliness, the study looked at the overall knowledge, attitude, and practice (KAP) ratings of the food handlers in government hospitals.

Aim of the study

Assess the food handlers' knowledge, attitude, and practices about safe and hygienic food in Egyptian government hospitals.

Materials and Methods

Designs: Cross sectional descriptive study was utilized to conduct this study.

Setting: The study was carried out in multiple governmental hospitals located at Dakhlia governorate, and they were as the following:

Hospital name	Actual Number of Nurses	Collected number
1-Mansoura New General Hospital	610 nurses	32 nurses
2-Mansoura old General Hospital	286 nurses	15nurses
3-Mansoura Fever Hospital	83nurses	4nurses
4-Mansoura chest Hospital	251nurses	13nurses
5-Mansoura ophthalmologyHospital	210nurses	11nurses
6-Mansoura Dental Center	44nurses	12nurses
7-Talkha Central Hospital	330nurses	17nurses
8-Sherbin Central Hospital	474nurses	25nurses
9-Nabarwa Central Hospital	217nurses	12nurses
10-Belqas Central Hospital	353nurses	19nurses
11-Aga Central Hospital	384nurses	20nurses
12-Met Ghamr Central Hospital	291nurses	15nurses
13-Met Ghamr KidneyHospital	113nurses	26nurses
14-Damas Central Hospital	116nurses	26nurses
15-Bani Obaid Central Hospital	233nurses	22nurses
16-Dekernes General Hospital	608nurses	24nurses
17-Meniet El Nasr Central Hospital	360nurses	29nurses
18-Met Salsil Central Hospital	172nurses	29nurses
19-El Gamaleya Central Hospital	245nurses	23nurses
20-Manzala Central Hospital	401nurses	25nurses
21-El Matareya Central Hospital	321nurses	27nurses
22-Senbillawain Central Hospital	406nurses	22nurses
23-Tamei Al Amadeed Central Hospital	206nurses	21nurses
24-Shubrahour Central Hospital	99nurses	25nurses
25-Almoqtia Central Hospital	63nurses	23nurses
26-Bhout Chest Hospital	23nurses	21nurses
27-Sadr Al-Manzala Dispensary	9nurses	22nurses
Total	6908	542

Subjects: The study involved the food handlers worked at the aforementioned hospitals, available at data collections and had the willings to participate were recruited in the study, their total number was 542.

Tools for data collection

A modified Sharif and AlMalki (2010) questionnaire for Knowledge, attitude and practice of the food handlers was used. The questionnaire consisted of fifty questions divided into three parts. Part one included 15 questions about the knowledge, part two included 15 questions about the attitude and part three included 20 questions about the practice. All questions about knowledge and attitude were scored on a five-point scale (0 to 4) with options of strongly agrees, agree, not sure, disagree or strongly disagree. But, the questions about practice were scored on a five-point scale (0 to 4) with options of always, most of the times, sometimes, rarely or never. The direction of the scale was (4 to 0) and reversed to (0 to 4) for some questions to check the validity of the responses. For dichotomous classification the scores less than 3 were categorized as a negative response, (Answering wrong) while the scores 3 and 4 were categorized as a positive response (Answering right). The questionnaire stated clearly to the participants that the information will be used only for scientific purposes and the participants signed a consent form.

Procedure:

Once permission was granted to proceed with the current study from responsible and authoritative parties, the researchers initiated data collection and contacted each potential food handler to explain the purpose and nature of the study. The tools of data collection were distributed to the subjects' participants after explaining the purpose, the total time allowed to fulfill by each participant was 20 to 30 minutes.

Statistical analysis of the data

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp). Qualitative data were described using number and percent. The Kolmogorov-Smirnov test was

used to verify the normality of distribution. Quantitative data were described using range (minimum and maximum), mean, standard deviation, median. Significance of the obtained results was judged at the 5% level.

The used tests were

1- Mann Whitney test

For abnormally distributed quantitative variables, to compare between two studied categories

2- Kruskal Wallis test

For abnormally distributed quantitative variables, to compare between more than two studied groups

3 - Pearson coefficient

To correlate between two normally distributed quantitative variables.

Ethical Consideration

The Research Ethics committee approved this study. This emphasized with permission for the investigators to utilize the targeted hospitals. Approval was obtained (written and oral consent) from the food handler. The researchers emphasized that participation in the study is entirely voluntary, the anonymity and the confidentiality of their responses were assured. Also, they had the right to withdraw from the study at any time they wish to do.

Results:

Table (1) shows that 57.9 % of the studied participants aged between 18-28 years and 58.3 % are female. The results also, revealed that, 41% of the studied participants worked as sanitation worker and 45.6 % of them had basic education. Eventually, the table adduced that, 31% of the studied participants had 6-10 years' experience in their work.

Table (2) shows that the studied participants' total food handlers' knowledge scores were 48.73 ± 5.33 , with a median of 49. Furthermore, the findings revealed that the studied participants' overall attitude about food safety and hygiene was 46.35 ± 5.73 , with a median of 47. Likewise, the statistics reported that the maximum practice scores of the studied participants for safe and hygienic food was 43.82 ± 8.68 , with a median of 43.

Table (3) shows that there was a strong statistical correlation between total knowledge scores and total attitude scores, total knowledge scores and total practice scores & total attitude scores and total practice scores, all with $p \leq 0.05$.

All demographic parameters (age, sex, type of employment, educational level, number of years of service) of the study participants were statistically significantly associated with total knowledge, total attitude, and total practice scores at $p 0.05$, as shown in Table (4).

Table (1): Distribution of the studied participants according to demographic data (n =542)

Demographic data	No.	%
Age (years)		
18:28	314	57.9
28:38	150	27.7
38:48	78	14.4
Sex		
Male	226	41.7
Female	316	58.3
Type of employment		
Cooker	108	19.9
Waiter	112	20.7
Sanitation worker	222	41.0
Nutrition specialty	100	18.5
Educational level		
Basic education	247	45.6
Middle education	195	36.0
High education	100	18.5
Number of years of service		
1:5	165	30.4
6:10	168	31.0
11:15	156	28.8
16:20	53	9.8

Table (2): Descriptive analysis of the studied participants according to scores of KAP about safe and hygienic food (n = 542)

Knowledge, Attitude and Practice on food poisoning	Total Score	Mean score	Percent Score
Knowledge			
Min. – Max.	38.0 – 58.0	2.53 – 3.87	63.33 – 96.67
Mean \pm SD.	48.73 \pm 5.33	3.25 \pm 0.36	81.22 \pm 8.88
Median	49.0	3.27	81.67
Attitude			
Min. – Max.	30.0 – 57.0	2.0 – 3.80	50.0 – 95.0
Mean \pm SD.	46.35 \pm 5.73	3.09 \pm 0.38	77.26 \pm 9.55
Median	47.0	3.13	78.33
Practice			
Min. – Max.	26.0 – 68.0	1.30 – 3.40	32.50 – 85.0
Mean \pm SD.	43.82 \pm 8.68	2.19 \pm 0.43	54.78 \pm 10.85
Median	43.0	2.15	53.75

Table (3): Correlation between knowledge, attitude and practice safe and hygienic food (n = 542)

	R	p
Knowledge Vs. attitude	0.576*	<0.001*
Knowledge Vs. practice	0.307*	<0.001*
Attitude Vs. practice	0.299*	<0.001*

r: Pearson coefficient

*: Statistically significant at $p \leq 0.05$

Table (4): Relation between knowledge, attitude and practice safe and hygienic food with demographic data (n = 542)

Demographic data	N	Knowledge	Attitude	Overall practice
		Mean \pm SD.	Mean \pm SD.	Mean \pm SD.
Age (years)				
18:28	314	81.08 \pm 8.44	77.63 \pm 10.30	54.85 \pm 10.31
28:38	150	78.94 \pm 8.11	75.21 \pm 8.64	52.43 \pm 10.89
38:48	78	86.20 \pm 10.09	79.70 \pm 7.05	58.99 \pm 11.72
H(p)		38.685*(<0.001*)	14.558*(0.001*)	16.628*(<0.001*)
Sex				
Male	226	78.70 \pm 9.54	73.85 \pm 11.02	53.37 \pm 11.86
Female	316	83.04 \pm 7.89	79.71 \pm 7.43	55.79 \pm 9.96
U(p)		25824.5*(<0.001*)	24897.0*(<0.001*)	31157.50*(0.011*)
Type of employment				
Cooker	108	80.52 \pm 10.74	73.55 \pm 11.75	49.62 \pm 7.89
Waiter	112	83.39 \pm 7.83	78.75 \pm 8.37	51.32 \pm 9.00
Sanitation worker	222	78.68 \pm 8.39	76.56 \pm 9.06	56.86 \pm 11.52
Nutrition specialty	100	85.20 \pm 6.61	81.13 \pm 7.28	59.60 \pm 10.63
H(p)		45.616*(<0.001*)	28.172*(<0.001*)	62.318*(<0.001*)
Educational level				
Primary education	247	83.97 \pm 8.66	78.26 \pm 9.69	56.42 \pm 10.77
Directive education	195	75.79 \pm 7.10	73.38 \pm 8.83	51.13 \pm 10.33
University education	100	85.02 \pm 7.35	82.35 \pm 7.30	57.83 \pm 10.19
H(p)		108.00*(<0.001*)	72.126*(<0.001*)	42.217*(<0.001*)
Number of years of service				
1:5	165	82.32 \pm 9.38	74.46 \pm 9.90	52.67 \pm 10.16
6:10	168	76.88 \pm 8.83	74.68 \pm 9.70	52.46 \pm 9.87
11:15	156	83.37 \pm 7.12	81.36 \pm 7.72	56.98 \pm 11.41
16:20	53	85.28 \pm 6.72	82.04 \pm 6.26	62.22 \pm 9.79
H(p)		62.063*(<0.001*)	70.175*(<0.001*)	40.904*(<0.001*)

U: Mann Whitney test

H: H for Kruskal Wallis test

*: Statistically significant at $p \leq 0.05$

Discussion

Food-related outbreaks and worries are on the rise, which has led to calls for better hygiene and quality standards. Outbreaks of food poisoning caused by Salmonella, Listeria, and E. coli have made people more wary of the food they consume. In recent months, the European Commission has recognized the need to reduce cases of food poisoning due to the rising number of meals

consumed outside of the home, along with the ever-growing variety of prepared meals. The necessity for better food hygiene regulations is highlighted by this change in consumer behaviour. Statistics show that more food poisoning outbreaks than any other sector of the food industry—70% of all cases of bacterial food poisoning—are caused by caterers. Insufficient food time and temperature management is responsible for 70% of occurrences of food poisoning, while the

The remaining 30% are brought on by cross-contamination (**Klingbeil and Todd, 2019**).

Effective food handling practices by food handlers and appropriate hygienic conditions in the kitchen are crucial for the prevention of food borne infections (FBDs) among patients, their companions, and hospital employees. Massive amounts of food are produced, and if the supply is not adequately controlled, epidemics could break out, disrupting the hospital's operations. The knowledge, attitude, and habits of food handlers are greatly influenced by their education and training, which helps to prevent FBDs (**Wahdan, Gad, Habib, Elshabasy, 2019**). Thus the study was carried to assess knowledge, attitude and practices of food handlers in the governmental hospitals of Mansoura city which affiliated to Daqahlia Governorate, Egypt.

The current study's findings revealed that the participants' overall knowledge scores on food poisoning were 48.73 5.33, with a median of 49. Additionally, the results showed that the participants in the study had an overall attitude toward food poisoning of 46.35 5.73, with a median of 47. Additionally, according to the statistics, the study's participants' highest practice scores for food poisoning were 43.82 8.68, with a median of 43.

Together, these results show that the participants' overall food handler knowledge, attitude, and practices are less than half of what they need to be. Only around half of them have completed elementary school, which suggests that their lack of education may be to blame. In addition, more than half of them are young, between the ages of 18 and 28. They also lack experience, with over a third of their jobs occurring while they were between the ages of 6 and 10. Government employees, particularly those working in university hospital kitchens, serve a lot of patients and are frequently busy, which lowers their likelihood of knowing anything new.

At a study named "Knowledge, Attitude and Practices of Food Safety among Food Handlers in Ismailia City Hospitals, Egypt," Elsherbiny, Sobhy, Fiala, and Abbas (2019) supported these findings the need to raise

awareness about food safety through education programmes about food safety and safe food handling techniques. It was concluded that there is a gap in knowledge, attitude, and correct behaviors among food handlers.

Furthermore, **Hamed and Mohammed (2020)** noted in their study titled "Food safety knowledge, attitudes, and self-reported practices among food handlers in Sohag Governorate, Egypt," "Our study highlights the poor knowledge of food handlers in Sohag about food safety, as well as the high level of non-compliance with food safety practices." Non-compliance could lead to outbreaks of food-borne illnesses. Promoting knowledge about food safety is therefore urgently needed. Adoption of education and training programs is necessary to improve the attitudes, skills, and behaviors of food handlers. It should also be necessary to obtain a license and maintain oversight.

In contrast to the findings of the current study, **Ahmed, Mohamed, Anas Dablood, and Elawad (2020)**, who conducted a study titled "Food hygiene knowledge, attitude, and practices among hospital food handlers in Elmanagil City, Sudan," found that food handlers in ElManagil city hospitals had a moderate level of knowledge, a positive attitude, and good practices regarding food hygiene. In the Sudanese healthcare system, there is an immediate need to improve food safety. It's also critical to implement food safety training programs for healthcare food handlers in order to improve their knowledge, attitude, and behaviors.

In the same vein, Sharif, Obaidat , Al-Dalalah (2013) in the study about Food Hygiene Knowledge, Attitudes and Practices of the Food Handlers in the Military Hospitals, showed that the means of the percentage scores for the knowledge, attitude, practice, were 84.82, 88.88, 89.43, respectively and the overall knowledge, attitude, practice (KAP) mean percentage score was 87.88. In addition, Lestantyo, Husodo, Irvati, Shaluhayah (2017) in the study conducted in Indonesia about "Safe Food Handling Knowledge, Attitude and Practice of Food Handlers in Hospital Kitchen", indicated that, more than 80% of food handlers have good knowledge in

safe food handling procedures, good attitude (66%) and good practices (90%).

The results of this study revealed a significant statistically positive association ($p < 0.05$) between total knowledge scores and total attitude scores, total knowledge scores and total practice scores, and total attitude scores and total practices scores. The researchers claim that this result both demonstrates and verifies the relationship between strong information and good attitudes and appropriate behavior. In other words, this shows that the quantity of knowledge a food handler possesses affects both their attitudes and methods for managing food in the sector of food service. Additionally, it shows how their attitude affects how they practice reducing food-borne illnesses.

This finding was corroborated by a cross-sectional study done in Iran by **Fariba, Gholamreza, Saharnaz, Ehsan, and Masoud (2018)**, titled Knowledge, Attitude, and Practice Among Food Handlers of Semi-Industrial Catering, which found significant relationships between knowledge and attitude ($p < 0.001$) and between attitude and practice ($p = 0.001$). In addition, **Rohin's (2016)** study, "Knowledge, Attitude, and Practices (KAP) on Good Manufacturing Practices (GMP) among Food Handlers in Terengganu Hospitals," found that there was a positive correlation between knowledge and attitudes at three levels ($r=0.13$), knowledge and practices at two levels ($r=0.24$), and attitudes and practices at four levels ($r=0.42$). Only level practices and attitudes, nevertheless, exhibit a meaningful association with $p < 0.05$. Also, the study in South Africa entitled "An Assessment Of The Food Safety Knowledge And Attitudes Of Food Handlers In Hospitals", which conducted by **Tabit and Teffo (2020)**, revealed that, there was a positive significant correlation between the Food Safety Knowledge And Food Safety Attitudes of hospital food handlers.

While the study by **Palupi, Fitasari, and Utami (2020)**, titled "Knowledge, Attitude, and Practice of Hygiene and Sanitation among Food-Handlers in an Indonesian Psychiatric Hospital a Mixed Method Study", revealed that, no correlations were found between knowledge, attitude, and practice regardless of any combination between two factors ($p > 0.05$).

Additionally, the results of this study showed that, at a statistical significance level of

0.05, all demographic characteristics of the study participants—including age, sex, type of employment, educational attainment, and number of years of service—were statistically significantly related to total knowledge, total attitude, and total practice scores. This finding was consistent with what **Hamed and Mohammed (2020)** revealed, which said that the majority of the demographic characteristics were substantially related to the participants' knowledge. Additionally, positive sentiments were strongly correlated with place of residence and education. Additionally, in multivariate logistic regression analysis, good knowledge was substantially correlated with age, male sex, urban location, higher education, and employment as a cook. Residence and education have a big impact on positive sentiments.

This is also in line with a Malaysian study by **Woh, Thong, Behnke, Lewis, and Zain (2016)** titled "Evaluation of Basic Knowledge on Food Safety and Food Handling Practices Amongst Migrant Food Handlers in Peninsular Malaysia," which discovered that age, sex, and education had a significant impact on food safety knowledge. Additionally, **Afolaranmi, Hassan, Bello, and Misari (2015)** found that education and age had a big impact on food sellers' practices in their study titled "Knowledge and Practice of Food Safety and Hygiene among Food Vendors, North Central Nigeria." **Elsherbiny, Sobhy, Fiala, and Abbas (2019)**, who elaborated on this, said that Regarding Differences between characteristics of the studied participants regarding knowledge score there was a statistical significant difference between age, educational level, working activity and working experience regarding knowledge score with P-value less than 0.05 except the difference regarding knowledge score with gender and place of work which was not statistically significant with P-value more than 0.05.

Conclusion and recommendations

The overall food handler knowledge, attitude, and practices are less than half of what they should be. In addition, there was a strong statistical correlation between total knowledge scores and total attitude scores, total knowledge scores and total practice scores & total attitude scores and total practices scores. Educational and training programs should be implemented

by the community health nurses using variety of teaching methods and modes to improve their knowledge, attitudes and practices.

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