International Journal of Agronomy and Agricultural Research (IJAAR)
ISSN: 2223-7054 (Print) 2225-3610 (Online)
http://www.innspub.net
Vol. 24, No. 2, p. 22-30, 2023

RESEARCH PAPER OPEN ACCESS

Hospital food safety regarding food handlers knowledge practices in Khartoum Government Hospitals

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Article published on February 20, 2024

Key words: Food safety, Food hygiene, Food handlers knowledge, Food handlers practices, Hospitals, Khartoum

Abstract

Food handlers' knowledge of safe health practices plays an important role in food safety. The aim of this cross-sectional study was to evaluate the level of food handlers, knowledge, practices related to food safety and hygiene for workers in government hospitals in Khartoum State - Sudan. The data was collected through a questionnaire conducted among 105 of those who work in food preparation and distribution, cleaning, and supervisors in 10 government hospitals in December 2014. The results showed that the female was 57% ,41.7% of them were in36-45of years, 65%, ≥ 5 of experience, 41.7% had primary education, 65% received food safety training, while 41.7% % They do not have knowledge of the importance of food safety, as for nutrition Office. The majority of them were women, 95.6%, and 44.4% of them in 25-35 years old. Most of them were clinical nutrition specialists, and 62.2% of them were university graduates. They have more than five years of practical experience, and 55.5% of them reported that the standard of meals provided to patients was satisfactory, while 13.3% reported that it was unsatisfactory, 53.3% reported that they do not train workers on the job, while 68.9% reported that they were a directed to the importance of obtaining a health card. The analysis also showed statistics between the age groups of food handlers and their training at the level of 0.01, as well as between the knowledge of food handlers about food contaminants and their training at the level of 0.01.

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Introduction

The hands of food handlers can spread foodborne diseases for reasons such as neglect of personal hygiene or cross-contamination. For example, poor personal hygiene may be widespread after using the toilet, or bacteria may be spread from raw to fresh foods such as green salad by the hands of food handlers (Ehiri *et al.*, 1996). The patient in the hospital needs safe and appropriate food so that he/she does not suffer from harmful health consequences such as nutrition related disease (Sharif *et al.*, 2013). Neglecting personal hygiene can also contribute to food-borne diseases in the hospital, such as the transfer of *Staphylococcus aureus* bacteria (Garcia *et al.*, 2015). Food born disease can cause severe and/or long-lasting damage to health (Tomkins *et al.*, 1989). Various pathogens have been identified as causing diarrhoeal diseases. Some of these include bacteria such as *Escherichia* coli, *Shigella spp., Salmonella spp.*, *Vibrio cholerae* ,*Campylobacter jejune; protozoa* such as *Giardia lamblia, Entamoeba histolytica, Cryptosporidium , rotavirus, Bacillus cereus, Staphylococcus aureus, Clostridium perfringens, helminths* (Black *et al.*, 1980), (Tardelli *et al.*, 1991) and *E. coli* are probably the commonest illnesses in developing countries (Esrey *et al.*, 19858). Foodborne diseases means diseases that result from eating contaminated foods, and there are more than 250 different risks that can be transmitted through food, including infectious bacteria, viruses and parasites which can be transmitted through food handles (Li *et al.*, 2019). It has been documented that many foodborne diseases are transmitted by consumers when they are travelling to consumer such as patients in hospitals which may worsen their condition, especially if they are immunosuppressed (Mohammed *et al.*, 2020). Food handlers may contaminate food by malpractices linked to a lack of knowledge about the basics of food safety, including personal hygiene, proper cooking and storage temperature, and cross-contamination (Hardstaff *et al.*, 2018). This knowledge can be enhanced by training of food handlers in food safety and hygiene (Addo *et al.*, 2020). The personal hygiene of food handlers plays an important factor in the safety of foods, especially those served in hospitals, by avoiding transferring the microbe to the food and then to the consumer (Bartram *et al.,* 2010). All food handlers should be trained on topics related to good hygiene practices, hazard analysis and critical control points. There is also training in identifying inappropriate employee behavior and explaining how to correct these problems (Medeiros *et al.*, 2011). This is to impart basic knowledge about the causative agents of food-borne diseases (Mitchell *et al.*, 2007) which should focus on the theoretical and practical elements of training for food services (Howells *et al.*, 2008).

There is a weakness in food services in some under-developing countries, especially for food handlers in hospitals and also those working to supervise them (Turnlund *et al.*, 1983), (Abdelkadir, 2017). There is a lot of important health knowledge and practices that food handlers must follow, such as maintaining personal hygiene, which includes: bathing and trimming nails, treating skin allergies, wounds, using hand sanitizer, washing clothes regularly, washing hands regularly, and washing the scalp. And hair, wearing personal protective equipment, avoiding coughing, sneezing, spitting around food, scratching the skin and hair, touching wounds, applying all healthy behaviors and applying the correct service standards (Pilling *et al.*, 2008).

In the context of my work in this field, there are a large number of patients in public hospitals who depend on the free meal provided to them, but there is little research that has been conducted in this field. Therefore, it was necessary to shed light on the workers' knowledge of the importance and application of food hygiene and safety, provided that it extends to Work on the extent of the impact of this on the meals provided by analysing some samples from workers and foods to determine the relationship between the application of health systems and their impact on the safety and hygiene of the foods provided so that the patient enjoys a good meal free of contaminants and thus not wasting some meals due to the reluctance of some patients to do so.

Materials and methods

The study was carried out in 10 Khartoum state hospitals which are all public hospital including: Khartoum Hospital, Khartoum Bahri, Ben Sinan, Jaafar bin Auf for children, Corn treatment, Ear, nose and throat, Dermatology, Omdurman hospital, dental hospital. which was the largest hospitals in the capital of Sudan Participants (105) were nutrition office staff ,food handlers Those who were present at the time of the visit and agreed to answer, Those who were not present and who did not have the desire to answer the questions were excluded. According to certain inclusion and exclusion criteria, this study is a cross sectional hospital-based study, designed to evaluate knowledge, attitudes and practices of the nutrition office staff towards food safety practices and food handlers, The procedures include primary data collected through a structured questionnaire in the form of interviews that contains a number of questions about participants' demographic data, such as age and gender, training, and etc. It also contained a set of questions about the food handlers' knowledge, practice of handling food in healthy ways and their behaviors. The questionnaire also contained another part to interview the supervisors at the Nutrition Office, in addition to the notes that were taken during the visit. The second method of collecting data is secondary data, which was collected from A collection of references and books related to the topic. All primary data were analyzed by using Statistical Package for social Science (SPSS V22) and Excel**.**

Ethical consideration

According to the research criteria, a letter was written to the Ministry of Health Then, after approval and the signature of the Director of Curative and Preventive Medicine, the letter was submitted to all the authorities from which the data was collected, which are a number of hospitals in Khartoum State. Work began after their approval.

Results

The following are the results obtained from a questionnaire cove ring 105 workers, including 60 workers in food preparation and distribution, and 45 from the Nutrition Office. It includes a different set of questions that include demographics characteristic data of the participants and information related to food safety and the practices deal with it. Table 1 shows the demographic characteristics of the handling workers participating in the questionnaire, whose oldest age was between 36 - 45 years (41.7%), most of them (57%) were women ,working in food distributions (45%) and (41.7) of them had primary education. The number of them living in villages was about (66.7%) and the number of married was 83.3%, those with more than five years' experience were (65%).

Table 2 shows the extent of food workers' knowledge about food safety which shows that 65% of them were given training on food hygiene (16.7% not formal). However, (16.7%) of them had no information about food contamination, and 25% of them reported that they were not sure about it , and 81.7% of them reported that they were followed up by food supervisors on this matter. Also, 56.7% of food handlers responded that they know the importance of wearing gloves, while 33.3 do not know the importance of that, and 10% are not sure of the importance of wearing gloves. The table above also shows that 78.3% of the participants in the questionnaire answered that they know the importance of personal hygiene in food safety, while 13.3% of them did not know that, and 8.3% reported that they were not sure of the importance of this relationship to food contamination.

Table 3 shows the practices of food handlers during the food preparation and distribution process, which shows that 53.3% of food handlers believe that they wear appropriate clothing for work; while 46.7% said that it is not appropriate for work. Also, 50% of them answered that the kitchen is cleaned once, while 36.6% reported that it is cleaned twice a day, and 13.4% responded that the kitchen is cleaned more than 3 times a day, Also, 60% of the participants in the questionnaire reported that washing hands occurs before and after work in preparing and distributing food, while 38.3% preferred not to implement this, as 6.7% of them responded that washing hands occurs at some times.

Table 1. Characteristic of the participants

Characteristic (N=60)		Variables	Frequency	Percentage	Valid percent	Cumulative percent
1	Sex	Male	26	43	43	43
		Female	34	57	57	100
	Total		60	100	100	
2	Age distributions	25-35	21	35	35	35
		36-45	25	41.7	41.7	41.7
		46-55	5	8.3	8.3	8.3
		≥ 55	9	15	15	100
	Total		60	100	100	
3	Type of work	Preparing foods	26	43.3	43.3	43.3
		Distribution of food	27	45	45	45
		other	7	11.7	11.7	100
	Total		60	100	100	
4	Education level of Participant's	primary	25	41.7	41.7	41.7
		Secondary	10	33,3	33,3	33.3
		illiterate	15	25	25	100
	Total		60	100	100	
5	Residence	Village	40	66.7	66.7	66.7
		City	20	33.3	33.3	100
	Total		60	100	100	
6	Marital status	Married	50	83.3	83.3	83.3
		single	10	16.7	16.7	100
	Total		60	100.0	100.0	
7	Years of experience	≤5 years	21	35	35	35
		More than 5 years	39	65	65	100
	Total		60	100	100	

Table 2. Knowledge of food handlers in the hospital

Characteristic (N=60)		Variables	Frequency	Percentage	Valid percent	Cumulative percent
1	Receive food hygiene training	Yes	35	65	65	65
		No	25	35	35	100
	Total		60	100	100	
2	Follow up with your supervisor on food safety	Yes	49	81.7	81.7	81.7
		No	11	18.3	18.3	100
	Total		60	100	100	
3	Received formal training	Yes	25	71.4	71.4	71.4
		Not formal	10	16.7	16.7	16.7
		None	25	28.6	28.6	100
	Total		60	100	100	58.3
4	Knowledge of food contaminants	Yes	35	58.3	58.3	16.7
		No	10	16.7	16.7	25
		not sure	15	25	25	100
	Total		60	100	100	
5	The importance of wearing gloves	Yes	34	56.7	56.7	56.7
		Not	20	33.3	33.3	33.3
		not sure	6	10	10	100
	Total		60	100	100	
6	The relationship between personal hygiene and food contamination	Yes	47	78.3	78.3	78.3
		No	8	13.3	13.3	13.3
		not sure	5	8.3	8.3	100
	Total		60	100	100	

Regarding the materials used in cleaning, 73.3% of the workers responded that they use soap and lukewarm water, and 18.4% reported that they use hot water with soap, while only 8.3% responded that they use other materials. Also, 50% of them responded that they wear gloves sometimes, while 25% of them reported that they wear them often, and 25% also reported that they do not wear the gloves.

Table 4 shows the health status of food handlers, which shows that 50% of them get the health card once a year, 36.7% get it twice a year, while only 6.7%

get the card three times a year, as 6.7% are not sure of the number. The times the cards are made for them, Regarding the validity of health cards, most of the workers, 56.7%, reported that their cards were valid, while 35% reported that they were invalid, and 8.3% of them were not sure about that, the table also includes workers' reports of vaccination, as most of them were not vaccinated, while 40% had been vaccinated, while 6.7% reported that they were not sure about that. Also, 91.7% of food handlers reported that they do not suffer from an infectious disease, while 8.3% reported that they were not sure about that.

Table 3. Food handler's practices

Characteristic (N=60)		Variables	Frequency	Percentage	Valid percent	Cumulative percent
1	Use appropriate clothing for work	Yes	32	53.3	53.3	53.3
		No	28	46.7	46.7	100
	Total		60	100	100	
2	How many times is the kitchen cleaned per day?	Once	30	50	50	50
		Twice	22	36.6	36.6	36.6
		three times	4	6.7	6.7	6.7
		more than three times	4	6.7	6.7	100
	Total		60	100	100	
3	Wash your hands before preparing and distributing foods	Yes	33	55	55	55
		No	23	38.3	38.3	38.3
		Some times	4	6.7	6.7	100
	Total		60	100	100	
4	use tobacco or cigarettes while working?	yes	16	26.7	26.7	26.7
		No	40	66.6	66.6	66.6
		Some times	4	6.7	6.7	100
	Total	60	60	100	100	
5	Types of materials used in cleaning	Soap and lukewarm water	44	73.3	73.3	73.3
		Soap and worm water	11	18.4	18.4	18.4
		Other material	5	8.3	8.3	100
	Total		60	100	100	
6	How often do you wear gloves when handling food?	I always	15	25	25	25
		I don't use it	15	25	25	25
		sometimes	30	50	50	100
	Total		60	100	100	

Table 4. Health information for hospital food handlers

Characteristic (N=60)		Variables	Frequency	Percentage	Valid percent	Cumulative percent
1	Card renewal times per year	Once time	30	50	50	50
		Twice	22	36.7	36.7	36.7
		three times	4	6.7	6.7	6.7
		Not sure	4	6.7	6.7	100
	Total		60	100	100	
2	Health card validity	yes	34	56.7	56.7	56.7
		No	21	35	35	35
		Not sure	5	8.3	8.3	100
	Total		60	100	100	
3	Get vaccinations when starting work	Yes	24	40	40	40
		No	32	53.3	53.3	53.3
		Not sure	4	6.7	6.7	100
	Total		60	100	100	
4	Conduct health checks when starting work	Yes	45	75	75	75
		No	15	25	25	100
	Total		60	100	100	
5	Now suffering from an infectious disease	Yes	5	8.3	8.3	8.3
		No	55	91.7	91.7	100
	Total		60	100	100	

Table 5. Characteristic of the participants (nutrition office)

Characteristic (N=45)		Variables	Frequency	Percentage	Valid percent	Cumulative percent
1	Sex	Female	43	95.6	95.6	95.6
		Male	2	4.4	4.4	100
	Total		45	100	100	
2	age distributions	25-35	20	44.4	44.4	44.4
		36-45	15	33.3	33.3	33.3
		≥ 46	10	22.2	22.2	100
	Total		45	100	100	
3	Type of work	Clinical nutrition	23	51.1	51.1	51.1
		Nutrition technician	22	48.9	48.9	100
	Total		45	100	100	
4	Education level of Participant's	University	28	62.2	62.2	62.2
		Secondary	17	37.8	37.8	100
	Total		45	100	100	
5	Residence	Village	5	11.1	11.1	. 11.1
		City	40	88.9	88.9	100
	Total		45	100	100	
6	Marital status	Married	25	55.6	55.6	55.6
		single	20	44.4	44.4	100
	Total		45	100.0	100.0	
7	Years of Experience	≤5 years	10	22.2	22.2	22.2
		More than 5 years	35	77.8	77.8	100
	Total		45	100	100	
8	Food hygiene training	yes	25	55.6	55.6	55.6
		no	20	44.4	44.4	100
	Total		45	100	100	

Table 6. Food safety related questions (nutrition office)

Characteristic (N=45)		Variables	Frequency	Percentage	Valid percent	Cumulative percent
1	Quality of patients meal	Good	12	26.7	4.4	4.4
		Acceptable	27	60	95.5	100
		Not acceptable	6	13.3	113.3	100
	Total		45	100	100	
2	Meal preparation place	Inside hospital	39	86.7	86.7	86.7
		Outside hospital	6	13.3	13.3	100
	Total		45	100	100	
3	Food safety	Good	13	28.9	28.9	51.1
		Acceptable	25	55.5	55.5	55.5
		Not acceptable	7	15.6	15.6	100
	Total		45	100	100	
4	Kitchen design	Standard	4	8.9	8.9	8.9
		Not standard	41	91.1	91.1	100
	Total		45	100	100	
5	Conduct training for workers	Yes	21	46.7	46.7	46.7
		No	24	53.3	53.3	100
	Total		45	100	100	
6	directing food handlers to health card	Yes	31	68.9	68.9	68.9
		No	14	31.1	31.1	100
	Total		45	100.0	100.0	
7	Shortage of workers	Yes	21	46.7	46.7	46.7
		No	24	53.3	53.3	100
	Total		45	100	100	
8	Guiding workers in food hygiene and safety	Yes	30	6.7	6.7	66.7
		No	15	33.3	33.3	100
	Total		45	100	100	

Table 5 contains other demographic questions that were conducted among employees in the nutrition office of which 95.6% were women, only 4.4% were men, and the majority were between 25-35 years old, 33.3% were between 36-45 years, while only 10% were over 46 years old, 51.1% of them are nutritionists, while all the rest work as nutrition technicians. 88.9% of them live in cities, and 55.6% of

them are married; most of them 62.2% obtained a university education. Also, 77.8 of them have more than 5 years of experience.

Table 7. Correlation between education level and received training of food handlers

		Education level	Received training
Education level	Pearson Correlation	1	.630**
	Sig. (2-tailed)		.000
	N	60	60
Received training	Pearson Correlation	.630**	1
	Sig. (2-tailed)	.000	
	N	60	60

**Correlation is significant at the 0.01 level (2-tailed).

Table 8. Correlation between education level and age groups of food handlers

		Education level	Age groups
education level	Pearson Correlation	1	.341**
	Sig. (2-tailed)		.008
	N	60	60
age groups	Pearson Correlation	.341**	1
	Sig. (2-tailed)	.008	
	N	60	60

**Correlation is significant at the 0.01 level (2-tailed).

Table 9. Correlation between received training and food contaminants knowledge of food handlers

		Received training	food contaminants knowledge
Received training	Pearson Correlation	1	.769**
	Sig. (2-tailed)		.000
	N	60	60
food contaminants knowledge	Pearson Correlation	.769**	1
	Sig. (2-tailed)	.000	
	N	60	60

**Correlation is significant at the 0.01 level (2-tailed).

Table 6 shows the answers of nutrition office employees to some questions related to food safety, where 60% of them answered that patients' meals are acceptable, 26.7 said that they are good, while 13.3 said that they are unacceptable. Regarding preparing and bringing food, 86.7% of the staff in the nutrition department said that it is prepared inside the hospital kitchen, while 13.3 of them said that it is from outside the hospital. Also, 91.1 of them responded that the hospital kitchen does not meet the standard standards, as only 8.9% reported that the kitchen in their hospitals meets the required standards Regarding the number of workers, whether it is sufficient for the work, 46.7% answered that it is sufficient for the workflow, while 53.3% answered that the number is not sufficient. Tables 7, 8 and 9 above show significant relationship among the age groups, education level, received training and the level of food safety knowledge of food handlers.

Discussion

The research shows that many workers (25%) are uneducated, which means that they have not received any food safety training (35%), their knowledge about food hygiene is poor. It is also the result conform (46.7%) that those who have received training in food safety are ignorant of much of the correct knowledge that enables them to perform in the correct ways, Also, some workers in the nutrition office (44.4%), did not receive appropriate training on food safety, and some of them (33.3%) reported that they do not follow up on guidance for workers on things that help food safety and not following up to renew health cards (31.1%) This has a negative impact on the safety of the foods provided to patients. In addition, some observations during visits to various work sites confirmed some wrong practices in preparing and distributing foods. Also, many kitchens are not standardized for practicing work in preparing and distributing foods in a healthy way.

Conclusion

Because of the results shown by this study, food handlers in a number of hospitals do not have sufficient information about the correct methods for preparing and distributing food, which requires training and follow-up from the nutrition office. Continuous training must also be followed up and programs must be created to ensure the continuation of this.

Recommendations

There must be training regarding food health and safety, whether formal or not, creating an education program about food hygiene for all employees.

One of the conditions for employment is that the worker must be educated. Follow up on the hospital administration in implementing the quality program due to its importance in food safety. The importance of the nutrition office's employees following up on workers inside the kitchen, paying attention to the standard structure of kitchens.

Acknowledgements

Thanks go to all the workers and facilitators of educational operations in the Ministry of Health, Khartoum State, and all the hospital workers who serve patients in the concerned hospitals morning and evening.

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