

Knowledge, Attitudes and Practices of Restaurants Workers Towards Food Safety and Food Borne Diseases in Khartoum State Between June 2016 and March 2020

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Abstract

A Descriptive Cross-sectional, Restaurants based, study was conducted for 360 food handlers in 96 restaurants, in Khartoum state, between June 2016 and March 2020 The general objective is to study assess of Knowledge, Attitude and Practice concept of restaurants workers about food safety and food borne disease.

Data were collected from food handlers by using Adapted verbal autopsy questionnaire, The relationship between variables were computed using the chi-square test and p value less than 0.05 was considered significant The odd ratio and its 95% confidence interval were computed ., knowledge about Transmission of foodborne diseases found significant risk factors for isolated intestinal parasite of food handlers(p value 0.041, odd ratio = 2) .

In conclusions, Knowledge about Transmission of foodborne diseases is found significant risk factors for the isolated intestinal parasite of food handlers and the attitude toward training and learning about food safety is found significant risk factors for isolated intestinal parasite of food handlers and also The locality found a significant association with isolated parasite stool sample .

Therefore the main recommendations are: More deductive research is needed to contribute further to the understanding of food handlers' practices and attitudes in order to further reduce intestinal parasitic infections in food handlers, and Continuous medical checkup of food handlers should be mandatory to more alleviate the Prevalence of intestinal parasites.

Introduction

Food is essential to human life but if contaminated can cause illness or even death [1]. A food handler (F H) is one who manufactures, processes, prepares, packages, or distributes the food to consumer [2]. The world health organization (WHO) mentioned that the food handler is involved in the whole process of food safety from farm to fork [3,5,6]. An unhygienic practice during food preparation, handling and storage creates the conditions that allow the proliferation and transmission of disease-causing organisms such as bacteria, viruses and of their poor knowledge of safe food handling [7]. Food handlers with poor personal hygiene working in food establishments could be potential sources of infections of many intestinal helminthes other food-borne pathogens [8, 9]. Intestinal parasitic infections cause significant problems in individuals and public health, particularly in developing countries, with a prevalence rate of 30-60% [11]. Transmission of intestinal parasites that occurs directly or indirectly through food, water or hands indicates the importance of fecal-oral human-to-human transmission [12, 13].

In industrialized countries, infected food handlers are an important source of food borne disease. Ingestion of infected food can result in mild to severe illness, hospitalization or even death [4]. Diseases with short incubation periods are more likely to be detected and attributed to infected food than those with longer incubation periods where the individual may not associate their illness with the ingestion of infected food [17]. In Africa poverty is the underlying cause of consumption of unsafe food [10]. Lack of access to potable water, poor government structural arrangement, communicable diseases, trade pressure, and inconvenient environmental conditions are notable reasons [14, 15, 16]. High incidences of diarrheal diseases among children are indications of the food hygiene situation in the African region [18].

Problem statement

Foodborne diseases are responsible for the majority of mortality and morbidity worldwide with up to 30% of population in industrialized countries suffering from foodborne illness annually [19,20]. According to the Centers for Disease Control and Prevention (CDC) update in 2017, each year about 50 million people succumb to food-based ailments, leading to the death of an estimated 3,000 people [21, 22, and 23]. Food borne diseases are common in developing countries including Sudan because of the prevailing poor food handling and sanitation Practices, inadequate food safety laws, weak regulatory systems, lack of financial resources to invest safer equipment, and lack of education for food handlers [24,25]. In Khartoum state food poisoning, was the third disease to be treated in the health unit of the state, the reports have reflected an increase in the number of treated cases in 2013 [27, 28]. The annual total number cases of food poisoning in Khartoum state in 2012 was 4448 cases, was increased compared to the number of cases in 2011, 4298 [29].

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Justification

Millions of people become sick each year and thousands die after eating contaminated or mishandled foods. It is observed that there is an increasing number of food premises in Khartoum state because it is becoming a profitable business [30, 31]. Khartoum State is expanding very rapidly due to rapid urbanization, and industrialization and influx of people from another state globally the prevalence of people eating away from home has increased. Due to this fact, most of the people take their meals out said their homes [32, 33, 34]. When food is cooked on a large scale, it may be handled by many individuals and thus increasing the chances of contamination of the final food, unintended contamination of food during large scale cooking, leading to food-borne disease outbreaks can pose danger to the health of consumers and economic consequence for nations [6].

Research questions

What are the food handlers' knowledge, attitudes, and practices and associated risk factors that can affect food safety and lead to food born diseases (parasitic diseases)

Objective

To assess the KAP of restaurants workers towards food safety and food borne diseases in Khartoum State.

Material and Method

Study design

A Descriptive Cross-sectional, restaurant based study conducted in Khartoum State.

Study period

From June 2016 to March 2020

Study area

Khartoum state is the capital of Sudan, located in approximately northern east area of the central part of In Khartoum state there are 960 restaurants and 3633 worker in these restaurants.

Study population

Food handlers in restaurants of Khartoum state (960 restaurants) and (3633 Workers)

Sampling

Sample size for food handlers is calculated according to following formula:

$$n = \frac{N}{1 + N(e)^2}$$

$$1 + N(e)^2$$

Name of locality	Number of unites	Number of restaurants in locality	Number of food handlers in locality	PPS% Of restaurants	PPS% Of handlers	estimate number of sample (handlers)	RESTURANTS
Khartoum	15	233	1732	24	47.7	172	23
Omdurman	15	167	516	17	14.2	51	17
Bahry	20	65	108	7	3	11	7
Karey	12	98	348	10	9.5	34	10
Shargalneel	16	148	422	15	11.6	42	15
Gab awlia	16	92	130	10	3.5	13	9
Ombada	19	157	377	16	10.5	38	16
Total	113	960	3633	100	100	360	96

The distribution of restaurants and food handler in Khartoum state localities' and Sample size for both restaurants and food handlers.

Sample size for restaurants

96 restaurants were included (10%) of total restaurants in Khartoum state; restaurants are selected by using simple random sample.

The distribution of restaurants and food handler in Khartoum state localities' and Sample size for both restaurants and food handlers

Table

Method of data collection

Face-to-face: interviews were conducted using structured questionnaire for collecting information from food handlers covering four items

Socio demographic data include age sex place of residence, level of education duration of work.

Knowledge about food borne diseases including the common food diseases, methods of transmission and knowledge about food hygiene

Attitudes about food borne diseases prevention

Practices of food handlers regarding prevention of food borne diseases.

Data analysis and presentation

Data was coded, cleaned, entered, analyzed by using SPSS version 20, Descriptive statistics were used to determine frequencies and percentages. The relationship between variables was computed using chi-square test and p value less than 0.05 was considered significant.

Results

A total of 360 Food handlers were participated in this study. Nearly half of food handlers (74%) are working in Khartoum locality while few of them are working in Jabal_awliya. (86.1%) were male and (13.9%) female; most of food handlers were Sudanese (78.9%) (Table 1).

Regarding age (9.2%) of food handlers were in the age group Less than 18 years followed by 18 - 20 years, 21-30year (34.4%), (33.9%) respectively and 3.6 more than 40 years (Table 2).

Nearly half (46.1%)of food handlers have secondary school, (33%) primary school university, 10.3% of food handlers have university education and lower percentage show in Khailwa and Illiteracy (Table 3).

The Figure shows Place of residence Most of food handlers of study sample (84.4 %) were staying outside of restaurant and (15.6%) were staying in restaurant (Figure 1).

Figure 2 (78.9%) of Food handlers wash their hands after blowing nose while only (20.8%) wash their hands when starting the shift.

The table shows majority of food handlers (90.4%) reported (yes)

Table 1: Shows Demography characteristics of food handlers of study sample.

Localities	Freq.	%
Khartoum	172	47.8%
Bahri	11	3.1%
Omdurman	51	14.2%
Obadiah	38	10.6%
Karari	34	9.4%
Shareq_Alneel	41	11.4%
Jabal_awliya	13	3.6%
Total	360	100%
Gender		
Male	310	86.1%
Female	50	13.9%
Total	360	100%
Nationality		
Sudanese	284	78.9%
NotSudanese	76	21.1%
Total	360	100%

Table 2: Shows Age group of food handlers of study sample.

Age group	Freq.	%
Less than 18 years	33	9.2%
18-20 years	124	34.4%
21-30 years	122	33.9%
31- 40 years	68	18.9%
Above 40	13	3.6%
Total	360	100%

Table 3: Shows Education level of food handlers of study sample.

Education level	Freq.	%
University	37	33.3%
Secondary	166	46.1%
Primary	120	10.3%
Khailwa	17	4.7%
Illiteracy	20	5.6%
Total	360	100%

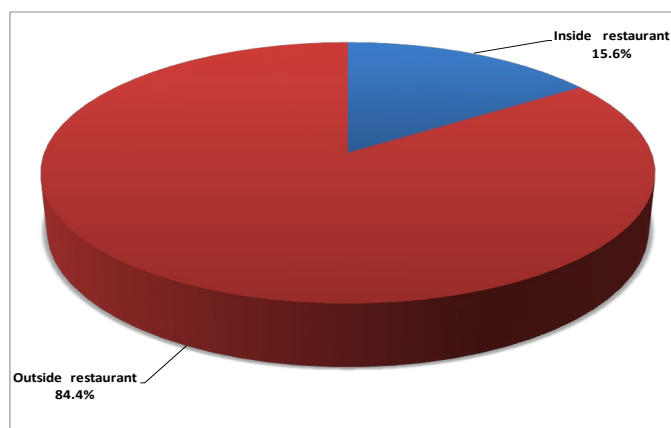


Figure 1: Place of residence of food handlers of study sample.

regarding relationship between food and disease. Half of food handlers said correct answer (51.4%) about most common food borne disease while 48.6 does not know most common food borne disease, Regarding Transmission of food borne diseases (61.7%) of food handlers knew Transmission of food borne diseases while 38.3% does not know (Table 4).

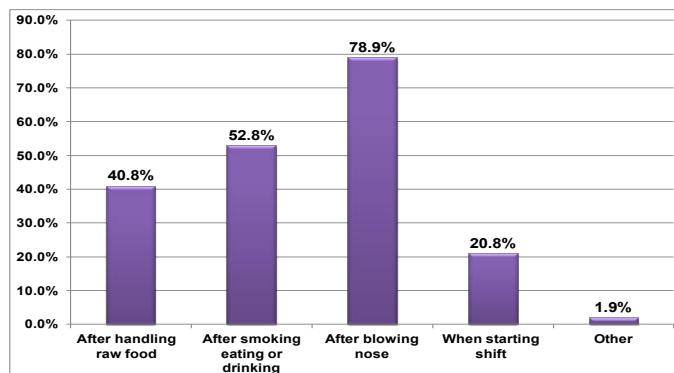


Figure 2: Shows food handlers of the study sample wash their hands.

Table 4: Shows the Knowledge about food borne disease among food handlers of the study sample.

Items	Frequency	Percent
Relation between food and diseases		
Yes	324	90.4%
No	36	10%
Most common food borne disease		
Correct answer	185	51.4%
Wrong answer	175	48.6%
Transmission of food borne diseases		
Correct answer	222	61.7%
Wrong answer	138	38.3%

Table 5: Shows Attitude towards food borne disease among food handlers of the study sample.

Items	Frequency	Percent
Safe food handling is an important part of your job responsibilities		
Agree	334	92.8%
Disagree	26	7.2%
Training and learning about food safety is important to you		
Agree	320	88.9%
Disagree	40	11.1%
Using caps masks, gloves and adequate clothing reduce the risk of food contamination		
Agree	308	85.6%
Disagree	52	14.4%
Un proper storage of food may be hazardous to health		
Agree	345	95.8%
Disagree	15	4.2%
Food handle with abrasion or cuts finger or hand should not touch un wrapped foods		
Agree	301	83.6%
Disagree	59	16.4%

The table shows (92.8%) of food handlers reported (agree) regarding Safe food handling is an important part of your job responsibilities while (7.2%) said disagree. (85.6%) of food handlers reported agree about using caps masks protective gloves and adequate clothing reduce the risk of food contamination while (14.4%) said disagree (Table 5).

Most of food handlers reported agree (88.9%) about training of food safety while (11.1%) reported disagree.

Most of food handlers (95.8%) reported agree about un proper storage of food may be hazardous to health and (4.2%) said disagree, and most of them (83.6%)reported agree about Food handle with abrasion or cuts finger should not touch un wrapped foods while (16.4%) reported disagree .

The table shows that the majority (85.3%) of food handlers were washing their hands with soap and (14.7%) with water only. most of food handlers (82.8%) do not use same knife for raw food, only (17.2%) use same knife for raw food. Regarding smoking only (6.7%) of food handlers were smokers and (93.3%) do not smoke (Table 6).

The table show knowledge of Relation between food and diseases and knowledge about most common food borne disease were not significant risk factors for isolated intestinal parasite. While knowledge about Transmission of food borne diseases is significant risk factors

Table 6: Shows the Practices of food handlers of the study sample.

Characteristics	Frequency	Percent
Washing hand practices		
Washing with soap	307	85.3%
Washing with water only	53	14.7%
Use same knife for raw food		
yes	62	17.2%
no	298	82.8%
Use same clothes for raw an ready to eat food items		
Yes	122	33.9%
No	238	66.1%
Do you Smoking		
Yes	24	6.7%
No	336	93.3%

for isolated intestinal parasite of food handlers (p value=.041, OR = 2) (Table 7).

The occurrence of parasites odds in food handlers does not know transmission of food disease was 2 times higher than odds occurrence of parasites in food handlers know transmission of food disease.

Table shows practice about washing hands (p value =.354,OR =1.5) use same knife, use same cloths (p value =.06, OR =.505) and smoking (p value =.634, OR =.737) were found No significant risk factors for isolated parasites of food handlers (Table 8).

The result show significant risk factors association between attitude toward Training and learning about food safety and isolated intestinal parasite (p value = .020, OR=2.713) (Table 9).

observed the food handlers reported agree about Training and learning about food safety are less likely to intestinal parasite disease or food handlers reported disagree are 2 time higher risk to intestinal parasite disease. Other attitude items are found not significant risk factors (like Safe food handling is an important part of your job responsibilitiesp value = .717 OR=.760 Using caps masks,gloves and adequate clothing reduce the risk of food contamination, p value = .046 OR=.2,270, Un proper storage of food may be hazardous to healthp value = .170, OR=.2,445 Food handle with abrasion or cuts finger or hand should not touch un wrapped foodsP-value = ..899OR=.1.062) for isolated intestinalparasite.

Discussion

This study was conducted in Khartoum state on 360 food handler in 96 restaurants

The present study provides critical information about the level of knowledge, attitudes, and practices of food workers about food safety

Table 7: Shows the association between knowledge about food borne diseases and isolated intestinal parasites of food handlers of the study sample.

Characteristics	Positive	Negative	Chi square	p-value	A OR(95%CI)
Relation between food and diseases					
Yes	9.0%	91.0%	2.197	.138	2.034(.782-5.292)
No	11.1%	88.9%			
Most common food borne disease					
Correct answer	10.3%	89.7%	130	.718	.879(.437-1.770)
Wrong answer	9.1%	90.9%			
Transmission of food borne diseases					
Correct answer	7.2%	92.8%	4.174	.041	2 (1.018-4.149)
Wrong answer	13.8%	86.2%			

Table 8: Shows the association between practices of food handlers of the study sample and isolated intestinal parasite.

Characteristics	Positive	Negative	Chi square	p-value	A OR(95%CI)
Washing hand practices					
Washing with soap	9.1%	90.9%	.860	.354	1.5 (.626-3.67)
Washing with water only	13.2%	86.8%			
Use same knife for raw food					
Yes	12.9%	87.1%	.863	.353	.673(.290-1.560)
No	9.1%	90.9%			
Use same clothes for raw an ready to eat food items					
Yes	13.9%	86.1%	3.70	.06	.505(.250-1.20)
No	7.6%	92.4%			
Do you Smoking					
Yes	12.5%	87.5%	.226	.634	.737(.208-2.606)
No	9.5%	90.5%			

Table 9: Shows the association between attitude of food handlers of the study sample and isolated intestinal parasites.

Items	Positive		Chi square	p-value	A OR(95%CI)
Safe food handling is an important part of your job responsibilities					
Agree	9.9%	90.1%	.132	.717	760 (.172-3.361)
Disagree	7.7%	92.3%			
Training and learning about food safety is important to you					
Agree	8.4%	91.6%	5.416	.020	2,713(1.37-6.471)
Disagree	20%	80%			
Using caps masks ,gloves and adequate clothing reduce the risk of food contamination					
Agree	8.4%	91.6%	3.984	.046	2.270(.997-5.170)
Disagree	17.3%	82.7.4%			
Un proper storage of food may be hazardous to health					
Agree	9.3	90.7	1.884	.170	.2,445(.656-9.121)
Disagree	20	80			
Food handle with abrasion or cuts finger or hand should not touch un wrapped foods					
Agree	9.6%	90.4%	.016	.899	1.062(.420-2.683)
Disagree	10.2%	89.8%			

in restaurants of Khartoum state, an important finding of the present study was that [35, 36].

Almost all respondents had good knowledge about food borne diseases; regarding the question of knowledge about Transmission of food borne diseases are found significant risk factors for the isolated intestinal parasite of food handlers. Other questions like knowledge of Relation between food and diseases and knowledge about Most common food borne the disease is not a significant risk factors for isolated intestinal parasite this is agreed with other studies conducted in Italy [37,38]. This study revealed that most of the food handlers who were negative for the parasite had high knowledge for all questions of food borne diseases. This means high knowledge lead to the low prevalence of parasites disease [39].

Attitude is a crucial factor that may impact food safety behavior and practices of food handlers, thus decrease the incidence of food borne illnesses [40, 41]. Attitude is an essential factor in food handling because it is the main link between Knowledge and practices; workers who do have knowledge is more likely to translate them into practices if they have a positive attitude, and vice versa [42,43]. This study found significant risk factors association between attitude towards training and learning about food safety and isolated intestinal parasites, The result observed the food handlers reported agree about Training and learning about food safety are less likely to intestinal parasite disease or food handlers reported disagree are 2 times higher risk to intestinal parasite a disease that same The study was conducted among food handlers in Kuwait restaurants [44]. Also that same The study was conducted among food handlers in Italy A positive attitude toward food borne diseases control and preventive measures were reported by the great majority of food handlers, and it was more likely achieved by those who had attended education courses Regarding the question of using caps, masks, gloves and adequate clothing reduces the risk of food contamination is found to be not a significant risk factors for isolated intestinal parasite, most food handlers who had negative for parasite were reported agree about using caps masks, gloves, and adequate clothing [45,46,47]. This means that they have good attitude

toward using protective equipment. In a study conducted in Catanzaro, Italy (69.1%) of food handlers believed and agreed that it was necessary to wear protective gloves while handling unwrapped raw or cooked foods reduces the risk of foodborne diseases [48]. in a study of food service staff in Al Madinah hospitals, Saudi Arabia. Majority of staff (81%) wore gloves when handling food during preparation Majority of staff also indicated that they always used a mask (70.6%) and a head cap (82.2%) when preparing and distributing food. Staff also reported the correct way of washing hands (70.6%) [49]. Other attitude items are found to be not significant risk factors for isolated intestinal parasites. Safe food handling is an important part of your job responsibilities and un proper storage of food may be hazardous to health Food handle with abrasion or cuts finger or hand should not touch unwrapped foods that same The study was conducted to evaluate attitudes, concerning foodborne diseases and food safety issues among food handlers in Italy statement of food handlers with wounds or cuts on hands should not be handling foods was approved by 70.1% of participants. Also, 75.6% of respondents strongly agreed that food handlers should not come to work when sick found that almost (85%) of their food staff were aware of the danger of touching foods with cuts on hands or fingers [50].

The present study revealed no significant risk factors association between the practice of washing hand and an isolated intestinal parasite that the same study in food handler in restaurant Khartoum west administration unit . the study was conducted to evaluate attitudes, concerning food borne diseases and food safety issues among food handlers in Italy was found they were washing hands before preparing food reduces the risk of food poisoning (97.3%) . Regarding practices of using the same knife and use same clothes are found no significant risk factors for isolated parasite of foodhandlers. This study no significant association between practices of smoking and isolated parasite of food handlers that same results of the study conducted in restaurants in Khartoum west administration unit .

The education level of food handlers is generally perceived as one of the factors that compromised food safety and hygiene. In this study, no relationship between the level of education and isolated parasite

stool sample observed that a vast percentage of food handlers who have secondary and university and Khailwa's education found to be negative. In another study a significant association was observed between the educational level of food handlers and parasitic infection assuming that they were highly aware of the importance of personal hygiene. Similar results were obtained in a study on Jakarta sidewalk food vendors. Literacy level reduces the number of positive samples; in other words, there is an It could be interpreted that if the literacy rate increased, then awareness about parasitic infections will also increase. Therefore, the lower need for health advice and better compliance with sanitary regulations will be achieved, as noted in other studies. These facts emphasize the need for education which is important for training of such workers.

Conclusion

The study concluded the following

Knowledge about Transmission of food borne diseases is found significant risk factors for isolated intestinal parasite of food handlers.

Knowledge of the relation between food and diseases and knowledge about the common food borne disease are not significant risk factors for an isolated intestinal parasite.

The attitude toward training and learning about food safety is found significant risk factors for isolated intestinal parasite of food handlers. Other attitude items are found no significant risk factors like Safe food handling is an important part, Using caps masks, gloves and adequate clothing reduces the risk of food contamination, Un proper storage of food may be hazardous to health, Food handle with abrasion or cuts finger or hand should not touch unwrapped foods)

Practice about washing hand use the same knife, use the same cloths and smoking is found no significant risk factors for isolated parasite of food handlers.

Recommendation

Recommendations are suggested

To Federal ministry of health further studies should be undertaken on the prevalence of intestinal parasite infections and associated risk factors, and also ensure from an equal distribution of free health services. More deductive research is needed to contribute further to the understanding of food handlers' practices and attitudes in order to further reduce intestinal parasitic infections in food handlers.

To locality authority Increasing the knowledge and awareness of food handlers via providing information about food contamination related to intestinal parasitic infections and transmission of food borne diseases by the role of health promotion section in the locality

To restaurants owner improvement of environmental sanitation to control the parasitic infection in food handlers and construct hand washing facilities inside the latrine, and it is better if the supervisors and managers were trained and certified food handlers.

To restaurants owner Training must be given to food handlers on personal hygienic conditions (like finger trimming and hand washing after toilet and before having contact with food with water and soap). The training should not only focus on theoretical aspects, but should also be practical and foster positive attitudes towards food-safety practices, and be part of an established food-safety culture. The support and positive reinforcement and motivation are given to food handlers by supervisors, managers, and trainers are extremely important to the success of food safety training.

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