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## Study of Customers, Knowledge, Attitude and Practices towards Food Hygiene and Safety Standards of Handlers in Food Facilities in Dilling locality (South Kordufan state– Sudan)

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### Abstract

A cross-sectional study was conducted to explore knowledge, attitude and practices of customers regarding the practices of food facilities as well as potential associated factors with knowledge, attitude and practices (KAPs), in Dilling locality, South Kordufan state–Sudan, from December 2018 to December 2019. A total of 200 customers were selected randomly for a questionnaire in Dilling University. A questionnaire was designed and random selection was used. The Chi square test was used to identify the positive relation between knowledge about food hygiene and safety among customers in food facilities and how to avoid risk of foodborne illness, and positive correlation ( $R=0.630$ ) by using simple correlation. Food facilities and monthly income showed a significant difference ( $p=0.025$ ). Most of customers considered the processing and selling of hygienic meals without leaving any food overnight as the most important feature in food facilities (42%). About 56.5% of participants chose reporting to concerning authorities. Most of handlers (35%) who work in food facilities are at a stage of secondary education. The higher score of knowledge was found in the group of people who were single, and had specific criteria when choosing their place to eat. The management and awareness of customers in food facilities because they are responsible for maintenance of hygienic standards. Keeping food will be safe and a number of foodborne diseases will be eradicated.

Keywords: Customers, Food hygiene, Dilling locality.

### Introduction

Foodborne disease, which results from consuming food having contaminants of viruses, bacteria, parasites, and allergens, have been a seemingly threat to public health and significant hindrance to the development of socioeconomic worldwide. Most countries have been worried about foodborne diseases nearly in developing countries due to food problems reported cases economic and social costs effect around the world (Zhao *et al.*, 2001). The microorganisms in different parts of food, carried out on food from original animal, and poultry products, contribute significantly to foodborne diseases in humans during processing, a high proportion of these organisms will be removed and will result in reducing the incidence of illnesses but further contaminations may occur at any stage of processing operation (Kabour, 2011). In Sudan Ministry of health, south Kordofan state, Dilling locality (2017) reported that incidents of Diarrhea Disease that affected about 6,815 people, and reported about 293 incidents of Cholera affected people and the mortality about 33 cases. These numbers might just be an underestimation, since there were potentially many cases uninvestigated in the communities.

Personal hygiene is critical in preventing contamination of food and foodborne illness, they must wash their hands properly to prevent contaminating other foods, and surfaces

they touch (Medeiros *et al.*, 2001). In Sudan, Siham *et al.*, (2010) recorded that all persons in contact with food and food products must know hygienic practices during their duty to prevent the food and its products from contamination. Gould (1994) reported that all handlers must have participated in training program in personal hygiene, good manufacturing practice, and disinfection procedures before training to work in the plant. All that food, farmers, food producers, individuals who work in markets and food service establishment, and other food prepare have a responsibility to keep food as safe as possible. Training helps to improve overall employee knowledge of food safety (Howes *et al.*, 1996; Costello *et al.*, 1997; Finch and Daniel *et al.*, 2005; Roberts *et al.*, 2008). The aim of the paper to explored knowledge, and practice of customers regarding food facilities.

### Materials and Methods

Study area: This survey were conducted from December 2018 to December 2019 in food facilities in Dilling locality, south Kordufan state-Sudan.

Questionnaire:

Questionnaire was composed of 200 participants (Students, office workers, housewives, other jobs who directly involved in food facilities. Data were collected through face to face interviews using structures of questionnaire, conducted with students of Dilling University, employees, workers, and The collected information consist of socioeconomic characteristics (i.e., gender, education attainment, material status, employment, and household income), habit in visiting food facilities (i.e., frequency of visiting food facility, feeling secure when eating out, and criteria when choosing facility), what customers considered the most important feature for food facility, and reported to concerning authority when problems of food hygiene regulation at food facilities, and two additional questions concerning to recommendations in the food facilities. In terms of knowledge about hygienic practice of handlers in food customers to report their perceptions about use chopsticks/tongs/knives for raw and cooked food and necessary of having trash and clean water and hygienic requirement for water, trash, and food handlers, and effects of cleaning food processing places or keeping food in glass cabinets.

Statistical Analysis:

The generated data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 20.0, IBM /SPSS. Frequencies were calculated for all variables. Descriptive statistic were performed and analysis of variance (ANOVA). The association between knowledge about food hygiene and safety and criteria when choosing food facilities and socioeconomic information, p-value less than 0.05, was considered as statistically significant.

### Results

Table 1 showed the most respondents were females (52.5%). Approximately more than 50% of the participants were single, indicative that the most respondents eating out, while the divorced/widow were 5%, and who married were 45%. The educated people were 34% in college/University, while illiterate and after graduate were 11%. The primary education was 17.5%, and secondary education were 13%. About 25% of them were students, and 22% were office worker, while 21% housewife, but 15% workers, and only 8% were un employments. In Household income, 60% of respondents had middle income, the poor 26%, the rich 11%, and only 2.5% were richest. About 65% of respondents were no using catering services and 35% of them were using catering services. About 65% of respondents were not feeling secure when eating out, and 36% of them were feeling secure when eating out. The respondents using street vendors were 53

%. While 21.5% using other food, Dining but 18% of them using restaurants, and just 7.5% were using fast food.

Table 1: Demographic characteristic of customers (n=200) in Dining locality, south Kordufan state- Sudan

Gender	Frequency	Percent
male	95	47.5%
female	105	52.5%
Marital status		
single	100	50%
married	90	45%
divorced	10	5%
Education		
illiterate	22	11%
primary school	35	17.5%
secondary school	26	13%
high school	27	13.5%
college/university	68	34%
after graduation	22	11%
Employment		
student	50	25%
worker	16	8%
office worker	42	21%
retire	6	3%
housewife	31	15%
unemployment	10	5%
other jobs	45	22%
Household income		
poor	53	26.5%
middle	120	60%
rich	22	11%
richest	5	2.5%
Frequently using catering services		
Yes	70	35%
No	130	65%
Feeling secure when eating out		
Yes	72	36%
No	128	64%
Type of current food facility		
fast food	15	7.5%
restaurant	36	18%
street vendor	106	53%
others	43	21.5%

Table 2 revealed that only 9.5% of respondents were using chopsticks or tongs to pick cooked food, while most (90.5) were not using chopsticks or tongs to pick cooked food. The most of respondents (73%) using separate knives for raw and cooked food, while only 27% of them were. About 93% were processing food at least 60cm from the ground, approximately 49.5% of respondents said that found positive effects of containing food

in glass cabinets, and 74.5% were tested water once year. Hygienic requirements of cooking food registered, 96.5%,90%, 88% in people, water, and trash respectively.

Table 2: The procedures of knowledge about food hygiene and safety among customers (n=200) in foodfacilities in Dilling locality, south Kordufan state- Sudan.

NO	The statements	Yes		NO		Mean	SD
		Freq.	%	Freq.	%		
1	Use chopsticks or tongs to pick cooked food.	181	90.2	19	9.5	1.10	0.294
2	Use separate tongs and knives for raw and cooked foods.	146	73	54	27	1.27	0.445
3	Processing food at least 60 cm from the ground.	186	93	14	7	1.07	0.256
4	Be able to list the positive effects of containing food in glass cabinets	99	49.5	101	50.5	1.51	0.501
5	Water should be tested once a year.	149	74.5	51	25.5	1.30	0.521
6	Be able to list hygienic requirements for water used for cooking.	180	90	50	10	1.10	0.301
7	Be able to list hygienic requirements for people cooking food.	193	96.5	7	3.5	1.04	0.184
8	Be able to list positive effects of cleaning or keeping hygiene in places where food is processed.	179	89.5	21	10.5	1.11	0.307
9	Be able to list hygienic requirements for a trash.	176	88	24	12	1.12	0.376
Cronbach's alpha		0.79					
Mean		1.18					
Standard deviation (SD)		0.123					

Table 3 showed about 35% were chose food with clean and certified by the food safety authorities, and 8% of them chose the facilities with clean places for preparing food. About 18% of respondent separated raw and cooked food,12% of them do not leaving food on the ground. The people who used toxins for mouse and cockroach in the food processing place were 10%, 42% of people chose freshness and cleanliness food as important feature but 56.5% of them were choosing a report to the local agency if finding food facilities violating food hygiene and safety regulations

Table 3: The criteria of cleaning and safety regarding food facilities of customers(n=200) in Dilling, south Kordufan state – Sudan.

NO	Statements			Female		Total	
		Freq.	%	Freq.	%	Freq.	%
1	Clean facilities, with a certificate of food hygiene and safety.	40	57	30	43	70	35
2	Clean-looking facilities, no need to have a certificate of food hygiene and safety.	18	53	16	47	34	17
3	Having clean food processing places.	8	50	8	50	16	8
4	separating raw food and cooked food	18	50	18	50	36	18
5	No, leave food on the ground	13	54.2	11	45.8	24	12

6	Use drugs on mouse and cockroach killing in the food processing places.	8	40	12	60	20	10
	Cronbach's alpha	0.79					
	Mean	2.85					
	Standard deviation	1.767					
	The most important feature for food facilities: -						
	NO Statements	Male		Female		Total	
		Freq.	%	Freq.	%	Freq.	%
1	Food processing and selling during a day with good hygiene and safety.	38	45.2	46	54.8	84	42
2	Have reasonable prices.	32	43.2	42	56.8	74	37
3	Sellers have good attitudes and are professional.	17	63.4	9	34.6	26	13
4	Others.	8	50	8	50	16	8
	Cronbach's alpha	0.83					
	Mean	1.87					
	Standard deviation	0.926					
	reporting to the concerning authority if finding food facilities violating food hygiene and safety regulations:						
	NO Statements	Male		Female		Total	
		Freq.	%	Freq.	%	Freq.	%
1	Yes	48	42.5	65	57.5	113	56.5
2	No	47	54	40	46	87	43.5
	Cronbach's alpha	0.83					
	Mean	1.87					
	Standard deviation	0.926					

## Discussion

In the present study (Table 1) the majority of respondents (52.5%) were females, indicated that the most females work in cook food and food facilities, while 50% of them were single, indicated that the most of respondents eating out. About 34% were students in college/University, indicated that the most of students eating in restaurants or street food, and had good knowledge and practices of food hygiene in food facilities. This may reflect that the participants may be potentially able to understand the basic of food safety if they were trained. This result in agreement with the result of Tran *et al.*, (2018). In household income 60% of respondents had middle income, indicative that people in Dilling locality -Sudan were equal with the economic income. About 65% were using catering services, but 64% of them not feeling secure when eating out, which indicated that there were poor hygiene practice and hygienic requirements in the food facilities. Only 9.5% of interviewed were using chopsticks or tongs to pick cooked food, this may reflect that, the chopsticks is not used and available for them. In the result (Table 2) the majority of customers had good knowledge about practice with raw and cooked food, as well as environmental practice when processing food, indicated that more than 73% of customers understood the necessity of food separating kitchen cutlery for raw and ready to eat foods. This result in agreement with the result of Abdalla *et al.*, and (2010) Siham *et al.*, (2010).

Among 200 customers, (R=0.630) there were positive correlation between knowledge about food hygiene and safety among customers in food facilities and avoided foodborne illness (table 2), and there were significant difference between criteria when choosing food facilities and monthly income (P-value=0.025). Also 50.5% of respondents

understand the positive effect of containing food glass cabinets, this may reflect that the people in that area need trained and courses about knowledge attitude and practice and hygienic requirements in the food facilities. In this result (Table 3) the criteria for choosing food facilities 35% of respondents were cleanliness and certified by the food safety authority, while only 8% of them chose food facilities without certificate from food safety authorities. About 18% were separate of raw and cooked food, but 12% were no laved food on the ground, about 42% customers reported freshness and cleanliness of the food served as the most important feature for the food facilities (Herson *et al.*, 2006). Assessment of food safety requirements, that reported the safety of meal were predominately trait affecting the decision dining outside, while the most important feature were reported cleanliness of the kitchen, utensils, dining area and restrooms, this result in agreement with the result of Lee *et al.*, (2012). About 56% of customers reported back to the concerning authority when the food facilities violated in the hygiene and safety regulation.

In conclusion, it necessity that public health officers should ensure that food handlers undergo medical screening on periodical bases and certificates to them. Basic training in personal, cooking and food hygiene needed for food handlers, as well as raising the people awareness of environmental requirements for food facilities.

### References

- Abdalla, M.A., Sihame E. Suliman, and Y.Y.H.A. Alian (2009). Microbial Contamination of Sheep Carcasses at Modern Slaughterhouse in Khartoum State. *Sudan Journal of Veterinary Science and Animal Husbandry*, 48(1&2): 51- 56.
- Castello, C.; Gaddis, T.; Tamplin, M.; and Morris, W. (1997). Evaluating the effectiveness of two instructional techniques for teaching four food safety principles to quick service employees. *Journal of Food Service Systems*, 10(1): 41-50.
- Finch, C. and Daniel, E. (2005). Food safety knowledge and behavior of emergency food relief organization workers: Effects of food safety training intervention, *Journal of Environmental Health*, 67(9): 30-34.
- Gould, W.A. (1994). *Current Good Manufacturing Practices Food Plant Sanitation 2nd edition* (T) publications Inc., Baltimore, MD, USA
- Henson, S.; Majowicz, S.; Masakure, O.; Sockett, P.; Jones, A.; Hart, R. (2006). Consumer assessment of the food safety of restaurants: The role of inspection notices and other information cues. *J. Fat*, 26, 275-301.
- Howes, M., McEwen, S., Griffiths, M. and Haris, L. (1996). Food handler certification by home study: measuring changes in knowledge and behaviour. *Dairy Food Environmental Sanitation* 3: 208-214.
- Kabour (2011). The microorganisms in different parts of food, carried out on food from original animal, and poultry products, contribute significantly to foodborne diseases in humans during processing.
- Lee, L. E. Niode, O. Simonnee, A.H. (2012). Consumer perception on food safety in Asian and Mexican restaurants. *Food Control*, 26, 531-538.
- Medeiros, L., Hillers, V., Kendall, P., and Mason, A. (2001). Evaluation of food safety education for consumers. *Journal of Nutritional Education*, 33(1): 27-34.
- Roberts, K.R., Barrett, B.B., Howells, A.D., Shanklin, C.W., Pilling, V.K., and Brannon, L.A. (2008). Food safety training and foodservice employees' knowledge and behaviour. *Food Protection Trends*, 28(4): 252- 260.
- Sudan Ministry of Health. Joint Annual Health Review (2017). Sudan Ministry of health: Al Dilling, south kordufan state - Sudan.



- Tran, X; Do, H.T.; Nguyen, L. T.; Boggiano, V.; Le, H. T.;T.T.; Trinh, N.B.; Do, K.N.; Nguyen, C.T.; Nguyen, T.T; et al. (2018) Evaluating food safety knowledge and practices of processors and sellers Working in Food Facilities in Hanoi, Vietnam. *J. Food prot.* 81,646\_652.
- Zhao,C.; Beilei, G.; Juan,D.V.; Rebert, S.; Emily,Y.; Shaoha, Z.; David,G.W.; and Jianghong,M.(2001).Prevalence of Campylobacter spp. Escherichia coli and Salmonella samovars in retail chicken, turkey, pork ad beef farm the Greater Washington D.C. area. *Applied Environmental ad Microbiology*, 67 (12): 5431-5436.
- Tran, X; Do, H.T.; Nguyen, L. T.; Boggiano, V.; Le, H. T.;T.T.; Trinh, N.B.; Do, K.N.; Nguyen, C.T.; Nguyen, T.T; et al. (2018) Evaluating food safety knowledge and practices of processors and sellers Working in Food Facilities in Hanoi, Vietnam. *J. Food prot.* 81,646\_652.
- Sudan Ministry of Health. Joint Annual Health Review 2017; Sudan Ministry of health: Al Dilling, south kordufan state - Sudan.
- Zhao ( 2001). food problems reported cases economic and social costs effect around the world.
- Kabour (2011). The microorganisms in different parts of food, carried out on food from original animal, and poultry products, contribute significantly to foodborne diseases in humans during processing.
- Medeiros (2001). Personal hygiene is critical in preventing contamination of food and foodborne illness.
- Gould (1994) reported that all handlers must have participated in training programme in personal hygiene.
- Howes (1996) and Costello (1997); Finch and Daniel (2005); Roberts (2008). Training helps to improve overall employee knowledge of food safety.
- Anh, Tuan. le Ngu. Yen (2018) and Bach, xuan. Traan (2018).Knowledge and practices of food hygiene in food facilities.
- Siham (2014) and Abdalla (2014) and Magda (2014).Knowledge about practice with raw and cooked food, as well as environmental practice when processing food.In Sudan.
- Henson, S. Majowicz, S, Masakure, O. (2006).Freshness and cleanliness of the food served as the most important feature for the food facilities. In Canada.
- Lee. L. E. Niode, O. Simonnee, A.H. (2012).The most important feature were reported cleanliness of the kitchen, utensils, dining area and restrooms. In Americans.