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Knowledge, Attitude and Food Safety Practice among Food Handlers in Kaduna North Local Government Area, Kaduna State, Nigeria

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Abstract

Food safety practices remain poor in Sub-Saharan Africa despite the significant financial burden that outbreaks of food-borne illness have on individuals. Kaduna State recorded cases and mortalities from the most recent cholera outbreak due to food borne diseases caused by poor safety practices from food handlers. Therefore, this study examined knowledge, attitude and food safety practices among food handlers in Kaduna North Local Government Area, Kaduna State. A descriptive cross-sectional design was utilized in this study. The three-stage sampling technique was used to select two hundred and forty-six food handlers. Data was obtained using a 28- itemed validated interviewer-administered questionnaire. For the entire construct, the Cronbach alpha coefficient was 0.75. All statistical tests were conducted at $p \leq 0.05$ level of significance. The result showed majority 219 (89%) of respondents had good level of knowledge, 151 (61.4%) had positive attitude and 157 (63.8%) had good food safety practices. There was a significant relationship between respondents' level of knowledge of food safety practices and their attitude towards food safety practices (r=0.57; p=0.000). Additionally, there was a significant association between respondents' knowledge of food safety practice and food safety practices (r=0.61; r^2=0.372; p=0.00). Further analysis revealed a significant association between respondents' attitude towards food safety practice and food safety practices (r=0.63; r^2=0.402; p = 0.00). In conclusion, findings from this study showed that most of the respondents had good level of knowledge, positive attitude and good food safety practices. Continuous training should be recommended on proper food safety practices by environmental health officers in order to improve their food safety practices.

Keywords: Attitudes, Food handlers, Food safety practices, Knowledge

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Introduction

Food safety practices have a significant impact on one's health (Mensah & Owusu, 2017). According to Williams Richmond (2016), food safety is a branch of science that focuses on the safe handling, preparation, and storage of food in order to reduce the danger of foodborne illness. As a result of this, the World Health Organization (WHO) member states enacted a resolution in 2015 recognizing food safety as a public health problem of concern. The contamination of food can occur at any point throughout its production, transportation, processing and preparation. This emphasizes the importance of food safety and cleanliness in preventing food-borne illnesses.

Due to the significant consequences of food-borne illness outbreaks to individuals, food industries, community health systems and the economy as a whole, the practice of food safety remains crucial. (Egan, Grubb, Lumbers, Dean & Adams, 2017).

Food-borne illness rises continually worldwide with contaminated food causing over 200 diseases, making food safety a global concern (Chapman, Eversley, Fillion, Maclaurin & Powell, 2015). According to the World Health Organization (2015), around 2.2 million annual fatalities globally are caused by food-borne diseases/illness, with 86 % of those being children, in Nigeria. Annually, over 65,000 mortality cases are caused by unwholesome food poisoning and contamination from smoked fish and other contaminated foods. These illnesses caused by foodborne diseases cost more than 12 billion naira ($24 million) each year.

Food handlers/vendors are often blamed for food-borne disease epidemics. In order to half the spread of this disease, these food handling professionals are frequently prohibited and encouraged to adhere to strict food safety/hygiene standards while maintain clean vending environments (Akabanda, 2017).

In July, 2021 in Kaduna state, an outbreak of cholera was recorded due to poor food safety practices and poor water sanitation leading to a total number of 2140 cases in 2 local government areas and a total number of 175 mortality cases, with Kaduna north local government having a higher number of cases (Ibrahim & Ibirogba, 2021).

The Nigeria Centre for Disease Control (NCDC) observed that the cholera outbreak was caused by the consumption and usage of contaminated water and food from/by some food vendors/handlers (Ibrahim & Ibirogba, 2021).

As many of them have untidy hair, unclean foot wears, spit and cough without using a handkerchief or face mask, leave foods exposed to flies in unclean environments and wash utensils in dirty water, it has been observed that many food handlers were nonchalant about adhering to food safety practices.

Due to the aforementioned factors, food contamination with compounds that can cause illness and disease remain common. Thus, immediate corrective actions must be taken to improve the operations of the food vendors and in order to do this, there is a need for formative research on the knowledge, attitude, and food safety practices among food handlers in the Kaduna North Local Government Area.

In Nigeria, food safety is a major concern as the consequences of ingesting contaminated food can be disastrous and lead to diseases such as cholera, Diarrhea, typhoid and other gastro-intestinal disease. Cases of foodborne illness outbreak have proven to cause suffering and stress to humans, the economy, useful workforce and health facilities. Additionally, vast sum of money has been invested in the management of food poisoning which includes establishment of restrictions and policies guiding food vending. However, most African countries ignore these restrictions, allowing food handlers/vendors to expand and self-regulate their businesses, putting the public at risk, especially when they lack expertise and safe practices.

The outbreak of cholera in Kaduna North LGA, which resulted in case fatalities, was a major issue, and this LGA cannot afford to be caught off guard when it comes to food hygiene because they are responsible for protecting both individuals and the community from the harmful effects of food borne diseases. There is little information available on food safety practices among food handlers in Kaduna North LGA. Therefore, the study on the food safety practices of food handlers in

Kaduna North is justified because it seeks to ascertain the level of knowledge, assess the attitude, and identify the level of various practices toward the prevention of food borne illnesses/diseases that may occur as a result of improper food handling.

Methodology

Study design, population and Area
A quantitative descriptive cross- sectional design was used in this study for the collection of data from the population in Kaduna North Local Government Area of Kaduna State without influencing the variables.

Sample size determination and sampling
Total enumeration was used for this study. Only 246 participants among 251 registered food handlers consented to participate in the study, yielding a response rate of 98.0%. Participants for this study were selected using a multi-stage sampling technique.

Data collection technique
A structured, validated and reliable 4-item questionnaire was developed and employed for the gathering of quantitative data. The questionnaire was initially designed in English before being translated into Hausa by language experts.
The variables measured in this study included socio-demographic characteristics of the food handlers/vendors which included their age, gender and level of education. Other measures included Knowledge, Attitudes and Food safety practices.

Results

Sociodemographic Characteristics of the Participants

As shown in Table 1 below, the mean age of respondents was 29.8 ±9.6 years. Less than half 109(43.3%) of the respondents were within ages 17- 26 years. Most 171(69.5%) of the respondents were females. Above a quarter 89(36.2%) of the respondents had secondary education.

Table 1: Socio-Demographic Characteristics of the Respondents

Socio-demographic variables for consideration	**Respondents in this study; N=246**	
	Frequency(n)	**Percentage (%)**
Age (in years) x̄ 29.8±9.6		
17-26	109	44.3
27-36	81	32.9
37-46	41	16.7
47-56	13	5.3
57-66	2	0.8
Total	246	100
Gender		
Male	75	30.5
Female	171	69.5
Total	246	100
Level of Education		
Non formal	17	6.9
Primary	36	14.6

Secondary	89	36.2
Tertiary	57	23.2
Vocational	47	19.1
Total	246	100

As shown in Table 2 above, majority 213(86.6%) of the respondents stated correctly that food handlers with disease could cause food contamination. Most 176(71.5%) of the respondents stated correctly that food borne diseases kills. Majority 216(87.8%) of the respondents stated correctly that poorly cleaned equipment could cause food contamination. Likewise, majority 219(89%) of the respondents stated correctly that lack of food hygiene could cause food contamination. The respondents reported that foodborne disease could result to diarrhea 198(80.5%), cholera 204(82.9%) and typhoid 152(61.8%). Majority 212(86.2%) of the respondents stated correctly that washing of hands reduces the risk of food contamination. Most 168(68.3%) of the respondents stated correctly that proper cleaning of the utensils could reduce food contamination. Most 170(69.1%) of the respondents stated correctly that contaminated foods always had some change in color, odor and taste. Less than half 83(33.7%) of the respondents reported that reheating cooked food could contribute to food contamination.

Table 2: Respondents Knowledge of Food Safety and Food Hygiene

Items	**Respondents in this study = 246**	
	Yes (%)	**No (%)**
Food handlers that have diseases can cause food contamination	213(86.6)	33(13.4)
Food borne disease kills easily	176(71.5)	70(28.5)
Diseases can be transmitted to food via poorly cleaned equipment	216(87.8)	30(12.2)
Lack of good food hygiene can cause food contamination	219(89.0)	7(11.0)
****Food borne disease could result to**		
Diarrheal	198(80.5)	48(19.5)
Typhoid	152(61.8)	94(38.2)
Malaria	46(18.7)	200(81.3)
Cholera	204(82.9)	42(17.1)
Botulism	155(63.0)	91(37)
Washing of hands reduces the risk of food contamination	212 (86.2)	34(13.8)
Proper cleaning and sanitization of utensil increase the risk	78(31.7)	168(68.3)

of food contamination		
Contaminated food always have some change in color, odor or taste	170(69.1)	76(30.9)
Reheating cooked food can contribute to food contamination	83(33.7)	163(66.3)
Total	246	100

More than half 129(52.4%) of the respondents agreed that frequent handwashing during food preparation worth the extra time. Most 153(62.2%) of the respondents agreed that with safe food handling guideline they could handle properly without supervision. Above a quarter 89(36.2%) of respondents agreed that wearing face mask could reduce food contamination. Less than half 111(45.1%) of the respondents strongly agreed that they were willing to change their food handling behavior. More than half 130(52.8%) of the respondents agreed that raw and cooked food should be stored separately. Less than half 110(44.7%) of the respondents strongly disagreed that cooking utensils should be washed and stored properly to prevent contamination. Less than half 97(39.4%) of the respondents agreed that health status of workers should be evaluated before employment. Less than half 99(40.2%) of the respondents agreed that they could be a source of food borne disease to their customers (See, Table 3).

Table 3: Respondents Attitudinal Disposition towards Food Safety and Hygiene Practices

Statement of consideration	**Respondents in this study; N=246**			
	SA (%)	**A (%)**	**D (%)**	**SD (%)**
Frequent hand washing during food preparation is worth the extra time	97(39.4)	129(52.4)	17(6.9)	3(1.2)
If I am provided with safe food handling practice guidelines, I will surely follow all of it without supervision	77(31.3)	153(62.2)	13(5.3)	3(1.2)
Wearing of face mask is an important practice to reduce the risk of food contamination	65(26.4)	89(36.2)	83(33.7)	9(3.7)
I am willing to change my food handling behavior when I know they are incorrect	111(45.1)	109(44.3)	21(8.5)	5(2.0)
Raw and cooked food should be stored separately to reduce the risk of contamination	86(35.0)	130(52.8)	29(11.8)	1(0.4)
Knives, cooking utensils and cutting boards should be sanitized to prevent contamination	110(44.7)	97(39.4)	30(12.2)	9(3.7)
The health status of workers should be evaluated before employment	86(35.0)	97(39.4)	49(19.9)	14(5.7)

I can be a source of food borne disease to my customers	90(36.6)	99(40.2)	36(14.6)	21(8.5)
Total	246(100)			

As shown in Table 4 above, less than half 107(43.5%) of the respondents reported that they wore glove always during food distribution. More than half 147(58.9%) of the respondents reported that they always wash their hands with soap and water before and after serving food. A considerable number 128(52%) of respondents reported that they never served food with wounds in their hands while almost half 118(48%) of the respondents reported that always wear apron while cooking and serving food. Less than half 114(46.3%) of the respondents reported that they always cover their hair while cooking and serving food. Most 151(61.4%) of the respondents reported that they always clean and sanitize the cutting surface before cooking. Less than half 103(44.3%) of the surveyed respondents reported that they always check the expiry date of package food before cooking. Majority 185(75.2%) of the survey participants reported that always washed their plates and utensils after use. Most 151(61.4%) of the respondents reported that they always serve and sell hot food. Furthermore, few 37(15%) of the respondents reported that they serve and sell cold food and more than half 134(54.5%) of the respondents reported that they always had constant supply of portable water at their cooking and food serving place.

The respondents' level of knowledge was divided into two categories. Based on 50^{th} percentile, those who scored between 0-6 were regarded as having poor level of knowledge while those whose scores were > 6-13 were regarded as having good level of knowledge.

The respondents' level of knowledge measured on a 13-point rating scale showed a mean score of 9.6± 2.1. Additionally, majority 219(89%) of the respondents had good/high level of knowledge of food safety and hygiene, while few 27(11%) had poor level of knowledge (See, Table 5).

Table 5: Proportion of Respondent's Level of Knowledge of Food safety and Hygiene

Total Obtainable Score (13)	**Respondents in this study; N=246**	
	Frequency	Percentage (%)
Poor (≤ 6)	27	11.0
Good (>6-13)	219	89.0
Total	246	100
Mean±SD	9.61 ± 2.16.	

The respondents' attitudinal disposition towards food safety and hygiene practices was divided into two categories. Based on 50^{th} percentile, those who scored between 0-8 (≤ 8) were regarded as having negative attitudinal disposition towards food safety while those whose scores were greater than 8-16 (> 8-16) were regarded as having positive attitudinal disposition towards food safety and hygiene practices.

The mean score of the respondents' attitudinal disposition towards food safety and hygiene practices measured on a 16-point rating scale was 9.5± 3.7. Additionally, most 151(61.4%) of the respondents had positive attitudinal disposition towards food safety and hygiene, while less than half 95(38.6%) had negative attitudinal disposition (See, Table 6).

Table 6: Proportion of Respondents' Attitudinal Disposition towards Food safety and Hygiene

Total Obtainable Score (16)	**Respondents in this study; N=246**	
	Frequency	Percentage (%)
Negative (≤ 8)	95	38.6
Positive (>8-16)	151	61.4
Total	246	100
Mean±SD	9.54 ± 3.72.	

The respondents' food safety and hygiene practices were divided into three. Those who scored between 0-11 (≤ 11) were regarded as having poor food safety practice while those whose scores were greater than 11-22 (> 11-22) were regarded as having fair food safety and hygiene practices and those whose scores were greater than 22-33 (> 22-33) were regarded as having good food safety and hygiene practices.

The mean score of the respondents' food safety and hygiene practices measured on a 33-point rating scale was 23.70 ± 5.37. Additionally, majority 157(63.8%) of the respondents had good food safety and hygiene practices, while only 6(2.4%) had poor food safety practices (See, Table 7).

Table 7: Proportion of Respondent's Food Safety and Hygiene Practices

Total Obtainable Score (33)	**Respondents in this study; N=246**	
	Frequency	Percentage (%)
Negative (≤ 11)	6	2.4
Fair (> 11-22)	83	33.7
Good (>22- 33)	157	63.8
Total	246	100
Mean ± SD	23.70 ± 5.37.	

Relationship between Respondents' Level of Knowledge and Attitude towards Food Safety Practices

The result of the correlation analysis showed a significant relationship between respondents' level of knowledge of food safety practices and their attitude towards food safety practices (r=0.57; *p*=0.000) (See table 8). Therefore, based on these values, respondents' attitudinal disposition towards food safety practices is dependent on their knowledge of food safety practices.

Additionally, the result of the correlation showed a relationship between respondents' level of knowledge of food safety practices and practice of food safety practices (r = 0.61; p = 0.000) (See, table 8). Therefore, based on these values, respondents' food safety practices is dependent on their knowledge of food safety practices.

The result of the correlation showed a relationship between respondents' attitudinal disposition towards food safety practices and food safety practices (r=0.63; p = 0.000) (See table 8). Therefore, based on these values, respondents' food safety practices is dependent on their attitudinal disposition towards food safety practices.

Table 8: Relationship between Respondents' Level of Knowledge and Food Safety

Variable	Food Safety Practices N=246	
	R	p value
Knowledge of Food Safety	0.57	0.000*
Level of Knowledge	0.61	0.000*
Attitude	0.63	0.000*

***Significant at p<0.05**

Discussion of Findings

Demographic Data of the Respondents

The finding of this study revealed that the respondents were within the ages 17-65 years. This finding is similar to the result of Bakare et al.., (2017) in Lagos, who reported that their participants were between the ages of 18 to 65 years. This study showed that the mean age of the respondents was 29.8 ±9.6 years. However, this finding differs from the findings of Hamid & Mohammed, (2020) in Eygpt and Afolaranmi et al., (2015) in Jos, where a higher mean age and lower mean age were reported respectively.

The data in this study confirmed that there were more of the female respondents than male respondents. This finding corroborated the reports of Bakare et al.., (2017) in Lagos, and Afolaranmi et al, (2015) in Jos where they reported that majority of the respondents were females. The similarity may be due to the fact that women tend to dominate professions related to food handling. However, this finding is at variance with the finding of Hamid & Mohammed (2020) in Egypt, where most of their respondents were males. The difference observed in results may be because females in Egypt were discouraged from working outside the home.

Majority of the respondents in this study had secondary level education. This corroborated the findings of Iwu et al., (2017) in Owerri and Afolaranmi et al, (2015) in Jos where they reported that majority of their respondents had secondary level. However, this finding is at variance with the result of Hamid & Mohammed in Egypt (2020) where they reported that most of their respondents were illiterates and few had primary education. The difference observed in the results may be as a result of difference in study location.

Respondents Knowledge of Food Safety among Food Handlers

The results of this study revealed that majority of respondents had high level of knowledge of food safety and hygiene practice. This study finding corroborates the result of Iwu et al., (2017) who conducted research among food vendors in Owerri and discovered that majority of the respondents had high level knowledge on food safety. The similarity in results may be due to the secondary education attained by respondents which enabled them to obtain information regarding food safety practices. This result, however, is at variance with the results of Hamid & Mohammed, (2020), who reported poor level of knowledge regarding food safety practices among food handlers in Egypt. This discrepancy in results may be due to the illiteracy among most respondents and the fact that few had primary education.

More than half of the respondents in this study attributed Typhoid fever and Cholera to contaminated food. This result supports the finding of Afolaranmi et al., (2015) in Jos. This study also revealed a significant relationship between the respondent's knowledge of food safety and food safety practices. This finding is similar to the result of Alaqurishi, Priyadarshini and Jaiswal,

(2019) who established that there was a significant relationship between practices on food safety and food safety knowledge in Saudia Arabia. In contrast, other studies revealed no correlation between knowledge on food safety and food safety practices (Lee, Halim, Thong & Chai, 2017; Akabanda et al., 2017).

Respondents Attitude of Food Safety among Food Handlers

This study's findings revealed that majority of the respondents had positive attitude towards food safety. This result is similar to the findings of Asmawi et al, (2018) where majority of the respondents had good attitudes towards food safety. Also, Iwu et al., (2017) in Owerri reported positive attitude towards food safety among food handlers. These similarities in finding may be as a result of the good level of knowledge regarding food safety practices among respondents which may influence their attitude. This study also established a relationship between the respondents' knowledge and attitude towards food safety. This finding corroborates the finding of Asmawi et al., (2018) and Teffo and Tabit (2020) in South Africa. Also, this agrees with the conceptual framework of this study. However, Hammed & Mohammed (2020) reported that majority of their respondents had negative attitude food safety. The difference in the results may be attributed to the poor knowledge of food safety among respondents.

More than half of the respondents in this study agreed that raw and cooked food should be stored separately. This finding differs from the result of Amaami et al., (2017) in Putrajaya where they reported that majority of their respondents agreed that raw and cooked food should be stored separately.

Less than half of the respondents agreed that wearing mask is an important practice to adopt in order to reduce the risk of food contamination. This finding is at variance with the result of Teffo and Tabit (2020) in South Africa where majority of their respondents agreed that wearing mask is an important practice to adopt in order to reduce the risk of food contamination. This difference in these findings could be attributed to the study being performed in different countries. This study further revealed a significant relationship between respondents' attitude and food safety practices. This result supports the finding of Asmawi et al., (2018).

Respondents Hygiene Practices of Food Safety among Food Handlers

According to the finding of this study, majority of the respondents reported good food safety practices. This finding supports the finding of Iwu et al., (2017), who reported that majority of the respondents' maintained good hygiene practice on food safety in Owerri, Nigeria. The similarities in finding may be as a result of the good knowledge and positive attitudes of the respondents which could have influenced their practice. This is also in line with the study's conceptual framework.

In this study, it was revealed that less than half of the respondents reported that they wore glove always during food distribution and more than half reported that they always wash their hands with soap and water before serving food. This finding is not in line with studies carried out in Dubai and Malaysia, where majority of food handlers reported always wearing gloves and washing their hands before and during food preparation (Al Suwaidi et al., 2015; Woh et al., 2016). Additionally, this study showed that a notable number of the respondents reported that they never served food with wounds in their hands. This finding is in line with the result of Al-Shabib et al., (2016) in Saudi Arabia. The similarities in finding may be because they may have received proper training on the use of PPE (personal protective equipment).

Conclusion

This study investigated the knowledge, attitude and food safety practice among food handlers in Kaduna North LGA, Kaduna State, Nigeria. Findings from the study indicated that most of the respondents had good level knowledge of food safety, positive attitude towards food safety practices and good food safety practices. Additionally, a significant correlation between the respondent's knowledge and attitude to food safety practices and food safety practices was observed. Thus, it is important to continually tailor strategies to improve the knowledge and attitude of food handlers, which will in turn yield better food safety practices.

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