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Knowledge and attitude of food vendors towards food hygiene and safety in Ilorin South Local Government, Nigeria

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ABSTRACT

Introduction: Food safety in the food market is one of the key areas of focus in public health, because it affects people of every age, race, gender, and income level around the world. Food can

transmit pathogens, which can result in illness or death in people and/or animals. The main media are bacteria, viruses, mold, and fungus. Therefore, the study aimed to examine factors affecting food safety knowledge among food vendors, and attitudes towards food, hygiene, and safety in a city in North-central Nigeria.

Methods: The study design used was a descriptive cross-sectional study using quantitative method of data collection. The study population comprised food vendors in selected vending sites in Ilorin South Local Government Area, Kwara State. Data was collected using a semi-structured questionnaire.

Result: The majority of the food handlers (85.9%) had adequate knowledge of food hygiene and safety, especially among respondents within the working experience group 0-9 years (65.0%). However, about half of the food handlers (50.9%) had a poor attitude towards food hygiene and safety. The study showed that level of education and working experience were significantly associated ($p < 0.05$) with the attitude of the food handlers towards food hygiene and safety. The socio-demographic characteristics of food vendors' knowledge, attitude, and practice included working experience, marital status, and educational level.

Conclusion: It was conclusively inferred that most of the respondents had good knowledge of food hygiene and food safety practices, while a poor attitude towards food hygiene and safety was prevalent in about half of the population. Therefore, more sensitization needs to be channeled towards food vendors with a low level of education, so as to improve their knowledge and practice towards food safety.

Key words: food safety knowledge, food hygiene practice and foodborne disease.

Introduction

1.1 Background Information

Food safety involves the handling, preparation, and storage of food in ways that prevent food-borne illness. The occurrence of more than two similar cases of illness resulting from the ingestion of a common food is known as a foodborne disease outbreak (1). Food safety remains a significant global public health problem despite technological, policy, and investment advances in recent years. Health managers, researchers, and organizations are seeking strategies to reduce the risks and outcome of foodborne disease (FBD). However, the World Health Organization (WHO) contemporary report estimated that 600 million cases and 420,000 deaths occur annually as a result of FBD (2).

Furthermore, food safety hazards can be a product of economic downturn due to a lack of both individual and national income generation, and cost of treating foodborne disease. Hence, food safety is of biological, social, and economic importance. Most FBD cases occur due to failure of food handlers in handling food processes properly (2). In some countries, studies have shown that the most common FBD occurred as a result of poor food handling practices by food handlers, which involved temperature and exposure time violations and a lack of personal and environmental hygiene (2,3).

Food safety standards are usually reviewed once every 5 years to ensure the standard (quality of food) remains relevant, which also determines whether food safety standards are due for revision and updating (4). Generally, food safety has not been considered an evaluation tool in assessing foodborne disease in developing countries, due to substandard and indefinite diagnosis of various infectious diseases, that is, identifying the pathogen responsible for the illness. Even if the pathogen is identifiable, it may be difficult to investigate further whether the source was food, water, other people, animals, or the environment. Besides, there is a general impression that foodborne disease is a self-inflicting illness that cannot be avoided (5).

Unsafe food consumption threatens public health globally. More than 2 million people annually, mainly children under 0-5 years die as a result of consuming contaminated food and water (4).

The majority of people in developing countries, including Nigeria eat street food (6). Many of these foods, which can also be beverages, are prepared, processed, and sold by vendors typically on the street, and can be consumed without further preparation or processing. Street food serves as a primary source of food for many low and middle-income earners residing in urban areas (4). There is recorded increase in the number of street and workplace food vendors in many countries, including Nigeria, due to socio-economic benefits that can be derived from it, this includes, provision of job opportunities and income, and supply of low-cost food that is affordable to low and middle income-earners at their convenience (6). Consumption of street and workplace vending food has been linked as a major source of foodborne disease occurrence in developing countries. Unfortunately, epidemiological data on food-borne disease outbreaks in Nigeria are not limited, but a broad 1997 Local Government Health System profile of the country showed that diarrhea as the cause of 25% of all deaths, followed by malaria (21.0%) and accidents (9%) (15). Nearly all food-borne disease cases in Nigeria appear to occur predominantly as isolated sporadic cases rather than taking the form of outbreaks. The majority of these cases are unrecognized, undiagnosed, and poorly recorded (6).

Personal hygiene of food handlers and food wholesomeness is pivotal in averting food poisoning, causing foodborne illness. Failure to maintain food and personal hygiene can lead to severe foodborne illness outbreaks (7). Promoting and maintaining food and personal hygiene of food handlers is very critical in

preventing the transmission cycle of pathogens from food handlers to consumers. Poor knowledge and practice of food hygiene increase the risk of food and beverage contamination (7)

1.2 Aim and Objectives

1. To assess food safety knowledge among food vendors in Ilorin South Local Government Area.
2. To identify factors affecting the knowledge of food safety among food handlers in Ilorin South Local Government Area.
3. To determine the attitude of food vendors towards food hygiene and safety.

This study aimed to examine food safety knowledge, factors affecting knowledge of food safety among food vendors, and attitude towards food and hygiene and safety in a city in North-central Nigeria.

2.0 Methodology

2.1 Description of Study Area

The research was conducted in Ilorin, the capital of Kwara State, located in the North-central part of Nigeria. Ilorin comprises three Local Government Areas, which include: Ilorin West, Ilorin East, and Ilorin South. The indigenous people of Ilorin, who are predominantly Muslim, are Yoruba, Nupe, Gobaris and Fulani; however, people from other ethnic groups and tribes in Nigeria also live in Ilorin. Their major occupations are farming, trading, and civil service. The 2006 census put the population at 786,429, with an annual growth rate of 2.5 percent.

Ilorin South is one of the sixteen local government areas of Kwara State, Nigeria. Established in 1995, its headquarters is seated in Fufu, a nodal town of about 30km from Ilorin city, with eleven wards (Akanbi I, Akanbi II, Akanbi III, Akanbi IV, Akanbi V, Balogun-fulani I, Balogun-fulani II, Balogun-fulani III, Okaka I, Okaka II, and Oke-ogun).

Ilorin South hosts a number of public and private health facilities, firms, a citadel of learning (such as the University of Ilorin), ministries, departments, and agencies. Food vendors in Ilorin South Local Government are estimated to be above 1,500. Some food vendors in the community have an umbrella association, which enables the group to easily arrange consultative meetings where their views, issues of concern, and food practices are discussed and taken into account during decision-making.

2.2 Study Design

The study was a descriptive cross-sectional study using a quantitative method of data collection to assess the food safety knowledge and practice among food handlers in Ilorin South Local Government.

2.3 Study Population

The study population comprised food vendors (organized food handlers and non-organized food handlers) in selected vending sites in Ilorin South Local Government Area, Kwara State.

2.4 Inclusion and Exclusion Criteria

Inclusion Criteria

1. All fixed food vendors (owners and apprentices) in Ilorin South Local Government were included in the study.
2. Contractual food vendors (owners and apprentices) in Ilorin South Local Government were included in the study.

Exclusion Criteria

1. Mobile food vendors with no shop or cafeteria were excluded from the study.
2. Food vendors that do not want to participate in the study were excluded.

2.5 Sample Size Determination

The sample size was calculated using Fisher's formula:

To determine the sample size for the study, the formula used for a population greater than 10,000

was:

$$n = \frac{z^2 pq}{d^2}$$

Where,

n = the minimum sample size when the population was more than 10,000

Z = the standard normal deviate was set to 1.96, corresponding to a 95% confidence level.

P

= proportion of food vendors with good knowledge of food safety and practice from a previous similar study was 50% (8).

$$q = 1 - p$$

d = degree of accuracy, set at 0.05 for this study

Therefore,

$$\begin{aligned} n &= (1.96)^2 \times 0.5 \times 0.5 / 0.05^2 \\ &= 384.16 \\ &= 384 \end{aligned}$$

Therefore, since the target population was less than ten thousand, the formula below was used to calculate the sample size:

$$n_f = n / 1 + (n/N) \dots\dots\dots(\text{when population is} < 10,000)$$

n_f = desired sample size when the target population was less than 10,000

N = the estimate of population size = 1,500

$$n_f = 384 / 1 + (384 / 1,500)$$

$$n_f = 306$$

To compensate for non-response, 10% of the original size will be added.

$$n_s = n_f / 0.9$$

Where,

n_s = sample size to compensate for attrition

n_f = original calculated sample size

0.90 = taken as 90% response rate were anticipated

$$\begin{aligned} n_s &= 306 / 0.9 \\ &= \mathbf{340} \end{aligned}$$

A total of **340** questionnaires were administered for this study.

2.6 Sampling Technique

A multi-stage sampling technique was used in this study.

Stage I

There are eleven wards in Ilorin South Local Government. Six wards were randomly selected by simple random sampling by balloting from the L.G.A

Stage II

Two communities were selected from each ward using a table of random numbers.

Stage III

Proportional allocation was used to assign questionnaires to each selected ward based on its population. Eligible food vendors based on inclusion criteria were selected.

$$P.P = \frac{P.C}{T.P} \times \frac{S.S}{1}$$

Where

P.P = Proportionate allocation to a particular community

P.C = Population of food vendors in the community

T.P = Total Population of the food vendors in the 12 communities added together

S.S = Sample size = 340

After proportionally allocating the food vendors, those recruited for the study were selected by the simple random sampling method.

2.7 Preparation for Data Collection

Advocacy visits were paid to selected food vendors to inform them of the research and solicit their support. Four trained research assistants were employed to aid with the administration of questionnaires. The data collection tool was pretested with 34 food vendors in the Offa Local Government Area.

2.7.1 Data Collection Instrument

A semi-structured interviewer-administered questionnaire was used to obtain information from the participants. The questionnaire was divided into sections, which are as follows: the socio-demographic data of the food handlers, the knowledge and attitude of food safety among food vendors. An observational checklist was also used to obtain information about food handlers' personal hygiene and safety practices during food preparation. The questionnaire was translated into the Yoruba dialect and back to English to ensure uniformity of the questions for respondents who only understand Yoruba. : A scoring system was used to assess the knowledge of the respondents in the study group.

2.8 Data Analysis

The data collected were cleaned, collated to eliminate errors, and coded for analysis. The quantitative data was analyzed using SPSS (IBM SPSS Statistics for Windows) Version 25.0. Descriptive statistics were used to assess respondents' characteristics, frequencies, percentages, and mean and standard deviations were calculated for appropriate variables. Chi-square was used to test for associations between the independent and dependent variables. Results were presented in the form of frequency distribution tables and cross-tabulation of variables. Observations from the walk-through survey were also transcribed, and detailed content analysis was done.

2.9 Ethical Consideration

Ethical approval for this study was sought and obtained from the University of Ilorin Ethical Review Committee. Informed consent was obtained from the respondents after adequate explanation of the nature, purpose, and benefit of the study before questionnaire administration. Confidentiality of respondents' information was assured by using anonymous questionnaires and by keeping the data in a secure place. Respondents were given the right to decline or withdraw from the study at any time.

This study was conducted in accordance with Helsinki, and ethical approval was duly obtained from the University of Ilorin Ethical Review Committee, Ilorin, Nigeria.

2.9.1 Informed Consent to Participate Declaration

All participants gave informed consent prior to participation in this study. For participants under 16 years of age, informed consent was obtained from their parent or legal guardian before participation in the study

2.9.2 Ethics Approval Committee

Ethical approval was obtained from the University of Ilorin Ethical Review Committee, Ilorin, Nigeria.

2.9.3 Human Ethics and Consent Statement

Ethics approval was obtained from the University of Ilorin Ethical Review Committee. Informed consent was obtained from community leaders, head of food vendors, and all participants.

3.0 RESULTS

Interpretation of Table 1

As shown in Table 1, the age of the respondents ranged from 12 to 69 years, with a mean of 33.69 ± 8.1 years. The gender distribution revealed more females than males. Gender distribution showed males were about one-third of the population, 122 (35.9%), while the majority, 218 (64.1%), were females. The majority of the respondents, 212 (62.4%), were single, 112 (32.9%) of the respondents were married, while 16 (4.7%) were divorced.

The majority of the respondents, 271 (79.7%), were Yoruba, while some 11 (3.2%) belonged to other ethnic groups such as Fulani and Nupe. Christianity was the religion practiced by the majority, 180 (52.9%), of the respondents, while the remaining 160 (47.1%) were Muslims. The majority of the respondents, 124 (36.5%), had tertiary education, some 109 (32.1%) had secondary education, while a few, 63 (18.5%), of the respondents had no formal education. Most respondents (76.5%) had been working as food handlers for less than 10 years, while some 67 (19.7%) had been working for 10–19 years.

Interpretation of Table 2

Table 2 revealed that most of the respondents, 304 (89.4%), had heard of foodborne disease, as the majority, 315 (92.6%), knew that it is usually caused by pathogenic microbes. Also, a large proportion of the respondents, 360 (98.8%), knew that insects transmit foodborne pathogens. The majority of the respondents, 320 (94.1%), knew that regular hand washing before cooking reduces the chances of food poisoning. Usage of warm water and antiseptic for hand washing is commonly practiced among the majority of the respondents, 211 (62.1); some 122 (35.9) preferred to use water alone for hand washing, while a few, 7 (2.1), preferred to use tissue paper only.

Interpretation of Table 3

As shown in Table 3, the majority of the food handlers, 292 (85.9%), in Ilorin South Local Government had adequate knowledge of food hygiene and safety, while 48 (14.1%) of the respondents had inadequate knowledge.

Interpretation of Table 4

There is no statistically significant relationship between level of education and knowledge of food hygiene and safety. Also, no statistically significant relationship between work experience and knowledge of food hygiene and safety. There is no statistical relationship between gender and knowledge of food hygiene and safety.

Interpretation of Table 5

Most of the food handlers interviewed had a poor attitude; 173 (50.9%), with 167 (49.1%) of the respondents had a good attitude towards food hygiene and safety.

Interpretation of Table 6

There is a statistical relationship between the level of education and attitude towards food hygiene and safety. Also, there is a statistical relationship between working experience and attitude towards food hygiene and safety, but no statistical relationship between gender and attitude towards food hygiene and safety.

Table 1: Socio-demographic distribution of respondents

Variables	Frequency	Percentage
Age group		
≤ 19	31	9.1
20 – 29	156	45.9
30 – 39	58	17.1
40 – 49	35	10.3
50 – 59	43	12.6
60- 69	17	5.0
Mean $\pm$ SD	33.69$\pm$ 8.1	
Gender		
Male	122	35.9
Female	218	64.1
Tribe		
Yoruba	271	79.7
Hausa	22	6.5
Igbo	36	10.6
Others	11	3.2
Religion		
Islam	160	47.1
Christianity	180	52.9
Others		
Marital Status		
Single	212	62.4
Married	112	32.9
Divorced	16	4.7
Level of education		
No formal education	63	18.5
Primary	44	12.9
Secondary	109	32.1
Tertiary	124	36.5
Years of practice		
0 - 9	260	76.5
10 - 19	67	19.7
20 - 29	10	2.9
30 - 39	2	0.6
>40	1	0.3

Table 2: Food Safety Knowledge among Respondents

Variables	Freq	(%)
KNOWLEDGE OF FOOD-BORNE DISEASE		
Heard of foodborne disease		
Yes	304	(89.4)
No	36	(10.6)
Food poisoning is caused by pathogenic microbes		
Yes	315	(92.6)
No	25	(7.4)
Insects can transmit food borne pathogens		
Yes	336	(98.8)
No	4	(1.2)

Table 3: Knowledge of Food Hygiene and Safety

Variables	Freq	(%)
KNOWLEDGE OF FOOD HYGIENE AND SAFETY		
Regular hand washing before preparing food		
Yes	320	(94.1)
No	20	(5.9)
Most preferable to clean hands with		
Water alone	122	(35.9)
Warm water and antiseptics	211	(62.1)
Tissue	7	(2.1)
Overall Knowledge Grading		
Adequate	292	(85.9)
Inadequate	48	(14.1)

Table 4: Factors Associated with Food Safety Knowledge among Respondents

	Knowledge Grading		Chi-Square X ²	p value
	Adequate	Inadequate		
Level of Education				
No Formal Education	55 (16.2)	8 (2.4)	5.902	0.116
Primary	36 (10.6)	8 (2.4)		
Secondary	88 (25.8)	21 (6.2)		
Tertiary	113 (33.3)	11 (3.2)		
Working Experience (Years)				
≤ 9	221 (65)	39 (11.5)	2.330	0.675
10 - 19	58 (17)	9 (2.65)		
20 - 29	10 (2.9)	0 (0.00)		
30 - 39	2 (0.59)	0 (0.00)		
≥ 40	1 (0.3)	0 (0.00)		
Gender				
Female	190 (55.9)	28 (8.2)	0.813	0.367
Male	102 (30.0)	20 (5.9)		

Table 5: Distribution of food vendors by attitude scores towards food hygiene and safety

Overall Attitude Grading	Freq (%)
Poor	173 (50.9)
Good	167 (49.1)

Table 6: Distribution of factors associated with Attitude towards Food Hygiene and Safety among food vendors.

	Attitude Grading		Chi-Square X ²	p value
	Poor	Good		
Level of Education				
No Formal Education	39 (11.5)	24 (7.1)	20.753	<0.001
Primary	25 (7.4)	19 (5.6)		
Secondary	36 (10.6)	73 (21.5)		
Tertiary	73 (21.5)	51 (15)		
Working Experience (Years)				
≤ 9	117 (34.4)	143 (42)	23.785	<0.001
10 - 19	51 (15)	16 (4.7)		
20 - 29	5 (1.5)	5 (1.5)		
30 - 39	0 (0.00)	2 (0.6)		
≥ 40	0 (0.00)	1 (0.3)		
Gender				
Female	105 (30.9)	103 (30.3)	1.795	0.180
Male	68 (20)	64 (18.8)		

4.0 DISCUSSION

Findings from this study revealed an extensive variation in the demography of food handlers in the Ilorin community; females (64.1%) were the dominant gender involved in food handling, which conformed largely to the well-acclaimed general trend that cooking is more a feminine business. This is similar to the study of Palupi and colleagues about Food safety knowledge, hygiene practices among food handlers, and microbiological quality of animal side dishes in contract catering, where they discovered that all participants were females (7). Most of the food handlers were single (62.4%), as a large proportion make a daily livelihood from food vending due to the low availability of job opportunities. The Yorubas were the most populous among the food handlers (79.7%), possibly due to the fact that this study was carried out in a Yoruba-dominated area.

The level of education of the food handlers ranged from secondary (32.1%) to tertiary (36.5%), indicating that the majority had formal education. This finding contradicts a study from Indonesia, which reported that a high number of the respondents had no academic education (7). Similar findings in Ghana and Egypt reported a greater proportion of low academic education among the food handlers, as structured learning reported was few among the respondents (9, 10). However, educational programs have been observed to positively influence food handlers' practices. These references are relevant as a significant association was observed between the food handlers.

This study showed that the majority of respondents had been working as food handlers for a period of 0-9 years (76.5%). The decrease in the number of those who had worked for longer years in food handling is not too good for food industry because those who have worked for longer years significantly are expected to have more knowledge and better attitude of food hygiene and safety than those with fewer years of experience, this finding disagreed with the report of whadan et al, where about 74.5% had over five years' experience (10).

The majority of the respondents (89.4%) in this study were aware of foodborne illness, and (92.6%) knew that food poisoning is caused by pathogenic microbes. A similar finding of Oladoyinbo et al. revealed that only a part of the interviewees had an average awareness of foodborne disease (11). A contrary finding was reported in Ghana, where some staff responsible for food handling in the food preparation process have limited or no knowledge of food poisoning, contamination, and hygiene as a whole (12). Food poisoning is a major disease associated with improper management of food at various stages of preparation and consumption.

The majority of food handlers (85.9%) had adequate knowledge of food hygiene and safety. These findings conform with the study carried out by Elechi and colleagues about knowledge, attitude, and practice of food hygiene in Port Harcourt local government of River State, where they discovered a higher percentage of residents (80.8%) have above average knowledge of food hygiene (13). This study showed an insignificant relationship between level of education, working experience, and gender and the knowledge of food hygiene and safety. However, there is a significant relationship between level of education and working experience with attitude towards food hygiene and safety among respondents. This is indistinguishable from a study in semi-industrial catering in a government office in Iran that reveals significant relations exist between knowledge and attitude and between attitude and practice (14).

The majority of food handlers (94.1%) in Ilorin South Local Government had a good perception towards food hygiene and safety. Contrastingly, Chukwuocha et al, reported an unsatisfactory attitude towards food hygiene and safety practices. This finding is similar to the study carried out in Port Harcourt local government, which found that food handlers had a satisfactory attitude towards food hygiene and safety (15). Poor perception of food hygiene practices may be detrimental to the quality of food preparation and preservation.

Findings from this study revealed that the majority of the respondent (62.1%) washed their hands after using the toilet. This indicated a high level of good personal hygiene perception and practice, which may prevent fecal-oral contamination and diseases such as Salmonella and typhoid fever, respectively, that are commonly contracted through improper handwashing. In addition, many food handlers are aware of the importance of hand hygiene and other measures to prevent pathogen contamination. This study is similar to the knowledge, attitude, and practice of food hygiene among food vendors in Owerri, Imo State, which reported a greater number of hand hygiene (86.5%) (8). A previous study reported that a large part of the respondents (88.6%) agreed that food can be contaminated through the aid of microorganisms by cross-contamination of foods (16). Many of the previous studies have proved that it is critical to practice personal hygiene, especially hand hygiene, because hands are the major agents that transmit fecal-oral microorganisms. A large number of respondents who wash their hands after using the toilet indicate a good prognosis for healthy food in the community, as the toilet represents a major den for infectious diseases. Comparably, Faremi et al, stated that a high number of participants (96.9%) washed their hands after using the toilet (16). Contrariwise, Wahdan et al, reported that above 99% of the respondents in their study did not practice hand washing after touching their hair, nose, and cars (10). Findings of other studies indicated better hand washing practices than findings of the present study, which may be attributed to the limited years of experience among food handlers.

This study revealed that the majority of the food handlers (50.9) had a poor attitude towards food hygiene and safety. This does not indicate a good prognosis for healthy food in the community.

5.0 Conclusions and Recommendations

This study highlights that most of the food handlers in Ilorin South Local Government, Kwara State have adequate knowledge of food safety, and there is no statistical relationship between factors affecting the knowledge of food safety among food handlers in Ilorin South Local Government Area, such as level of education, work experience and gender with food safety knowledge.

In addition, this research work also unveiled poor attitude of the food handlers towards food hygiene and safety. However, more efforts could still be made towards food handlers on food poisoning awareness, personal and environmental hygiene, and proper handling of food from farm to table. These will reduce morbidity and mortality caused by food poisoning. Based on the study findings, the following recommendations were proposed:

- 1. Institutionalize Regular Training**

Health authorities should implement periodic, compulsory training for food handlers to reinforce knowledge and promote best practices in food hygiene and safety.

- 2. Strengthen Monitoring and Enforcement**

Regular supervision and enforcement of hygiene regulations by environmental health officers are essential to ensure compliance among food vendors.

3. **Promote Positive Behavioral Change**

Targeted behavioral change communication (BCC) strategies, including public sensitization campaigns, should be employed to improve attitudes toward food hygiene and safety.

4. **Implement a Certification System**

A formal certification and licensing process should be introduced to ensure that only trained individuals are authorized to handle and sell food.

5. **Enhance Community Sensitization**

Community-based outreach programs, especially in local languages, should be conducted to improve hygiene practices among informal and low-literacy food handlers.

Conflicts of Interest

No conflict of interest was reported among the authors.

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