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Knowledge, Attitude and Practices of Food Hygiene and Safety among Stationary Food Vendors in Major Markets in Calabar Metropolis, Cross River State, Nigeria

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Abstract

The general objective of the study was to determine the knowledge, attitude and practice of food hygiene and safety among stationary food vendors in major markets in Calabar metropolis in Cross River State, Nigeria. The study population comprised all stationary food vendors in major markets in Calabar Metropolis. A total of 137 questionnaires were distributed for the study, and 137 were filled and sent for analysis, giving a response rate of 100%. It can be traced from table 1 that there were 7(5.1%) male respondents and 130(94.9%) female respondents who took part in the study. Majority of the respondents 93(67.9%) were between the ages of 31-40, 28(20.4%) were between the ages of 41 and above and 16(11.7%) were between the ages of 21-30. Majority of the respondents 133(97.1%) thought that washing of hands with soap and running water while cooking was important, 3(2.2%) thought it wasn't important while 1(0.7%) didn't know if it was important or not. 2(1.5%) of the respondents thought it was okay to store raw and cooked food together, majority, that is 135(98.5%) thought it wasn't okay to do that. About 48(35.0%) of the respondents always wear aprons, gloves head coverings and masks when handling food, 80(58.4%) only wear them sometimes while 9(6.6%) never wear them. Out of 137 respondents, majority 134(97.8%) did not store raw and cooked food together while 3(2.2%) stored them together. Knowledge of food hygiene and safety among stationary food vendors in major markets in Calabar metropolis

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was high, but 87.4% did not know that hepatitis A was a food borne disease and 96.4% did not know what temperature danger zone meant. The attitude towards food hygiene and safety was also positive. The level of practice was moderately good.

Keywords: *knowledge, attitude, practices, food hygiene, safety among stationary food vendors*

Introduction

Food hygiene and safety is an issue of global health concern. It is even more worrisome for those living in developing countries.[1] The idea of food hygiene refers to the methods of controlling hazards in foods in order to make it fit for human consumption, while food safety ensures the edibility of food and it's being free of harmful effects. Food hygiene and safety management is necessary so as to ensure that the food that gets to the consumer is healthy and safe. Effective food hygiene and safety measures starts from farms. Ineffective regulatory systems contribute to poor food hygiene management in Nigeria. An effective regulatory environment is very important in order to achieve food hygiene and safety.[2] Food vendors are very important in the food supply chain in many developing countries, Nigeria inclusive. This is partly due to urbanization. Food vendors also play a socioeconomic role in terms of employment for people, especially women and also providing food at pocket friendly prices to the lower income population.[3]

The street food sector in Nigeria faces so many challenges just as in other developing countries. Food safety officers do not carry out effective supervision and monitoring and there is little or no compliance with food hygiene regulations among the food handlers. All these makes street food to be at a very high risk of contamination as food is being stored at wrong temperatures and sold from unhygienic stores and environment.[3] Safe food is a basic human right; despite this food still get contaminated by microorganisms which we sometimes cannot see with our naked eyes.[4] These microorganisms are capable of causing illnesses generally termed as food-borne diseases and can even lead to death.

The most important factor in the prevention of food borne diseases is the observance of food hygiene and safety.[5] When food is cooked on a large scale, the efforts of many individuals are needed and this could end up increasing the chances of contaminating the end product. Though this contamination was not intended it still results in food- borne diseases outbreaks which causes danger to the consumers

Inadequate refuse disposal and the absence of toilets facilities for the consumers is one of the obstructions to food safety in Nigeria. Most of the stationary shops located around markets always have unkempt surroundings, poor supply of water and drainage system, unsanitary waste disposal systems and are over populated. The source of the raw foods and the ingredients is also an obstacle to food safety. Several studies have shown that the level of knowledge of food vendors in Nigeria is low; hence there is need for education of food vendors. Other studies in Nigeria have also shown

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that attitude and practice of food hygiene and safety are also low as some food vendors do not even practice hand washing all the time.[7]

This study therefore seeks to assess the knowledge, attitude and practice of food hygiene and safety among stationary food vendors in major markets in Calabar metropolis in Cross River State, Nigeria. The general objective of the study was to determine the knowledge, attitude and practice of food hygiene and safety among stationary food vendors in major markets in Calabar metropolis in Cross River State, Nigeria.

Research Methodology

Study area

The study area for this research was Calabar Metropolis.

Study design

A descriptive cross sectional study design was used in this study.

Study population

The study population comprised all stationary food vendors in major markets in Calabar Metropolis.

Sample size determination

The sample size was calculated using Fishers formula as cited in Bluman.[8]

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

Where n = desired sample size

z = confidence interval= 95% (1.96)

p = prevalence of food vendors with acceptable food hygiene practices =8.8% =(0.088) (Johnson, 2019)

q = (1-p) proportion of non-occurrence= (1-0.088)=0.912

d = Precision=5%= 0.05

$$n = \frac{1.96^2 \times 0.088 \times 0.912}{0.05^2}$$

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$$n = \frac{3.8416 \times 0.088 \times 0.912}{0.0025}$$

$$n = \frac{0.30831145}{0.0025} = 123.3$$

n =123

Assuming a non-response rate of 10% (0.1)

Using: $\frac{n}{1\text{-non- response rate}}$

$$n = \frac{123}{1 - 0.1} = \frac{123}{0.9} = 136.7$$

Therefore, the total sample size will be 137.

Sampling procedure

A multistage sampling technique was used in selecting the markets, food stations and respondents.

Stage 1: Selection of major markets

Four major markets, that is; Watt market, Ikot-ishie market, Marian market and 8miles market were conveniently selected for this study.

Stage 2: Selection of food stations

All food stations in the four markets were conveniently selected for this study as there were limited numbers of stationary food vendors present in the markets.

Stage 3: Selection of Respondents

All food vendors found in all food stations within the four markets weresampled till total sample size was achieved.

Instrument for data collection

The instrument for data collection was a semi-structured questionnaire which was prepared based on the research objectives as well as a checklist that was carefully designed to identify WASH

facilities in and around the food stations. The questionnaire was developed in English language and it comprised of open ended and close ended questions. The questionnaire consists of 4 sections (A, B, C, and D) with 32 items. Section A consists of socio-demographic characteristics of the respondents. Section B consists of knowledge of food hygiene and safety. Section C consists of attitude towards food hygiene and safety. Section D consists of practice of food hygiene and safety.

Method of data collection

The data was collected using a questionnaire, which was interviewer administered. Data was also collected using a checklist for identifying WASH facilities in and around the food stations. The data was collected by the researcher.

Method of data analysis

Each completed questionnaire was checked manually on a hard copy to ensure that there was no missing information. The data was analyzed using Statistical Packages for the Social Sciences (SPSS) version 25. The results were presented using tables, and figures.

Ethical consideration

An ethical approval was obtained from the Department of Public Health Ethics Committee. Verbal consent was obtained from the respondents before administering the questionnaire. All respondents were informed that the information collected will be treated confidentially and that participation in the study is voluntary.

Results

A total of 137 questionnaires were distributed for the study, and 137 were filled and sent for analysis, giving a response rate of 100%. It can be traced from table 1 that there were 7(5.1%) male respondents and 130(94.9%) female respondents who took part in the study. Majority of the respondents 93(67.9%) were between the ages of 31-40, 28(20.4%) were between the ages of 41 and above and 16(11.7%) were between the ages of 21-30. Analysis of marital status of the respondents showed that 81(59.1%) were married, while 56(40.9%) were unmarried. In terms of educational qualification, analysis showed that 89(65.0%) were SSCE holders, 16(11.7%) stopped at primary school, 12(8.8%) had tertiary education, 9(6.6%) stopped at junior secondary school, 10(7.3%) had no formal education and 1(0.7%) had other qualification which was not disclosed. In terms of duration of being in the business of food vending, 99(72.3%) had been in the business for about 1-5 years, 22(16.1%) for 6-10 years, 7(5.1%) for 11-15 years, and 9(6.6%) for over 16 years. All the respondents 137(100%) were Christians.

Table 1

Socio-demographic variables of respondents

Variables	Sub-variables	n	%
Sex	Male	7	5.1
	Female	130	94.9
Age group (year)	21-30	16	11.7
	31-40	93	67.9
	41>	28	20.4
Marital status	Single	56	40.9
	Married	81	59.1
Education	NFE	10	7.3
	Primary	16	11.7
	JSS	9	6.6
	SSS	89	65
	Tertiary	12	8.8
	Other	1	0.7
Religion	Christianity	137	100
	Islam	0	0.0
	Traditionalist	0	0.0
	Others	0	0.0

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Duration of work	1-5	99	72.3
	6-10	22	16.1
	11-15	7	5.1
	16>	9	6.6
	Total	137	0.0

From table 2, it can be seen that 136(99.3%) knew that regular hand washing is part of personal hygiene, while 1(0.7%) didn't know. 136(99.3%) knew that they ought to wash their hands before and after leaving food to do something else while 1(0.7%) said no, it wasn't necessary. 126(92.0%) said wearing apron was part of personal hygiene while 11(8.0%) said it wasn't. 118(86.1%) knew that they should wear a glove over an injured finger till it heals, 11(8.0%) said no, it wasn't necessary while 8(5.8%) didn't know if it was okay or not.110(80.3%) of the respondents knew what cross contamination was, 26(19.0%) didn't know and 1(0.7%) didn't care if she knew or not.116(84.7%) of the respondents knew that use of gloves reduce the risk of food contamination, 4(2.9%) said it didn't, while 17(12.4%) had no idea. 135(98.5%) of the respondents agreed that correct cleaning procedures of cooking utensils can reduce the risk of food contamination, 1(0.7%) said it didn't, while 1(0.7%) didn't know if it did or not.8(5.8%) of the respondents said it was okay to use one cutting board for raw and cooked food, 127(92.7%.) said it wasn't okay and 2(1.5%) didn't know if it was okay or not. Out of 137 respondents, 135(98.5%) knew that eating contaminated food can cause diseases, and 2(1.5%) said they didn't know.15(10.9%) of the respondents said diarrhoea is the only food borne illness, 113(82.5%) said it wasn't the only foodborne illness while 9(6.6%) had no idea.31(22.6%) of the respondents knew that hepatitis A was a foodborne illness, 23(16.5%) said it wasn't while 83(60.6%) didn't know if it was or not.

123(89.8%) of the respondents agreed that food vendors should stay at home when sick while 14(10.2%) said no. Out of all the respondents, only 5(3.6%) knew what temperature danger zone meant, 120(87.6%) didn't know what it meant and 12(8.8%) said they had no idea.120(87.6%) of the respondents knew that time and temperature control bacteria growth, 5(3.6%) said it didn't and 12(8.8%) didn't know if it did.119(86.9%) of the respondents knew that meat should be cooked at a certain temperature for a long time, 14(10.2%) said it wasn't necessary and 4(2.9%) didn't know if it was good or not. Over all, most of the respondents (80.3%) had high knowledge of food hygiene and safety, as seen on figure 2.

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Table 2

General responses on knowledge of food hygiene and safety

Variables	Frequency	Percentage(%)
Regular hand washing is part of personal hygiene		
Yes	136	99.3
No	0	0.0
Don't know	1	0.7
Wash hands when you leave food to do something else		
Yes	136	99.3
No	1	0.7
Don't know	0	0.0
Wearing apron is part of personal hygiene		
Yes	126	92.0
No	11	8.0
Don't know	0	0.0
Wear a glove when you have a cut		
Yes	118	86.1
No	11	8.0
Don't know	8	5.8
Do you know what cross contamination is		
Yes	110	80.3

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No	26	19.0
Don't know	1	0.7
Use of gloves reduce the risks of food contamination		
Yes	116	84.7
Don't know	4	2.9
Clean utensils can reduce risks of contamination		
Yes	135	98.5
No	1	0.7
Don't know	1	0.7
Use one cutting board for raw and cooked food		
Yes	8	5.8
No	127	92.7
Don't know	2	1.5
Eating contaminated food causes food borne illnesses		
Yes	135	98.5
No	0	0.0
Don't know	2	1.5
Diarrheal disease is the only food borne illness		
Yes	15	10.9
No	113	82.5
Don't know	9	6.6
Hepatitis A is a food borne illness		
Yes	31	22.6
No	23	16.5

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Don't know	83	60.6
You should stay at home when sick		
Yes	123	89.8
No	14	10.2
Don't know	0	0.0
Do you know what temperature danger zone is?		
Yes	5	3.6
No	120	87.6
Don't know	12	8.8
Time and temperature control bacteria growth		
Yes	120	87.6
No	5	3.6
Don't know	12	8.8
Meat should be cooked at certain high temperature		
Yes	119	86.9
No	14	10.2
Don't know	4	2.9

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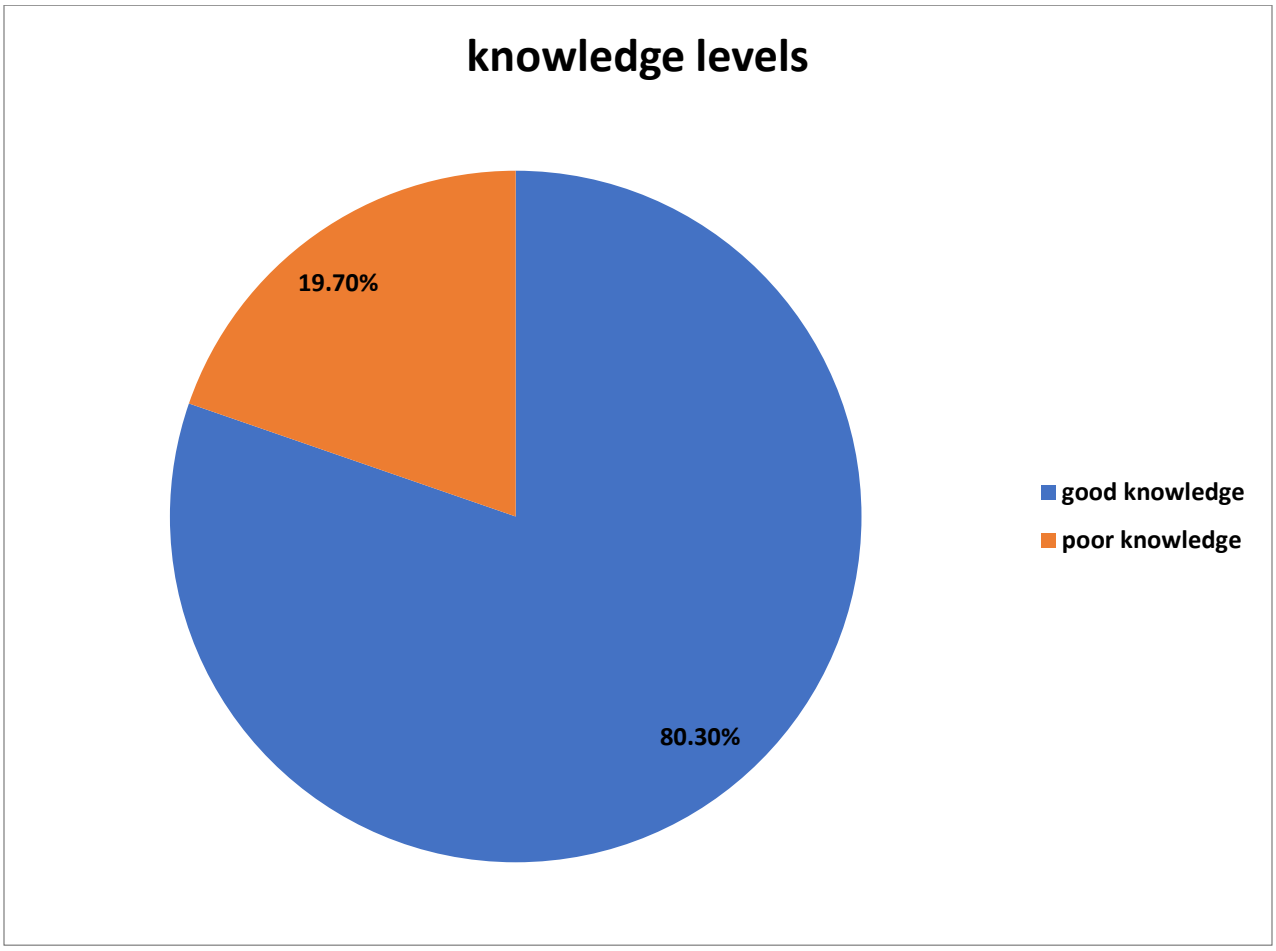

Most of the respondents (80.3%) had high knowledge of food hygiene and safety

(Chi cal. = 962.782; df = 14; p<0.01)

Figure 2: pie chart showing knowledge levels

From table 3, it can be seen that 135(98.5%) of the respondents thought that food hygiene and safety was important while 2(1.5%) didn't know if it was important or not. 116(84.7%) of the respondents thought they should carry out regular health assessments, 18(13.1%) thought it wasn't necessary while 3(2.2%) didn't know if it was necessary or not. Majority of the respondents 133(97.1%) thought that washing of hands with soap and running water while cooking was important, 3(2.2%) thought it wasn't important while 1(0.7%) didn't know if it was important or not. 2(1.5%) of the respondents thought it was okay to store raw and cooked food together, majority, that is 135(98.5%) thought it wasn't okay to do that. From figure 3, majority of the respondents (94.7%) had a positive attitude towards food hygiene and safety

Table 3

General responses on attitude of food hygiene and safety

Variables	Frequency	Percentage(%)
Do you think food hygiene and safety is important		
Yes	135	98.5
No	0	0.0
Don't know	2	1.5
Regular health assessments		
Yes	116	84.7
No	18	13.1
Don't know	3	2.2
Periodic hand washing while cooking is important		
Yes	133	97.1

No	3	2.2
Don't know	1	0.7
Store raw and cooked food together?		
Yes	2	1.5
No	135	98.5
Don't know	0	0.0

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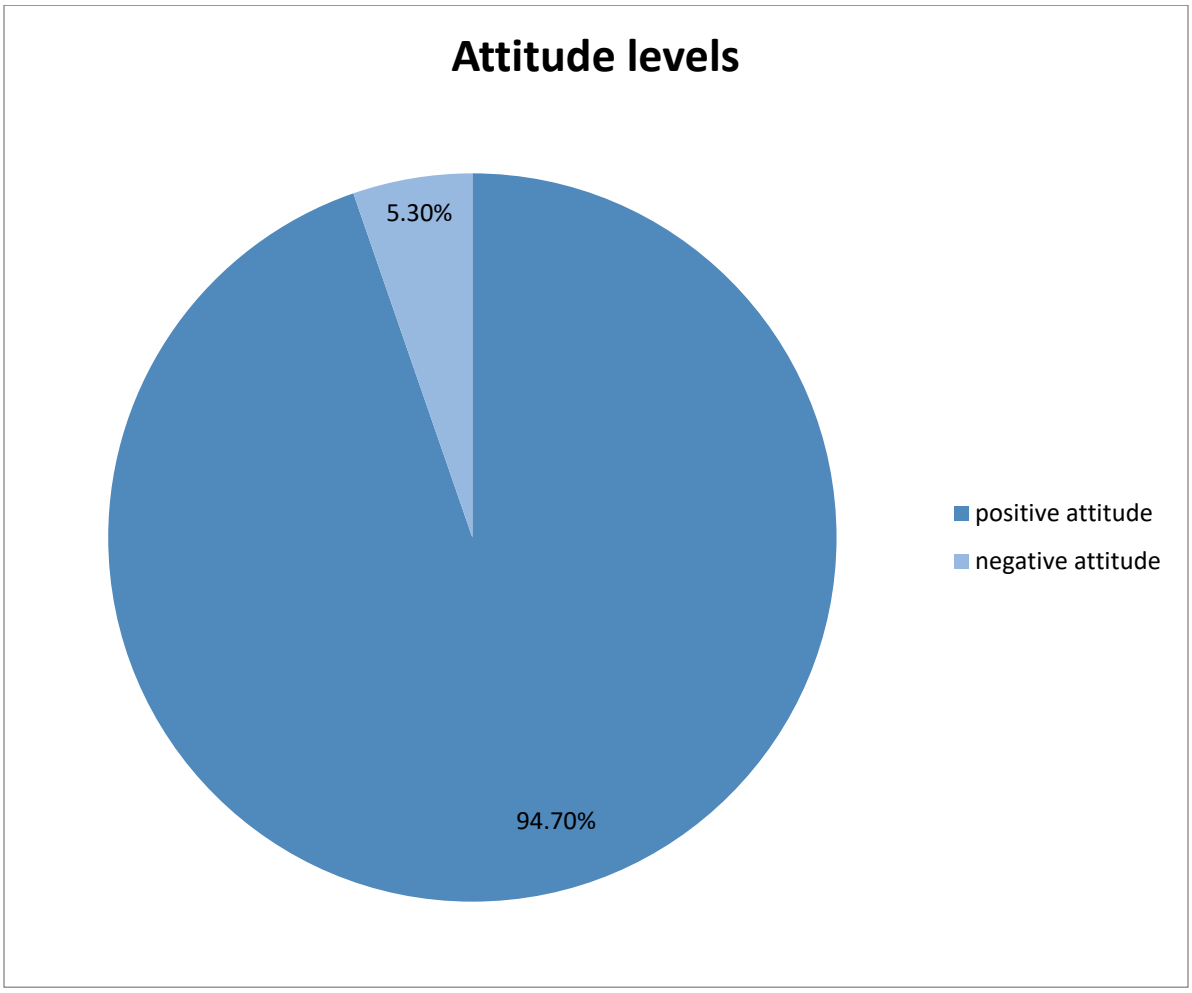

Majority of the respondents had positive attitude(94.7%) towards food hygiene and safety (Chi cal. = 37.101; df = 3; $p<0.01$)

Figure 3: pie chart showing attitude of food vendors

From table 4, the analysis of practice of food hygiene shows that majority of the respondents 92(67.2%) washed their hands all the time before they start preparing food while 45(32.8%) only

washed their hands sometimes. About 48(35.0%) of the respondents always wear aprons, gloves head coverings and masks when handling food, 80(58.4%) only wear them sometimes while 9(6.6%) never wear them. Out of 137 respondents, majority 134(97.8%) did not store raw and cooked food together while 3(2.2%) stored them together. When asked how they preserved their leftovers, 69(50.4%) said they preserved them in the refrigerator, 63(46.0%) said they ate the leftovers so as to have only fresh meals every day while 5(3.6%) said they warmed the leftovers against the next day. All the respondents 137(100%) washed their plates and utensils with water and detergent in a bowl. None of them used running water. Majority of the respondents 135(98.5%) check for expiry dates of the food ingredients they buy while 2(1.5%) do not check. When asked about their source of water, all the respondents 137(100%) said they got their water from a borehole close to them. Majority of the respondents (70.8%) practiced good food hygiene and safety as seen on the bar chart in figure 4.

Table 4

General responses on practice of food hygiene and safety

Variables	Frequency	Percentage(%)
Wash hands before food preparation		
All the time	92	67.2
Sometimes	45	32.8
Never	0	0.0
Wear apron, gloves		
Yes	48	35.0

Never	9	6.6
Sometimes	80	58.4
Do you store raw and cooked food together?		
Yes	3	2.2
No	134	97.8
How do you preserve your left over?		
Refrigerator	69	50.4
Eat them and make fresh food daily	63	46.0
Warm them	5	3.6
Wash utensils with detergent &running water?		
Yes	0	0.0
Without detergent	0	0.0
With detergent in a bowl	137	100.0
Check for the expiry dates?		
Yes	135	98.5
No	2	1.5
Source of water used		
Well	0	0.0
Borehole	137	100.0
Pond	0	0.0
Stream	0	0.0

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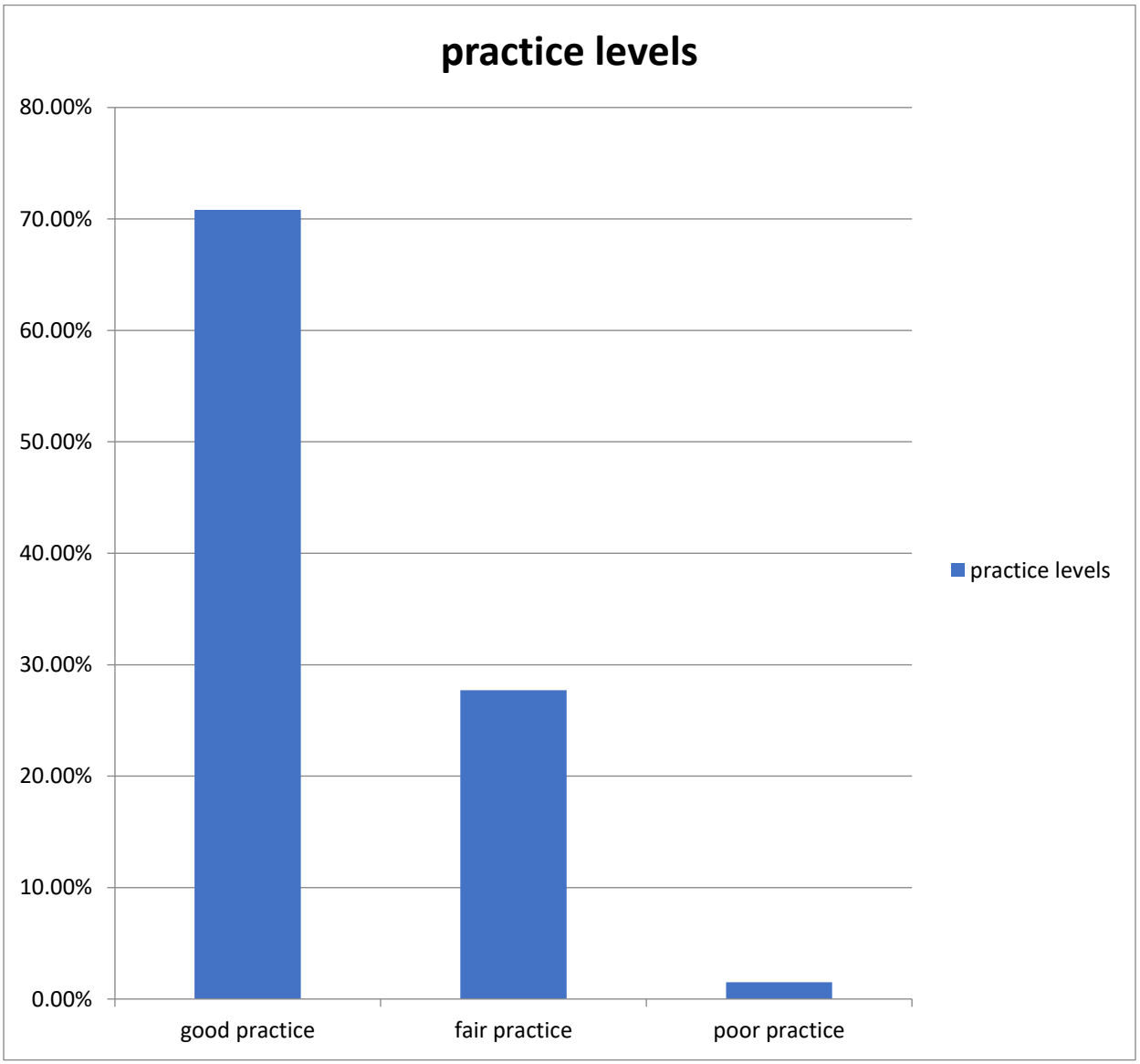

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Good practice of food hygiene and safety was exhibited by most of the respondents (70.8%), 27.7% exhibited fair practice while 1.5% exhibited poor practice levels

(Chi cal. = 615.665; df = 6; $p<0.01$)

Figure 4: Bar chart showing levels of practice

The knowledge level of respondents related positively with their practice of food hygiene and safety. ($p<0.05$)

Table 5

Relationship between knowledge, and practice of food hygiene and safety by respondents

Parameter	Practice
Pearson Correlation	0.228**
Sig. (2-tailed)	0.007
N	137

Knowledge of respondents related positively and significantly ($p<0.05$)

with their practice of food hygiene and safety

A checklist was made to identify WASH facilities in and around the food stations. It contained items like Pipe borne water, Sink with running water, restrooms with running water, restrooms with no water, open bins around food stations, dump site in close proximity, stagnant water around and rodents in food stations. None of the food stations had pipe borne water. All of the food stations 137(100.0%) did not have sinks with running water. Majority of the food stations 106(77.4%) had soap for hand washing, while 31(22.6%) did not have it. All the food stations 137(100.0%) did not have restrooms that had running water in them. Majority of the food stations 111(81.0%) did not have any restrooms at all while 26(19.0%) had restrooms with no water. Majority of the food stations 83(60.6%) did not open bins around them while 54(39.4%) had open bins around. Most of the food stations 92(67.2%) did not have dumpsites in close proximity while 45(32.8%) had dump sites in close proximity. Out of 137 food stations visited, 57(41.6%) had stagnant water around them while 80(58.4%) did not have. Most of the food stations 113(82.5%) did not have rodents in them while 24(17.5%) had rodents in them.

Table 6

Summary of checklist for available facilities in and around the food stations

Variable	Present	Absent	Total
Pipe-borne water	0 (0.0%)	137 (100.0%)	137 (100.0%)
Sink with running water	0 (0.0%)	137 (100.0%)	137 (100.0%)
Soap for hand washing	106 (77.4%)	31 (22.65)	137 (100.0%)
Restrooms with running water	0 (0.0%)	137 (100.0%)	137 (100.0%)
Restrooms with no water	26 (19.0%)	111 (81.0%)	137 (100.0%)
Open bins around food stations	54 (39.4%)	83 (60.6%)	137 (100.0%)
Dump site in close proximity	45 (32.8%)	92 (67.2%)	137 (100.0%)

Stagnant water around	57 (41.6%)	80 (58.4%)	137 (100.0%)
Rodents in the food station	24 (17.5%)	113 (82.5%)	137 (100.0%)

Discussion

This study revealed that the level of knowledge of food hygiene and safety was high among the respondents. This may be due to the fact that an urban setting was used for this study. This is in addition to the relatively high educational qualifications of the respondents as most of them had completed their SSCE. This is in line with a study conducted in Nasarawa state by Yusuf &Chege [9] who found a high level of knowledge (96.6%) among food vendors. Findings from this study are in contrast with a study conducted among food vendors in Cameroon which found that 57% of the food vendors had poor knowledge of food hygiene and safety. Findings from this study are also in line with a study carried out in Ghana which showed that the food vendors had a high level of knowledge of food hygiene and safety.[10] This study is also in agreement with a study conducted in Iraq which showed that over 90% of the food vendors had good knowledge of food hygiene and safety.

The study showed that the food vendors had positive attitude towards food hygiene and safety as 94.7% of the respondents had positive responses to this section of the questionnaire. In addition to this about 97.1% of the respondents thought that it was important to wash hands periodically while cooking.84.7% of the respondents thought that the health status of food vendors should be assessed regularly and 98.5% thought that raw and cooked food should be kept separate, this is consistent with a study that was conducted in china where majority of the respondents also shared the same line of thought above (Ma et.al, 2019). This study is also similar to a study conducted in Kuwait where 94% of the food vendors had positive attitude towards food hygiene and safety.[11]

The results from this study show a moderately good practice (70.8%). Though they all get their water from the borehole and check for expiry dates of their food ingredient, none of them washed their utensils under running water and only 35% always washed their hands before they start cooking. A study conducted in Nasarawa, showed a level of practice that was categorized a fair which may be similar to this study, as 70.8% is not exactly a very high practice. [9]

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From the results of this study, it can be seen that there was a positive relationship between knowledge level and practice. This finding is in agreement with a study conducted in Uyo which also showed that there was a relationship between knowledge and practice (Johnson, 2019). Another study carried out in Imo state, Nigeria, by Iwu, *et al*[12] also showed a positive and significant relationship between knowledge and practice of food hygiene and safety. Alemayehu *et al*[13] also conducted a study in Ethiopia, which showed that good levels of knowledge were positively related with satisfactory levels of practice of food hygiene and safety, and this corresponds with this study. The positive correlation shown between knowledge level and practice in this research corresponds with a study done in Kuwait.[11]

According to results from this study, most of the food stations did not have the required WASH facilities. This may be due to the fact that most of the food stations were small scale businesses and the food vendors do not make enough money to provide these facilities. None of the food stations had pipe borne water, sink with running water or restrooms with running water, this in contrast with findings from study conducted in Benin city by Okojie & Isah, [14], which showed that 90.5% of the food stations had the required facilities.

Conclusion

Knowledge of food hygiene and safety among stationary food vendors in major markets in Calabar metropolis was high, but 87.4% did not know that hepatitis A was a food borne disease and 96.4% did not know what temperature danger zone meant. The attitude towards food hygiene and safety was also positive. The level of practice was moderately good. The high level of knowledge is statistically related to the level of practice. None of the food stations had sink with running water or pipe borne water. The conditions of the food stations were not satisfactory.

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