



Factors affecting food hygiene practices of local food vendors in Obio-Akpor Local Government Area of Rivers State

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GSC Advanced Research and Reviews, 2025, 23(03), 074-084

Publication history: Received on 30 April 2025; revised on 10 June 2025; accepted on 12 June 2025

Article DOI: <https://doi.org/10.30574/gscarr.2025.23.3.0159>

Abstract

Background: The birth of globalization gave rise to an increase in local food vending businesses in our societies, thereby making local food vendors key contributors to nutritional status of the population, which impacts health. Poor food hygiene practices by food vendors/handlers have led to consumption of unsafe food, consequently causing outbreak of food borne diseases which has increased morbidity and mortality rates in our country.

Objective: The aim of this study is to determine the factors affecting food hygiene practices of local food vendors in Obio-Akpor Local Government Area (LGA) of Rivers State.

Methods: This study is a descriptive cross-sectional study. The sample size calculated to be 422 using Cochran formula and a multi-stage sampling technique was employed to recruit the study participant. A pretested interviewer-administered questionnaire was used to collect data. Data generated was analysed using version 26 of SPSS.

Results: Findings from this study showed that only 37.6% and 36.3% of respondents who possessed good knowledge and attitude respectively, practiced good food hygiene. This implies that having good knowledge and attitude of food hygiene does not always translate to good practice.

Conclusion: This study reveals that a greater proportion of the food vendors lack basic infrastructure such as good water source and license, which is important to enhance food hygiene practices. Therefore, government should provide basic infrastructure necessary to improve food hygiene practices and ensure registration and licensing all food vendors.

Keywords: Food Hygiene; Practices; Factors; Local Food Vendors; Obio Akpor LGA

1. Introduction

Food is essential for human survival, and in other to sustain life and promote good health, accessing adequate quantity of wholesome and nutrient rich food is paramount. Food hygiene is an extensive procedure which should be maintained starting from the production stage to the consumption stage for adequate nourishment of the human body and diseases prevention. Food hygiene practices are those measures taken or applied by handlers of food during production, transportation, processing, preparation or storage to avoid contamination but, ensure the food is safe and suitable at every point of the food chain for safe consumption. Food poisoning outbreaks are caused majorly by bacteria, supported by inadequate cooking, cross-contamination, and improper storage temperatures in street food stalls and food enterprises, in the recent years. Food hygiene has a direct connection to the 17 Sustainable Development Goals, especially in achieving goals 2 (zero hunger) and 3 (good health and well-being).

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In advanced and underdeveloped countries, food borne diseases have become an increasing problem of significant public health importance [1]. Food borne diseases arise as a result of consumption of contaminated foods and drinks causing various illnesses depending on the disease pathogen. The World Health Organization said in a report that food borne disease (FBD) has compounded the morbidity and mortality rate worldwide [2] however, the cost of unhealthy food, and especially the threat posed as a result of chemical and parasitic contaminants in food, is still unknown [3]. Food safety remains marginalized, despite the growing international publicity on food poisoning as a compelling danger to health and development of the economic. The lack of accurate data on the full extent and cost of food borne diseases, which would enable policymakers to set public health priorities and allocate resources, is a barrier to adequately addressing food safety concerns [2]. Food borne diseases epidemiological data remain scarce, especially in developing nations. The awareness and investigation of Food poisoning outbreaks are usually neglected and may only be visible if associated with an utmost community health or financial consequences [2].

The nutrient intake, absorption, and utilization of vulnerable sub-populations, specifically children, older adults and pregnant women, are threatened by disruption in food hygiene processes. Food borne diseases leading to frequent bowel movement negatively impacts dietary needs of an individual by decreasing nutrient absorption and aggravating nutritional deficiencies. A chain reaction of poor health and well-being arises from unavailability and inaccessibility to nutrient rich and hygienic foods. A notable civil and financial consequence result to income losses and decreased accessibility to the market, which is imposed by consumption of unhygienic food, beyond its direct health effect [4]. Factors such as the need for affordable and nutritious foods by town or city residents due to the current economic meltdown, population migration and, changing demands of consumers behavior have led to increase in the population that depend on ready-to-eat-foods from local food vendors [5]. Consequently, these factors have added to the challenges in food hygiene due to inadequate allocation or lack of allocation of resources for controlling and implementing interventions to foster food safety in some regions, thereby increasing food borne diseases occurrence [2].

Local food vendors are also referred to as street food vendors. They prepare and sell ready-to-eat foods in our streets and other public places such as markets, in makeshift or temporary structures such as, kiosks and, pushcart. They are either stationary or mobile. In Nigeria, they are frequently referred to as "mama-put," and the food they offer is known to as "street food." The local food sector has given people the chance to work for themselves and build their own businesses skill. It also offers urban residents affordable, diverse, and nutrient-rich indigenous meals, and it has grown to be a significant source of earnings for vendors, especially women [6]. According to Omemu and Aderoju [7], the "food vendors earn more than some countries minimum wage". Food vendors play a crucial part in food safety and in transmitting food borne diseases to consumers, because they can introduce pathogens into foods during preserving, preparing, selling and serving of food [8]. They frequently lack expertise in food safety and appropriate hygiene standards [9]; therefore, the comprehension of food hygiene practices and the potential factors that causes food borne diseases is important to food sellers.

Food borne disease is a global health problem that has increased the morbidity and mortality rate in our countries [2]. This has been linked to personal hygiene, environmental sanitation, and food hygiene. Passing through the streets, roads, and public places in Obio/Akpor LGA, Rivers State and Nigeria at large, it is very common to see food vendors sited close to a waste disposal ground or drainage system with make-shift structures, no source for water supply; cooking, selling and serving foods to their customers. These areas are often infested with flies which act as vectors carrying microorganisms/pathogens and contaminating foods which causes ill-health.

Food borne diseases could result due to poor handling of food or cooking and serving foods especially meat and meat product that are contaminated with toxin. Growing-up in Nsukka there was a case of hospitalization and death in my neighborhood as result of consumption of pork meat used in preparing food during a burial. As Rivers state especially Obio/Akpor and Port Harcourt LGA join the globalized world, there is increase in out-of-home feeding leading to proliferation of local food vending sites as majority of the working population, especially small-scale business owners depend on the local food vendors for their meals, mostly breakfast and lunch. Also, it is a very familiar sight in our society to see parents as they take their children to school in the morning stop by the roadside to buy food for their children which could lead to diarrhea or dysentery in children. I have also been a victim of food borne illness as result of consumption of the popular bole during my internship year in the University of Port Harcourt Teaching Hospital.

In Nigeria, there is no official food borne disease surveillance system leading to under reporting of cases of food borne poisoning resulting in hospitalization and deaths [10]. The Nigerian Centre for Disease Control (NCDC) was alerted to an outbreak of botulism which was connected to food consumption in Abuja [11], which is one in many cases. An estimate of over 200,000 Nigerians dies annually from food poisoning due to contamination by food borne pathogens (especially *Escherichia coli* and *Salmonella*) [12]. It is of importance to note that *Escherichia coli*, *Shigella*, *Staphylococcus*

aureus and *Clostridium spp* have been isolated from fresh-cut ready-to-eat fruits, vegetables and ready-to-eat-foods that is sold usually on the streets, roadsides, and public places in Nigeria [13].

This research aims to assess the factors affecting food hygiene practices of local food vendors in Obio-Akpor local government area of Rivers State. It is proposed that this research, when completed, will provide primary evidence on the depravity of this challenge in the research centre, and provide evidence with which public health experts, government and other stakeholders can improve on the training and regulation of food vendors and for the provision of safe food for the teeming population. Additionally, this research will provide additional data which will serve as secondary data for systematic reviews and meta-analyses on the subject, and therefore, contribute to the availability of rich evidence on which to base practice in the region.

2. Materials and method

2.1. Study Design

This is a descriptive cross-sectional study of the factors affecting food hygiene practices of local food vendors in Obio-Akpor LGA of Rivers State.

2.2. Study Population

The study population comprises of all local food vendors who sell cooked food on the streets and public places, who have been in the business for at least 6 months and, are daytime food vendors. Local food vendors who are acutely ill, mobile and below the age of 18 were excluded from this study.

2.3. Sample Size Determination

The Cochran [14] formula was used in determining the minimum sample size, which is 424.

Cochran formula: $n = Z^2pq/e^2$

2.4. Sampling Technique

This study used the multi-stage sampling method which is a probability sampling technique to recruit food vendors consenting to the research across the 17 wards in Obio-Akpor LGA of Rivers State, using a step-by-step approach.

- **Stage 1:** A sampling frame of all the wards in the LGA was developed and a simple random sampling was done using balloting to select 8 wards from the 17 wards. Wards 2, 5, 6, 7, 9, 11, 12 and, 15
- **Stage 2:** Out of the 8 wards selected, a sampling frame of all communities was developed, and simple random sampling was used to select 2 communities from each ward. In communities where the required number of participants cannot be gotten, participants will be recruited from another randomly selected community within the same ward. 18 communities were selected.
- **Stage 3:** Cluster sampling was applied to select 26 study participants from the randomly selected communities. Study participants were recruited until the desired sample size was achieved.

This exercise was carried out within 4 weeks, from 3rd of April to 30th April 2022. Two people were trained to assist in data collection. In situation where the chosen subject is not willing to participate, the next willing subject is recruited and assessed. This process was continued until the required sample size was achieved.

2.5. Study Instruments and Tools

A structured, pre-tested interviewer administered questionnaire with closed-ended questions was used for the collection of data to assess the socio-demographics information of the food vendors and food hygiene knowledge, attitudes, practices, and factors affecting food hygiene.

2.6. Data Entry Plan and Analysis

The data generated was collated, sorted and cleaned using Microsoft Excel sheet version 2016. The cleaned data was exported and analyzed using version 26 Statistical Package for Social Sciences (SPSS).

The continuous variables were summarized using mean and standard deviation, while the categorical variables were summarized using frequency and percentages. Additionally, Chi square test was used to determine the association

between the categorical variables and the p-value set at less than 0.05 significant level ($p < 0.05$) and confidence interval at 95%.

2.7. Challenges

- Refusal of food vendors to participate in study due to fear of government interference and taxation.
- Communication issue as a result of language barrier or lack of understanding.
- Variability in weather condition and working hours for different food vendors.
- Financial constraint as a result of hike in fuel price leading to increased cost for transportation.

3. Results

Table 1 Social demographic Data

Variable	Frequency n=422	Percent (%)
Age group		
18-25	15	3.6
26-35	147	34.8
36-45	195	46.2
>45	65	15.4
Sex		
Female	355	84.1
Male	67	15.9
Marital status		
Single	73	17.3
Married	314	74.4
Divorced	6	1.4
Widowed	27	6.4
Others	2	0.5
Education		
No formal education	6	1.4
Vocational	36	8.5
Primary	18	4.3
Secondary	269	63.7
Tertiary	93	22
Religion		
Christian	402	95.3
Islam	20	4.7
Vendor		
Stationary	422	100.0
Yrs. Of Exp.		
<5 years	95	22.5
6-10 years	230	54.5

11-15 years	69	16.4
16-20 years	18	4.3
> 20 years	10	2.4
License to operate		
Yes	28	6.6
No	394	93.4

The table 1 shows that 15(3.6%) of the respondents were between the ages of 18-25 years, 147(34.8%) were between the ages of 26-35 years, 195(46.2%) were between the age of 35-45 years and 65(15.4%) were >45 years. Females were 355(84.1%) and males were 67(15.9%). Assessing the respondents' educational status, 6(1.4%) had no formal education, 36(8.5%) had vocational education, 18(4.3%) had primary education, 269(63.7%) had secondary education and, 93(22%) had tertiary education.

Findings among the respondents revealed that 230(54.5%) had between 6-10 years' experience, 394(93.4%) had no license to operate.

Table 2 a Factors affecting hygiene practices

Variable	Frequency n=422	Percent (%)
Have a valid food handler certificate		
Yes	24	5.7
No	398	94.3
Frequency of food inspectors visit to assess hygiene and safety assessment		
Never	356	84.4
Yearly	4	0.9
Half yearly	4	0.9
Quarterly	4	0.9
Monthly	54	12.8
Source of water		
Bore hole	12	2.8
Running water/plastic tanks	10	2.4
Water in buckets/gallon	360	85.3
Tap water	40	9.5
Have soap/sanitizer		
Yes	372	88.2
No	50	11.8
Access to toilet running water/soap		
Yes	149	35.3
No	273	64.7
Place of food preparation		
At home	132	31.3
On the spot	264	62.6

In a professional kitchen	26	6.2
When do you buy fish/meat		
The same day	150	35.5
The day before	171	40.5
A few days before	101	23.9
Preserve raw meat/fish/eggs		
Refrigerator	56	13.3
In a cooler	2	0.5
Parboil	254	60.2
No preservation	110	26.1

The result in table 2a shows that only 24(5.7%) of the respondents have a valid certificate to handle food and 356(84.4%) of the respondents are never had food inspectors visit to assess food hygiene and safety practice. Among the respondents, 360(85.3%) water source are stored in buckets/gallons, only 40(9.5%) have tap water as the water source. Among the respondents, 372(88.2%) have sanitizer/soap at the point of their services and, 149(35.3%) of the respondents have access to toilet with running water/soap. Also, 264(62.6%) of the respondents prepare their food on the spot, 171(40.5%) buy their raw meat/fish/eggs a day before day prepare and 245(60.2%) preserve their meat/fish/egg by parboiling them.

Table 2 b Factors affecting hygiene practices

Variable	Frequency n=422	Percent (%)
Have a fridge at home		
Yes	260	61.6
No	162	38.4
Site close to waste dump or drainage		
Yes	212	50.2
No	210	49.8
Type of vending site		
Kiosk	12	2.8
Canopy/umbrella	108	25.6
No shelter	33	7.8
Make-shift structure	103	24.4
Roofed building	166	39.3
Type of warmer/holding equipment		
Warmer/cooler	277	65.6
Plastic containers	21	5.0
Stainless containers	124	29.4
Nylon bags		

Findings in table 2b shows that 260(61.6%) of the respondents had a fridge at home, 212(50.2%) of the respondents' site is close to a dump or drainage site, only 166(39.3%) respondents operate in a roofed building and 277(65.6%) of the respondents used warmer/cooler as holding equipment.

Table 3 Factors associated with food hygiene practice

Variable	Practice		OR (95% C.I.)	χ^2 (p<0.05)
	Poor/Fair n (%)	Good n (%)		
Sex				
Female	217(61.1)	138(38.9)	0.2(0.1-0.5)	18.068(<0.001) *
Male	59(88.1)	8(11.9)		
Age group				
≤35 years	107(66.0)	55(34.0)	1.0(0.7-1.6)	0.049(0.826)
>35 years	169(65.0)	91(35.0)		
Marital status				
Single/Divorced/ Widowed/Others	82(75.9)	26(24.1)	2.0(1.2-3.2)	7.103(0.008) *
Married	194(61.8)	120(38.2)		
Education				
≤ Secondary education	230(69.9)	99(30.1)	2.4(1.5-3.8)	13.396(<0.001) *
Tertiary education	46(49.5)	47(50.5)		
Years of Experience				
≤10 years	214(65.8)	111(34.2)	1.1(0.7-1.7)	0.123(0.726)
>10 years	62(63.9)	35(36.1)		
Have license				
Yes	26(92.9)	2(7.1)	7.5(1.8-32.0)	9.990(0.002) *
No	250(63.5)	144(36.5)		
Training on food hygiene				
Yes	34(60.7)	22(39.3)	1.3(0.7-2.3)	0.627(0.428)
No	242(66.1)	124(33.9)		
Knowledge				
Poor/Fair	37(94.9)	2(5.1)	11.1(2.6-46.9)	16.492(<0.001) *
Good	239(62.4)	144(37.6)		
Attitude				
Negative	23(92.0)	2(8.0)	6.5(1.5-28.2)	8.308(0.004) *
Positive	253(63.7)	144(36.3)		

Table 3 shows that sex ($\chi^2=18.068$, $p<0.001$), marital status ($\chi^2=7.103$, $p=0.008$), were significantly associated with hygiene practices of local food vendors. This implies that the food vendors who are females and those who are married were 0.2 and 2.0 times respectively more inclined to good food hygiene practices compared to those who are males (OR=0.2; 95%CI: 0.1-0.5) and are not married (OR=2.0; 95%CI: 1.2-3.2). A statistically significant association exists between education and food hygiene practices ($\chi^2=13.396$, $p<0.001$). Food vendors who had tertiary education were 2.4 times more inclined to food hygiene practices. Also, a statistically significant association was observed between having a license and food hygiene practices ($\chi^2=9.990$, $p=0.002$). Local food vendors without license were 7.5 times more likely

to practice good food hygiene (OR=7.5; 95%CI: 1.8-32.0). It is important to note that only 36.5% of local food vendors without license practiced good food hygiene as against 7.1% of those with license.

Furthermore, an association between knowledge and hygiene practices of local food vendors was statistically significant ($\chi^2=16.492$, $p<0.001$). This implies that local food vendors with good hygiene practices are 11.1 times more likely to be exposed to good knowledge of food hygiene (OR=11.1; 95%CI: 2.6-46.9). Although only 37.6% of those who possessed good level of knowledge practiced good hygiene. Also, an association between attitude and hygiene practices of local food vendors was statistically significant ($\chi^2=8.308$, $p=0.004$). Only 36.3% of those with positive attitude practiced good hygiene. The local food vendors who practiced good hygiene were 6.5 times more likely to possess positive attitude towards food hygiene and safety (OR=11.1; 95%CI: 2.6-46.9).

4. Discussion

4.1. Factors associated with Hygiene Practices

Hygiene practices during food handling are a key determinant to safe food. This study shows that sex ($p<0.001$), marital status ($p=0.008$), education ($p<0.001$), license ($p=0.002$) was significantly associated with hygiene practices of local food vendors (LFVs). LFVs who had tertiary education were 2.4 times more inclined to good food hygiene practices (FHP). LFVs without license were 7.5 times more likely to practice good food hygiene. It is important to note that only 36.5% of LFVs without license practiced good food hygiene as against 7.1% of those with license, this implies that having a license does not translate to good FHP. Food hygiene knowledge ($p<0.001$) and attitude ($p<0.004$) were significantly associated with hygiene practices. Although only 37.6% and 36.3% of respondents who possessed good knowledge and attitude respectively, practiced good food hygiene. This study shows that majority of food LFVs having good knowledge and attitude did not put it into practice and some are still careless with FHPs as supported by studies by Muyanja et al., [15] and Liu et al., [16].

The finding in this is somewhat synonymous to the finding reported in Bauchi where knowledge ($p=0.002$), attitude ($p=0.040$) and, training ($p=0.015$) had significant association. While gender, age, education, marital status, and years of experience showed no association with hygiene practice [17]. In a study in Jos, age, education, training on food hygiene and food hygiene knowledge (FHK) showed a significant association with food hygiene practice. The older a food vendor (FV) is, the better the hygiene practice [18]. Iwu et al., [5], reported a statistically significant association for food hygiene practice with food safety/hygiene knowledge, attitude, and training in Owerri. A contrasting study in North Dayi District and Ejisu-Juaben, both in Ghana found that registered street food vendors (SFVs) ($p<0.001$) and license ($p\leq 0.002$) respectively were significantly associated with hygiene practice. Trained FVs were 5.97 times more inclined to good FHP in North Dayi District, also, training was significantly associated with hygiene practice [19], [20]. A multivariate analysis in Dangila town, Ethiopia showed that marital status and monthly income were associated with food hygiene practice which is contrasting to this study but also revealed that knowledge was associated with food hygiene practice [21]. Another study at the University of Gondar, Northwest Ethiopia reported a somewhat similar result of age, sex, years of experience and level of education having a significant association with hygiene practices. Food safety/hygiene knowledge and attitude were not associated to FHP [22].

The findings in Northern Kuching city showed that training on FHP, age, knowledge, and attitude were significantly associated with FHP [23]. In another study, religion ($p=0.021$), knowledge ($p=0.040$) and attitude ($p=0.020$) were found to be significantly associated with FHP [24]. A study by Htway and Kallawicha [25] supports that level of education and knowledge are associated with FHP, but training is not. Also, in Kolkata India, a study conducted supports that educational level and marital status have an association with food hygiene practice but no significant association with knowledge and attitude which contrasts with the finding in this study [26]. A study in a governmental organization Tehran supports that food hygiene attitude and age are statistically significant with hygiene practice [27].

5. Conclusion

The hygiene practices of the LFVs play a significant role in the health of the populace due to increase of out-of-home-feeding as a result of globalization. This has created a lucrative business for LFVs as many mothers have joined the teaming workforce leading many families to depend on LFVs who sell ready-to-eat-foods, which are very affordable and easily accessible. These food vendors play an important role in food safety and food borne illness because many of them operate under unhygienic conditions which introduce harmful microorganisms during food preparation, serving and storage.

Having a license for operation was statistically significant to hygiene practices, although, those without license were 9.9 times more likely to have GHP. Hygiene practices of the LFVs were influenced by sex, marital status, level of education, having a license, knowledge, and attitude. Statistically significant association were found between knowledge of food hygiene ($p<0.001$), food hygiene attitude ($p=0.004$) and food hygiene practices. Stemming from the findings in this study, I recommend the following

- Researchers should endeavour to give feedback of performance to participant food vendors after assessing them and educate them on appropriate food hygiene practices and its benefit to health.
- Food vendors' association or union should be created at the local government levels. This is essential to regulate their activities and ensure registration of food vendors of which Environmental Health Officers (EHOs) should be a member of the union.
- EHOs should ensure that food vendors carry out medical examination before registration and subsequently monitor food vendor to ensure they carryout periodic medical examination and practice good food hygiene through routine supervision.
- Workshops should be organized yearly for food vendors and evaluation of food hygiene knowledge and skills tested before yearly renewal of their license to operate by concerned bodies in the State government.
- The government should set-up systems to track, report, and monitor food borne disease outbreak and formulate guidelines to regulate food vendors' activities and produce information materials on food hygiene practices. Also, they should establish system to penalize defaulters.
- Collaboration of federal, state government, primary health care management board and non-governmental organization interested in street food safety to ensure effective implementation of food policies and organize regular training programs and workshops based on evidence from research for food vendors to improve knowledge and skills.
- Government should provide basic infrastructure such as electricity, stalls, pipe borne water supply etc. necessary to improve hygiene practices of LFVs.

Compliance with ethical standards

Acknowledgments

Our gratitude goes to God, then to the research assistants trained to collect data, local food vendors who participated in this study, and family who offered unconditional support during the period of the study.

Disclosure of conflict of interest

The authors declare that there is no conflict of interest.

Statement of ethical approval

Ethical approval and clearance for this study was sort and obtained from the Ethical and Research Committee of the University of Port Harcourt before commencing the study with the protocol number UPH/CEREMAD/REC/MM84/034. Permission was also obtained from environmental health office in Obio/Akpor LGA.

Statement of informed consent

Informed consent was solicited and obtained from each food vendor during the course of the study. The selected food vendors were assured of confidentiality and anonymity, which was maintained during the study, also participation of the subjects was voluntary.

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