Food Hygiene Practices among Food Vendors in Odeda Local Government Area, Ogun State, Nigeria

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ABSTRACT

Background: *The continuous rise in the incidence of food borne illness has led to an increase in global concern about food hygiene practices among food handlers and vendors.*

Objective: *To assess the food hygiene practices among food vendors in Odeda Local Government Area of Ogun State, Nigeria.*

Methodology: *The study adopted a descriptive cross-sectional design involving 150 food vendors. Semi-structured questionnaire including an observational section modified by Society for Family Health (SFH) Water, Hygiene and Sanitation checklist were used to elicit relevant information. Data were analyzed and presented using frequencies, percentages, means, standard deviation and Chi square used to test for association between relevant variables at 0.05 level of significance.*

Results: *Food vending business was dominated by women (90%), almost 49% were aged 30-40yrs and 66.7% had food handler certificate. The food vendors demonstrated good food hygiene practices as 99.3% wash hands before cooking and after handling raw foods. Observation of environmental and personal hygiene revealed that 54% cooked in clean environment while 80% had no food debris observed on their hands. The food vendors environmental hygiene was influenced by age ($p = 0.044$), level of education ($p = 0.002$), monthly income ($p = 0.006$), and refuse disposal method ($p = 0.034$).*

Conclusion: *The food vendors displayed good food hygiene practices with suboptimal environmental practices. Regular environmental inspections by appropriate authorities to enforce and promote adequate environmental measure among food vendors is recommended.*

Keyword: *Food hygiene, environmental hygiene, personal hygiene, food vendors.*

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INTRODUCTION:

Food vendors are establishments that provide prepared food for public consumption. These establishments have become a distinctive part of food industry because they are mostly affordable and easily accessible. They provide ready-to-eat foods and beverages which include snacks, drinks, and full meals (1). Despite the advantages of food vending services, lack of regulatory bodies (2), mass preparation of food, food mishandling and negligence to hygienic measures on the part

of the food vendors may introduce pathogens into foods during production, processing, distribution and serving (3). Most operators in the business lack formal education and basic knowledge of standard food hygiene practices, and foods sold are prepared, handled and processed using traditional methods with no attention to hygiene standards (4).

Consumption of contaminated foods had significant public health risk, especially to young generation, the elderly and pregnant women in both developed and developing countries (5). In Nigeria, an estimated 200,000 people die of food borne disease annually (5). This continuous rise in the incidence of food borne illness has led to increase in global concern about food hygiene among food handlers and vendors (6). Reports of epidemiological studies indicated that majority of the foodborne illness outbreaks originated in food vending services (7), and this outbreak had been reported to be attributed to poor food handling and sanitation practices among food vendors (8).

The high rate of food borne related illness in developing countries are often traced to poor environmental, personal and food hygiene practices observed among food vendors. This has led to increased risk of consumers contracting infections thus the need to assess the hygiene practices exhibited by the food vendors (9). Inappropriate handling of foods at each stage of preparation can result in contamination and spread of food borne diseases. Some studies have corroborated this such that 12 to 18% of food-borne illnesses are attributable to contaminations (10), poor food safety, and inappropriate hygiene practices which were accredited to street-cooked food handlers (SCFHs) (11). In a study among the US population, the incidence of food borne illness was significantly associated with eating away from home especially at the food vendors (12). The study in Putrajaya found 55% of the ready-to-eat food samples as unsuitable for consumption after testing positive with coliform bacteria and *Staphylococcus aureus* (13). In another study conducted by Balaria (14) foodborne pathogens present in the samples of barbecue tested were *S. aureus* and *E. Coli*. These pathogens have been shown to cause food borne diseases like diarrhea, cholera, typhoid fever, food poisoning (15), and malnutrition (5).

Food vendors with poor personal hygiene coupled with limited knowledge on prevention of food borne illnesses could be responsible for the spread of infectious diseases and malnutrition. To reduce the incidence of food borne diseases as well as the associated nutritional deficiencies, the understanding of food hygiene and the potential factors that cause food borne diseases is very essential for all food vendors (16). According to Alimi (17), good knowledge on personal and environmental hygiene are crucial in the prevention of food borne illness and positive attitude towards hygiene have also been shown to reduce the incidence of food borne diseases. In contrast, studies have reported suboptimal knowledge on hygiene practices among food vendors (18) with factors such as inadequate food safety laws, weak regulatory system, poor adherence to safety laws (19). Again, lack of financial resources to procure a safer equipment, inadequate knowledge of food borne diseases and their causes, improper handling of food and unhygienic environments were observed in the food vending services and these have been identified as some of the causes of food borne diseases (18).

The World Health Organization recommended five strategies to ensure food safety. These include separating raw and cooked food, using safe water and raw materials, cooking thoroughly, keeping food at safe temperatures, and keeping clean (20). These strategies have been adopted by several training programs for street food vendors especially in developing countries. Despite all these e orts, there are, however, gaps in the operations of food safety regulatory institutions and the laws governing food safety, knowledge of food vendors on safety food practices, and the food-handling practices of food vendors (21). This has led to sub-standard food safety practices by food vendors. In view of these problems, this study aimed at assessing the hygiene practices exhibited by food vendors in the study area.

METHODOLOGY

Study Area

The study was conducted in Odeda Local

Government Area (LGA), Ogun State. It is one of the Twenty (20) LGAs in Ogun State located on the outskirts of Abeokuta and shares boundary with Abeokuta North Local Government Area of Ogun. The headquarters is in Odeda Township which is about 10km from Abeokuta (State Capital). There are over 20 semi-urban areas and 860 villages and hamlets in the LGA including a population of 222,097. Odeda is divided into district areas namely; Alagbagba, Alabata, Ilugun, Itesi, Obantoko, Obete, Odeda, Olodo, Opeji and Osiele (22).

Study Design and Population

The study adopted a cross sectional descriptive design. It comprised of food vendors in their respective food vending sites.

Eligibility Criteria

Inclusion Criteria: All stationary food vendors such as cafeteria, canteens, restaurants and bars

Exclusion Criteria: Only stationary food vendors were included in the study because they have a permanent location for their food vending business such that they can easily be tracked and monitored while mobile food vendors were excluded as they move from one place to the other hawking the cooked foods. Some of these mobile food vendors come from outside the study area to sell their cooked foods and this could make tracing and observation of their practices challenging. Hence, the exclusion from the study.

Sample Size Determination

Using the formula

$$S = \frac{Z_\alpha^2 PQ}{d^2}$$

Where S= calculated sample size

Z_α= Standard normal variate corresponding to 1.96

P= Percentage of good hygiene practices among food vendors in Uyo, Nigeria = 8.8% (23)

Q = 1-P = 1-8.8% = 91.2%,

D = precision at 5% = 0.05

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

S = 125participants

The minimum sample size calculated was 125 participants. However, 25 respondents were added which is 20% of the minimum sample size in order to account for unresponsiveness and improve data representation, so a sample size of 150 was used.

Sampling Procedure

The study involved a 3 stage sampling technique. The Local Government of study is made up of ten (10) district areas from which five (5) were selected using simple random sampling. The selected districts were Alabata, Obantoko, Odeda, Osiele and Obete. From each of these district areas, five (5) communities with stationed food vendors were randomly chosen making a total of twenty-five (25) communities. The selected communities include:

Alabata district – Alabata, Ajilete, Ajegunle, Dopemu and Balogun

Obantoko district – Alagbede, Iyanbu, Kangudu, Obantoko and Lakiri

Odeda district – Akogun, Ogunbayo, Ogunleje, Agboke and Idi-Obi

Osiele district – Ajan, Camp, Jagun Akinfenwa, Itoko and Owe

Obete district – Ajuba, Asipa, Odo-Erin, Ogunmola and Adebori

Then, from each of these communities, 6 food vendors were selected through convenience sampling and gave their consent to participate in the study giving a total of 150 food vendors.

Informed Consent

Participants were duly informed of the objectives of the study, written and verbal consent were obtained and for the illiterate respondents, a right thumb print was taken as signature.

Data Collection

A detailed semi-structured interviewer administered questionnaire was used to elicit information on the socioeconomic and demographic characteristics of the food vendors. Hygienic practices, nutritional knowledge and attitude were assessed through the questionnaire which included the observational sections modified from the Society for Family Health (SFH), Water Hygiene and Sanitation Checklist (24). The observational checklist based on physical assessment of the food vendors was done by

observing their personal food handling practices and display of good environmental hygiene practices.

Data analysis

Data obtained were screened for completeness and analyzed using Statistical Package for Social Sciences (SPSS) 23.0. Descriptive and inferential statistics comprising of frequency distribution, mean, percentages and Chi square were used to test for association between relevant variables at 0.05 level of significance.

RESULTS

The results of the socioeconomic and demographic characteristics of the food vendors of study are depicted in Table 1. The age ranged from 15-61years with mean value of 36.68 ± 9.09years. About 49% were between 31 and 40years of age while less than 3% were between ages 15 and 20years. Majority (96%) of the food vendors of study were females. More than 70% of the food vendors had some form of education and 26.7% were without formal education. The food vendors were mostly (77.3%) married. The religious affiliation indicated more than half (57.3%) as Christians, 39.3% and 3.3% as Muslims and traditionalist respectively. The respondents are majorly (84.7%) Yorubas. The income showed that 68.7% earned more than N30,000 on monthly basis. About three-quarter (75.3%) reported to have had some form of training on food handling.

Tables 2 and 3 showed the food hygiene practices of the food vendors assessed through interview and physical observation. The physical observation included both food handling practices as well as environmental sanitation practices. In table 2, more than one-third of the respondents (66.7%) claimed having a food handler certificate. Almost all respondents (99.3%) reported washing of hands before cooking and after handling raw foods including proper cleaning of food storage area before storing new food products. A little more than half (50.7%) wear apron during food preparation, 25.3% repeatedly reheat left over foods for sale while 32% still cook at vending sites when sick.

The results of the food hygiene practices assessed through physical observation shown in Table 3 indicated that (94%) had their foods covered, 90.7% do not dish out foods with bare hands and (98%) do not blow air into cellophane bag used for vending food. Based on observation of the environmental condition of the vending area, more than half (54%) prepared foods in clean environment, although 89.3% had soap for washing however, wash hand basin could only be seen among 21.3%. The overall score for hygiene practices exhibited in terms of personal and environmental hygiene as observed revealed that majority of the food vendors (94.7%) exhibited good personal food handling practices while less than half of the food vendors (42.7%) displayed good environmental hygiene practices as depicted in Table 4.

Table 5 showed the relationship between the vendor's socio-demographic characteristics and food hygiene practices. A statistically significant association was observed between food hygiene practices and age ($\chi 2 = 9.533$; p value ≤ 0.044), ethnicity ($\chi 2 = 8.132$; p value ≤ 0.033), marital status ($\chi 2 = 14.021$; p value ≤ 0.001), education ($\chi 2 = 14.552$; p value ≤ 0.002) and monthly income ($\chi 2 = 10.164$; p value ≤ 0.006). However, no significant relationship was found between the vendors food hygiene practices and their gender ($\chi 2 = 0.137$; p value ≤ 0.701) including religion ($\chi 2 = 2.987$; p value ≤ 0.254).

DISCUSSION

The socio-demographic characteristics of the food vendors showed that both males and females, married and unmarried operate as food vendors although with larger proportion of the female gender. This could be because food preparation is culturally regarded in African society as exclusive for females thereby reflecting their sociocultural role (25). It could also be because food vending business is a common income generating venture among women in developing countries, Nigeria inclusive with women as the sole owners and employers in the business. Most similar studies have also reported a higher proportion of females such as in Nigeria (25), Ghana (26) and Ethiopia (27). However, countries like Haiti (28) and Kenya (29), street food vending was dominated by male

gender. Majority of the food vendors belonged to age group 30-40 years with mean age of 36.68±9.09years. This age group is regarded as the most active phase of human life hence the rationale behind having majority of food vendors in this age bracket. The same trend was observed in Bangladesh where majority of the food vendors belonged to the age group 30-40 years (30), although a younger mean age of 22.4years was reported in Ethiopia (27) while an older mean age of 41.2years was reported in Nigeria (31). Ethnically, the dominance of Yoruba tribe in this study can be attributed to the conduct of the study in a southwestern State which is largely dominated by the Yoruba population. The study also revealed that 73.3% of the food vendors had some form of education while 26.7% had no formal education, almost half completed primary education while just 9% reported tertiary education whereas in another study about half of the respondents of study had university education (32) which might not be unconnected with the University environment where the study was conducted unlike this study that was conducted outside an educational institution. Hence, the lower educational status observed may be because food vending business is not enumerated in the formal sector of the country's economy and are identified as informal sector whose business are conducted as a form of irregular, unstable and marginal economic activities and so belong to the lower socio-economic status (31) and having poor educational background (28).

The food hygiene practices of the food vendors were examined by interview and physical observation. The physical observation included both food handling practices and the environmental sanitation practices. Overall, 94% food vendors displayed good practice towards food hygiene. Good hygiene practices have been documented to prevent several food-borne diseases when practised (33).

Specifically, almost all reported washing hands before cooking; after handling raw foods; before handling cooked foods and proper cleaning food storage area before storing new products. The good practices observed can be attributed to the training received on food handling practices which would have comprised of safety and hygienic handling of foods. This is in consistency with the study on hygiene practices among food vendors in educational institutions in Ghana (34) where food vendors generally adhered to good food hygiene practices. Thus, corroborating the advantage of training in promoting food handling practices of food vendors. In contrast, only 2% of food vendors reported being trained on food handling in Kenya (35) while in Imo State Nigeria about 83% claimed no food safety training (36). The study further showed that 67% of the food vendors had food handler's certificate indicating that one-third of food vendors were operating illegally without license to vend foods. This could be due to lack of enforcement and commitment by the agency responsible for such regulations. This trend of no medical certificate of fitness in food handling has been reported in other studies. In a study in Tamale Metropolis, thirty (30) out of 141 food vendors representing 21% had medical certificate (4). In another survey, 60% of food vendors interviewed in Accra had no medical examination certificate (37).

The hygiene practices of the food vendors assessed using observational checklist showed about 95% with good personal food handling practice, 94% had foods covered in containers with short fingernails. However, only 13% wore apron during food preparation. In contrast, the study in Kenya (29) showed inadequate food hygiene practices among the food vendors where cooked foods were stored at ambient temperature in cupboards, plastic bowls, buckets and left in the open. A similar study in Northern Nigeria (38) added that vendors used their mouth to blow air into polythene bags to open it up before using to package foods for customers. It was also added that food handlers studied in South Africa did not wear gloves, hair nets or apron (1). The poorer practices observed in both countries were attributed to lack of food safety, hygiene training and probably the educational status of the population of study.

The environmental hygiene assessment showed that 54% vend food in a clean environment; 38.7% had waste bin and 21% had wash basins. Overall, less than half (42.7%) displayed good environmental sanitation practice. Unlike food handling practices, the poor environmental

sanitation observed may be due to insufficient or inadequate knowledge on environmental practices. Lack of inspection by authorities may also account for the poor environmental practices observed among the food vendors. Similar findings from a study conducted in Kenya through in-depth interview and observation checklist revealed that the food vendors lack appropriate skills in ensuring hygienic vending site. The study outlined that preparation surfaces for the preparation of raw foods were not washed regularly, garbage and waste bins were beside the stalls (28). These were attributed to the fact that the vendors were not aware of hygienic and sanitary practices (28). Also, a survey of street food vendors at vending site in Durban South Africa showed that washing of utensils was carried out in bowls or pots also used for cooking and water was not being changed, as it was not easily accessible. This indicated that the washing water was becoming dirtier and dirtier with repeated use. Dirty pots and other dishes were left in heaps close to serving areas and already prepared food (1). The activities caused a great number of flies in the area as garbage were left open. Prepared foods were displayed with no covers in very humid weather. This encourages the proliferation of insects and rodents linked to disease (1).

Some of the predictors of the suboptimal environmental sanitation identified included the socio-economic and demographics characteristics of the food vendors. Age of the food vendors influenced the food hygiene practices as adults aged 30-50years displayed significant food hygiene practices compared to other age group ($P < 0.044$). This maybe because older adults are believed to have more experience in food vending business including food safety and hygiene practices. Educational status of the food vendors can also influence their hygienic behavior. In this study, there was a significant association between education level and hygiene practices ($P < 0.002$) of the food vendors. Food vendors with higher educational level displayed good hygienic practices. This is in consistency with similar studies in Nigeria (32, 39). Anecdotal evidences have shown that the higher the socio-economic status, the higher the likelihood of engaging in healthy behavior (40).

CONCLUSION AND RECOMMENDATION

The study has shown that food vending is majorly dominated by women who are within the most active phase of human life. The food hygiene practices were generally good based on handwashing practices, however suboptimal environmental hygiene was observed especially with presence of flies within the vending areas. The environmental health department of the Ministry of Health in the local government should enforce and promote adequate environmental practices among the food vendors.

Table 1: Socio-economic and demographic characteristics of respondents

Socio-economic and demographics characteristics	Frequency (n)	Percentage (%)
Age (yrs.)		
15-20	4	2.7
21-30	31	20.7
31-40	73	48.7
41-50	27	18.0
51-61	15	10.0
Mean ± S. D	**36.68±9.09**	
Sex		
Male	6	4.0
Female	144	90.0
Religion		
Christian	86	57.3
Islam	59	39.3
Traditional	5	3.3
Ethnicity		
Yoruba	127	84.7
Igbo	2	1.3
Hausa	8	5.3
Others	13	8.7
Marital Status		
Single	14	9.3
Married	116	77.3
Widowed	20	13.3
Educational Status		
No formal education	40	26.7
Primary	74	49.3
Secondary	22	14.7
Tertiary	14	9.3
Food vending experience		
Less than 5 years	54	36.0
6-10 years	41	27.3
11-15 years	16	10.7
16-20 years	10	6.7
21 and above	29	19.3
Monthly Income	12	8.0
₦10,000-19,999	35	23.3
₦20,000-29,999	103	68.7
≥ ₦30,000		
Have you ever had any training on food handling?	113	75.3
Yes	37	24.7
No	**150**	**100**
Total		

Table 2: Food Hygiene Practices of respondents

Food Hygiene Practices	Yes F (%)	No F (%)
Possession of food handler's certificate	100 (66.7)	50 (33.3)
Repeated reheating of left over foods	38 (25.3)	112 (74.7)
Washing of hands before cooking	149 (99.3)	1 (0.7)
Washing of hands after handling raw foods and before handling cooked foods	149 (99.3)	1 (0.7)
Wear apron while preparing food	76 (50.7)	74 (49.3)
Proper cleaning of food storage area before storing new products	149 (99.3)	1 (0.7)
Cook at vending site even when down with sickness like diarrhea, vomiting, sores and cuts	48 (32.0)	102 (68.0)
Buy and use clean/fresh foods for cooking	141 (94)	9 (6.0)

Table 3: Observational Checklists Personal/Environmental

Personal Food Handling	Yes (%)	No (%)
Food covered in container	141 (94.0)	9 (6.0)
Presence of food debris on vendor hand	30 (20.0)	120 (80.0)
Food exposed to flies	20 (13.3)	130 (86.7)
Vendor dished out food with hand	14 (9.3)	136 (90.7)
Vendor wore hand jewelry	54 (36.0)	96 (64.0)
Vendor had long nails	9 (6.0)	141 (94.0)
Vendor had hair covering	97 (64.7)	53 (35.3)
Vendor wore apron	19 (12.7)	131 (87.3)
Vendor blew air into cellophane bag use for vending food	3 (2.0)	147 (98.0)
Vendor had cut on the hand	1 (0.7)	149 (99.3)
Environmental		
Clean environment	81 (54.0)	69 (46.0)
Waste bin present	58 (38.7)	92 (61.3)
Refuse site present	18 (12.0)	132 (88.0)
Wash basin present	32 (21.3)	118 (78.7)
Presence of hand towel	8 (5.3)	142 (94.7)
Soap present	134 (89.3)	16 (10.7)
Presence of flies	111 (74.0)	39 (26.0)
Presence of rats/cockroaches	9 (6.0)	141 (94)

Table 4: Personal Food Handling and Environmental Observation Score

Personal Food Handling	Frequency (n)	Percentage (%)
Score		
Good (7-10)	142	94.7
Poor (0-4)	8	5.3
Mean ± SD	**7.84 ± 1.25**	**Range = 3.00 - 10.00**
Environmental Observation		
Score		
Good (6-8)	64	42.7
Poor (0-3)	86	57.3
Mean ± SD	**3.41 ± 1.18**	**Range = 0.00 - 8.00**

Table 5: Relationship between Socio-demographic characteristics and food hygiene practices of the food vendors

Socio-demographic characteristics	F (%)	Chi Square	P-values
Age group			
15- 20	4(2.7)		
21- 30	31(20.7		
31-40	73(48.7)		
41-50	27(18.0)		
51-61	15(10.0)	9.533	**0.044***
Gender			
Male	6(4.0)		
Female	144(96.0)	0.137	0.701
Religion			
Christian	86(57.3)		
Islam	59(39.3)		
Traditional	5(3.3)	2.987	0.254
Ethnicity			
Yoruba	127(84.7)		
Igbo	2(1.3)		
Hausa	8(5.3)		
Others	13(8.7)	8.132	**0.033***
Marital Status			
Single	14(9.3)		
Married	116(77.3)		
Widowed	20(13.3)	14.021	**0.001***
Education			
No formal Education	40(26.7)		
Primary	74(49.3)		
Secondary	22(14.7)		
Tertiary	14(9.3)	14.552	**0.002***
Monthly income			
₦10,000-19,000	12(8.0)		
₦20,000-29,000	35(23.3)		
₦ ≥30,000	103(68.7)	10.164	**0.006***

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