

Assessment of Food Hygiene and Safety Knowledge and Practices among Street Food Vendors in Mowe Town of Ogun State, Nigeria

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Abstract

Street food is a major source of affordable cooked food in developing countries, including Nigeria, yet it remains a significant public health concern due to the risk of food borne illnesses. Poor food handling practices increase the likelihood of contamination with biological, chemical and physical hazards. This study assessed food hygiene and safety knowledge and practices among 103 street food vendors in Mowe town of Ogun State, Nigeria using a cross-sectional descriptive survey involving structured questionnaires and interviews. Most vendors (73.79 %) were females, and over half (54.37 %) were aged 18 to 35 years. Secondary education was the most common qualification (32.04 %), and (42.72 %) were married. The mean food hygiene and safety knowledge/awareness score was 69.42 %, while the mean food hygiene and safety practice score was lower at 54.53 %. Chi-square test ($\chi^2(1) = 0.71, p = 0.398$) showed no statistically significant association between knowledge/awareness and food handling practices, although this finding should be interpreted cautiously given the small proportion of respondents with inadequate awareness. The findings suggest that knowledge alone may not consistently translate into safe food handling practices, with implications for more targeted training for vendors and regulators, supported by enabling environments, supervision, compliance monitoring, and regulatory oversight. Strengthened intergovernmental collaboration may also support sustainable improvements in street food safety.

Keywords: Enabling Environments, Foodborne Illness, Food Hygiene and Safety, Knowledge and Practices, Public Health, Street Food Vendor.

Introduction

People are affected daily by diseases that result from consumption of unhygienic and unsafe food. Adequate attention to good hygienic practices is critical to prevent and control such foodborne illnesses and diseases. In developing countries, food borne illnesses have become major concern particularly with increase in patronizing street food vendors [1]. Street foods are ready to eat foods and beverages that are sometimes prepared by vendors in the streets and other public places

and sold on the street. They are accessible, affordable and have become the major source of food for most people, especially the low-income earners, the unemployed, students and government workers [2]. High demand for cheap, ready-to-eat food on the street, high unemployment and relatively cheap to operate, mostly using local technology, have compelled many people predominantly women in developing countries into street food business [2]. Not only are street foods valued for their convenience and affordability, but they also

make a significant contribution to the country's economy, and the preservation of society's cultural and social heritage [3].

Most street food vendors have inadequate or no knowledge of food hygiene, sanitation and safety [4, 5] and often carry out their operations informally with little or no regulation by the government [1, 6]. Enforcement of and compliance with food laws in this business sector have always been a challenge due to many reasons including the informal nature of the street food business and lack of coordination in national food safety control system. The mode of operation of these vendors inevitably promotes contamination of street foods with transmissible pathogens and may severely impair the wholesomeness of street foods with the potential to cause significant food safety concerns to consumers. The activities of street food vendors have been linked to outbreaks of diarrhoea diseases in developing countries [4, 5]. In addition to unhygienic practices, street food vendors are mostly unaware of their personal health status and may be infected persons or carriers of transmissible pathogens, which can be transmitted via foods to unsuspecting consumers [4]. Regular medical screening for food vendors to identify infected vendors and carriers for treatment are often ignored by street food vendors due to ignorance, high cost and lack of commitment on the part of authorities to enforce food safety regulations, unlike vendors in formal/regulated institutions who are compelled to undergo medical examination and provide a certificate of fitness to operate.

Operating and vending sites for most street food vendors usually lack basic infrastructures such as potable water supply, handwashing facilities, waste disposal systems, and sanitary systems or toilets [6]. Some sites are located close to public toilets or dump sites, thereby encouraging rodent and insect infestation as well as faecal contamination. Dust, contaminated with exhaust fumes from vehicles and industrial machineries around vending sites

is also source of chemical hazards such as poly aromatic hydrocarbons, lead and arsenic, some of which are known to be carcinogenic [7]. Cooked food is a good source of nutrients for pathogenic microbes [1] and the temperatures at which street foods are sold enhances the survival of the infective forms of food pathogens. Also, the climatic condition of the study area, with generally high temperatures encourages rapid proliferation of microbial pathogens in such foods.

Consequences of the unsafe practices among street food vendors have negative impact on the economy of developing countries. Scarce funds for socio-economic development are being expended on public health management for treating disease outbreaks that could have been prevented through the provision of safe foods [8].

Despite the obvious challenges highlighted above, there is dearth of data on the handling practices and the level of food safety knowledge among street food vendors in Nigeria, especially in the densely populated areas such as Mowe town, being considered in this study. On several occasions, especially through media, cases of microbial foodborne illnesses have been reported in these areas, such as the recent cholera outbreak in August 2021. Therefore, this study aims to assess the food hygiene and safety knowledge and practices among street food vendors in Mowe town of Ogun State, Nigeria to identify gaps and proffer interventions as a basis for formulation of a sustainable public health education programme for food handlers to make street food safe and reduce the spread of food-borne illnesses in the community.

Materials and Method

Study Area

Mowe is a town in Obafemi Owode local government of Ogun State in the Southwestern part of Nigeria, located along Lagos-Ibadan expressway. It is 512 km southwest of the Federal Capital Territory, and 29 km from

Lagos. It is located between latitude: 6°48'38"N and longitude: 3°26'11"E in a tropical savanna and wet climate. Temperatures in Mowe town range between 24 °C and 32 °C throughout the year. The area was chosen for this study because it is densely populated due to its proximity to the capital of Lagos State, Ikeja. It thereby offers a relatively cheap abode for people to live and work yet have easy access to the high-brow City Centre.

Study Design

A cross-sectional descriptive study was conducted on street food vendors in Mowe town. The study was conducted in August 2021. For this study, street food vendors were defined as individuals selling ready-to-eat foods in open places whether mobile or in stationary locations along the streets or in public places. Other inclusion criteria were as stated below:

1. Vendors must be on the street, mobile or located in standard locations with temporary or permanent structures, and
2. Vendors must be selling any ready-to-eat food that does not require further processing by the consumer prior to consumption.

A total of 120 vendors found vending street foods were approached. The study was explained to the street food vendors, stating that participation was voluntary and some of those who gave their consent were randomly selected based on the inclusion criteria. Out of the total number of vendors approached, only 103 gave their consent to take part in the study. The study was conducted on same days that street food vendors were identified. No prior notification had been sent to the selected participants to inform them of the data collection exercise. Structured questionnaire on age, sex, marital status, educational background, knowledge, attitude and practices (KAP) in relation to food hygiene and safety was designed. The questionnaire designing process was guided by relevant information from previous literature and the guidelines provided by WHO [9]

regarding street food vending hygiene and safety practices. The questionnaire was pretested and administered through a face-to-face interview.

Data Analysis

Data obtained from the interview sessions were entered into Microsoft Excel 2013 edition for analysis including frequency, percentage, and association. Awareness level was assessed using six dichotomous (Yes/No) items capturing training and knowledge dimensions. Responses were coded as 1 for Yes and 0 for No and aggregated to generate an awareness score ranging from 0 to 6. Hygiene practices were measured using six dichotomous items, coded similarly and summed to produce a practice score ranging from 0 to 6. Scores were categorized to permit chi-square testing. Awareness and hygiene practice scores were categorized using a midpoint cut-off, with scores ≥ 3 classified as adequate awareness or good hygiene practices and scores < 3 classified as inadequate or poor, consistent with common practice in KAP-based survey analyses. A chi-square test of independence was then conducted to examine the association between awareness category and hygiene practice category [10].

Results and Discussion

Demographic Characteristics

Randomly selected 103 respondents, who gave their consent, participated in the study. Table 1 below gives an overview of the demographic characteristics of the 103 respondents. Results revealed that female street food vendors were markedly more (73.79 %) than their male counterparts (26.21 %). Some other studies have confirmed the domination of women in street food vending business in Uganda [11], Nigeria [12], and Accra, Ghana [4, 13]. The sociocultural role of women in food preparation and serving comes into play and it is evident in the greater proportion of females engaged in street food vending business, in Benin City, Nigeria [14], in Ethiopia [15], and

in Uganda [11]. This agrees with the findings of Campbell-Lendrum and Corvalan [2]. Nevertheless, males have also dominated the street vending business in few countries such as Haiti [16] and Kenya [17]. In terms of the distribution by age, age group of 18 – 35 were found to be predominant (54.37 %), which implies that street food vending is an avenue for employment opportunity to the youth. This is like the findings of a study [18] where 50.00% of the food vendors in Nigeria were aged 25 – 35 years. Only about 3.88 % of the respondents were above the age of 50. Regarding the level of education, results showed that majority (32.04 %) were secondary school graduates, followed by categories without educational

qualification (23.30 %). Similar finding has been recorded by Chukuezi [19]. This could be an indication of the inability to progress into tertiary institution because of poverty. However, some vendors had achieved educational qualification at the level of diploma (12.62 %) and degree (18.45 %), which may be because of high rate of unemployment. According to Campbell-Lendrum and Corvalan [2], high unemployment rates have forced many youths into street food vending business. Furthermore, most of the respondents were married (42.72 %), which reflects the burden of parenting and agrees with the findings of a previous study [13].

Table 1. Demographic Characteristics of Interviewed Street Food Vendors

Variables		Frequency (n = 103)	Percentage (%)
Gender	Male	27	26.21
	Female	76	73.79
Age	<18	25	24.27
	18 – 35	56	54.37
	36 – 50	18	17.48
	>50	4	3.88
Educational level	None	24	23.30
	Primary	14	13.59
	Secondary	33	32.04
	Diploma	13	12.62
	Degree	19	18.45
Marital status	Married	44	42.72
	Single	27	26.21
	Divorced/ Separated	20	19.42
	Widowed	12	11.65

Awareness on Hygiene and Safety Practices among Street Food Vendors

The awareness on hygiene and safety practices among the selected street food vendors were assessed and the results are outlined in Table 2 below. About 26.21 % of the vendors confirmed that they have been trained on food hygiene and safety, with

majority (73.79 %) not having any training experience. The level of awareness among street food vendors on food hygiene and safety practices was poor. The result, in terms of the proportion of vendors that have undergone training on food hygiene and safety practices, aligns with the findings of a study [20] which indicated that in Nigeria, only a few street food

vendors were trained on good hygienic practices and only a few practiced good hygienic practices. Two studies [4, 5] also reported inadequate or no knowledge of food hygiene, sanitation and safety of street food vendors. However, 81.55 % admitted that they are aware that safe food handling is an important aspect in food vending business. Assessment of their knowledge on proper hand washing (before cooking; after handling raw foods and before handling cooked foods) and food borne disease prevention revealed that 23.30 % of the vendors were ignorant of the relationship between proper hand washing (before cooking; after handling raw foods and before handling cooked foods) and incidence of food borne diseases while majority 76.70 % reportedly have this understanding. Similar trend was observed on the assessment of their knowledge regarding food handlers being source of food borne infections/outbreaks, though with slightly higher percentage (30.10 %) being ignorant of this fact. According to the findings from the studies [4, 5], activities of street food vendors have been linked to outbreaks of diarrhoea diseases in developing countries. One of the studies [4] noted that street food vendors can be ignorant of their health status thereby transmitting pathogens via foods to unsuspecting consumers. Notwithstanding, the highest percentage in this category was observed for the knowledge that raw foods should be separated from cooked foods to prevent contamination as only 15.53 % were ignorant of this. On the need for careful selection of raw materials for safe food preparation, 77.67 % were aware while 22.33 % opined that selection of raw materials was not a critical consideration.

Food Handling Practices among Street Food Vendors

Some food hygiene and safety practices adopted by the street food vendors were also assessed and the results are shown in Table 3. Only 43.69 % of respondents had a license for operation while the rest (over 50 %) were not licensed. Worse still, only 26.21% had food handler's certificate, which implies that even those licensed do not comply with all stipulated requirements to operate the business; although, 59.22 % claimed to have checked their health status before commencing the vending business as against 40.78 % who did not. These findings agree with the report of other three studies [1, 6, 13] that food vending operations were done informally with little or no regulation by the government. Although 76.70 % of respondents demonstrated awareness that hand washing (before cooking; after handling raw foods and before handling cooked foods) is vital for foodborne disease control in Table 2, this awareness was not uniformly reflected in practice, with lower adherence observed for hand washing after handling raw foods and before handling cooked foods (54.37 %) compared with handwashing before cooking (82.53 %). About 17.48 % of the vendors admitted to not washing their hands before cooking and even higher proportion (45.64 %) do not wash hands after handling raw foods and before handling cooked foods. Poor handwashing practice was also observed among street food vendors in Addis Ababa, Ethiopia [21-23]. Furthermore, only 38.83 % of the vendors would avoid work when having diarrhoea and/or other health conditions such as vomiting, sores and cuts, while about 61.17 % would still provide the vending services even when sick.

Table 2. Level of Awareness on Food Hygiene and Safety Practices among Respondents

Variables ¹	Yes		No	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Have you received any training on food hygiene and safety?	27	26.21	76	73.79
Are you aware that safe food handling is an important aspect in food vending business?	84	81.55	19	18.45
Are you aware that proper hand washing (before cooking; after handling raw foods and before handling cooked foods) can prevent food borne diseases?	79	76.70	24	23.30
Are you aware that food handlers can be a source of food borne infections/outbreaks?	72	69.90	31	30.10
Are you aware that raw and cooked foods should be stored separately?	87	84.47	16	15.53
Are you aware that you should carefully select raw materials for safe food preparation?	80	77.67	23	22.33

Relationship between Level of Awareness and Hygiene Practices

Table 4 presents the association between awareness / knowledge of street food vendors and their food handling practices. Out of the 94 vendors with adequate awareness, 72 (76.6%) demonstrated good practice compared with 8 out of 9 vendors (88.9%) with inadequate awareness. The chi-square test indicated that

this difference was not statistically significant, $\chi^2 (1, N = 103) = 0.71, p = 0.398$. Although over three-quarters of vendors with adequate awareness demonstrated good practices, a trend that agrees with previous studies linking training and food safety knowledge to better hygiene behaviour [24-26], the statistical analysis in this study did not show a significant association between awareness and actual practice.

Table 3. Food Handling Practices among Street Food Vendors

Variables ²	Yes		No	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Have you been issued a license for operation?	45	43.69	58	56.31
Do you have food handler's certificate?	27	26.21	76	73.79
Did you check your health status before starting food vending business?	61	59.22	42	40.78

¹ Mean score: Yes – 69.42 %; No – 30.58 %

² Mean score: Yes – 54.53 %; No – 45.47 %

Do you wash your hands before cooking?	85	82.52	18	17.48
Do you wash your hands after handling raw foods and before handling cooked foods?	56	54.37	47	45.63
When suffering from sickness such as diarrhoea, vomiting, sores and cuts do you still cook at the vending sites?	63	61.17	40	38.83

Although no statistically significant association was observed between awareness and hygiene practices, this finding should be interpreted with caution. The number of participants classified as having inadequate awareness was relatively small, which may have limited the statistical power to detect a meaningful association. Consequently, the absence of statistical significance does not necessarily indicate the absence of a true relationship between awareness and hygiene practices. This suggests that while improved awareness and training may contribute to better practices in some contexts, they may not

independently predict practice among the vendors assessed. Rather, the finding indicates that food safety awareness alone may not translate into a better food handling practices or behaviour among street food vendors and supports previous studies showing that knowledge alone is insufficient to change food safety behaviour [27, 28]. It also aligns with evidence that structural barriers, such as inadequate access to clean water, limited infrastructure, and economic constraints, may impede the application of food safety knowledge [29].

Table 4. Relationship between Awareness Level and Hygiene Practices among Street Food Vendors (N=103)

Awareness Category	Good Practice (n)	Poor Practice (n)	Row Total
Adequate	72	22	94
Inadequate	8	1	9
Column Total	80	23	103

$$\chi^2 (1, N = 103) = 0.71, p = 0.398$$

Conclusion and Recommendations

Females within the age group of 18 – 35 years dominate street food vending business in Mowe town of Ogun State, Nigeria. Their food hygiene and safety knowledge, and practices were poor. Although food vendors in this study demonstrated generally adequate levels of food safety awareness, this knowledge did not translate into significantly better food handling practices. Therefore, knowledge alone is insufficient to drive behavioural change. Structural barriers, including limited access to clean water, inadequate infrastructure, and

economic pressures, may impede the practical application of food safety knowledge, even when awareness is high [29]. Furthermore, KAP studies consistently highlight gaps between what vendors know and what they do, underscoring that effective improvement in food handling behaviour requires more than training; it demands supportive environments, continuous supervision, and strong regulatory enforcement [10]. Consequently, interventions should combine education and sensitization with practical, context-specific measures that address environmental constraints and support sustained behaviour change among street food

vendors. While this study did not directly assess policy or regulatory systems, the observed gaps between awareness and hygiene practices have important implications for street food safety interventions and regulation. These findings suggest the potential value of sustained collaboration among international, regional, governmental, and non-governmental organizations in supporting the effective implementation of food safety policies and the delivery of more tailored training programmes. Such collaborations may contribute to strengthening intervention programmes through regular funding and human resource support, informed by evidence from research. In addition, the results indicate that public awareness strategies such as media jingles, road shows, and town hall meetings could be particularly important for reaching semi-rural and rural communities, including settings such as Mowe town. The findings also underscore the potential role of adequately trained environmental health officers and other regulators in facilitating training, monitoring compliance, and supporting enforcement. However, these implications highlight the need for balanced and well-coordinated approaches that avoid over-regulation of street food vendors. Finally, the study suggests that the availability and accessibility of information, education, and communication materials on food hygiene and safety may support reinforced learning among street food vendors.

Limitations

The categorization of awareness and hygiene practice scores using a midpoint cut-off (≥ 3), while commonly applied in KAP studies, may have resulted in some loss of information and limits direct comparison with studies employing alternative or validated scoring approaches. Also, the small proportion of participants in the inadequate awareness category may have reduced the power of the analysis, limiting the ability to detect

statistically significant associations between awareness and hygiene practices.

Ethical Approval

This study was based on primary data obtained through structured questionnaires and interviews. It was guided by ethical principles of integrity, transparency, confidentiality, and informed consent. Participants' informed consent was obtained and confidentiality maintained.

Data Availability

The data that support the findings of this study are available from the corresponding author upon credible request, due to the confidentiality principle.

Author Contributions

Corresponding author, Modupe Adeyemo conceptualized and designed the study, collected and analyzed the data, interpreted the results, and drafted the manuscript. Both authors, Modupe Adeyemo and Yemisi Jeff-Agboola reviewed the manuscript and approved the final version for submission.

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Conflict of Interest

There is no conflict of interest.

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