

<https://doi.org/10.33003/jaat.2024.1002.02>

ASSESSING FOOD SAFETY AWARENESS AND PRACTICES AMONG STREET FOOD VENDORS IN KATSINA STATE, NORTH WESTERN NIGERIA

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ABSTRACT

Food safety is a critical global issue, with contaminated food posing serious health risks, particularly to vulnerable populations such as children under five, the elderly, and the sick. This study examined food safety practices among street food vendors in major towns of Katsina State. Using structured questionnaires and a multi-stage sampling technique, data were collected from a total of 316 street food vendors to assess vendors' awareness and adoption of food safety measures. Descriptive statistics and traffic light model were used to analyse the data. While vendors demonstrated high awareness of basic hygiene practices like washing utensils and avoiding work when ill, the adoption of other crucial practices, such as using hand gloves and maintaining clean selling locations, was found to be low. This gap between awareness and practice highlights the need for targeted interventions, including training programs and public awareness campaigns, to bridge the knowledge-behaviour gap. The traffic light model categorized food safety risk to levels, revealing that many vendors operate at high to moderate risk levels. These findings underscore the importance of continuous monitoring, feedback, and enforcement of food safety regulations. Recommendations include enhancing access to resources, providing incentives for good practices, and implementing regular health and safety audits. This can significantly reduce foodborne illnesses, ensuring safer food consumption, and supporting national health and economic development through safer trade and tourism activities. This study contributes to the ongoing discourse on food safety in developing regions and highlights critical areas for policy and practical interventions to safeguard public health.

Key words: Food Safety, Street Vendors, Foodborne Illness, Public Health, Katsina State

INTRODUCTION

Street food vending is a significant part of the informal sector in many developing countries, including Nigeria, providing employment and affordable food to a large segment of the population. However, the informal nature of this sector often leads to lapses in food safety practices, making street food a potential source of foodborne illnesses. The World Health Organization (WHO) estimates that foodborne diseases are a major public health concern, especially in low- and middle-income countries (WHO, 2015). In Nigeria, street food vendors are often not adequately trained on food safety practices, and poor hygiene can lead to contamination, raising concerns about the safety of food consumed by the public (Iwu, 2017; Madaki & Miroslava, 2021).

The specific objectives of this study were; to (i) identify the level of awareness of food safety measures among the food vendors in the study area; (ii) estimate the level of adoption of food safety measures among the respondents and (iii) to estimate the food safety

status of the street food vendors in Katsina state. While prior studies, such as those by Okita et al. (2022a) and Akolaa et al. (2024a), have documented high levels of food biosafety awareness among street food vendors in different parts of Africa, this does not always translate to proper implementation of safety practices. Factors such as access to resources, socio-economic conditions, and ingrained habits may hinder the full adoption of recommended biosafety measures (Rosenstock et al., 1988; Mensah, 2018).

This study also explores the biosafety risk status among vendors, providing insights into the areas where interventions are most needed. By examining awareness and adoption levels of food safety practices, the study offers a comprehensive view of the challenges faced by street food vendors in maintaining safe food handling environments. It further highlights the need for targeted interventions, such as training and awareness campaigns, to improve both food safety knowledge and practices, thus reducing the risk of foodborne diseases in Katsina State.

MATERIALS AND METHODS

Katsina State has a total land area of 24,192 Km² (9341 square miles) located between latitude 11^o N and 13^o20'N and longitude 7^o00'E and 8^o55'E. It shares boarder with Niger Republic to the North, Kaduna State to the South, Jigawa and Kano States to the East, and Zamfara State to the West. The projected population of the state was put at 10,314,105 in 2023 at a growth rate of 3.2 percent per annum (NPC, 2006). Climate of the area is tropical continental which can be sub-divided into tropical wet, dry and semi-arid. The southern part of the state, with Northern Guinea savanna type of vegetation has average annual rainfall of about 1000 mm, the central part, with Sudan savanna type of vegetation, has average annual rainfall of about 800 mm. The extreme northern part, with Sahel savanna type of vegetation has average annual rainfall of less than 600 mm and Rainfall is between May and September with very high intensity between the months of July and August (NIMET, 2018). The major crops grown are maize, groundnut, millet, sorghum, cowpea, rice, and vegetables among others. The State is made up of 34 Local Government Areas with 3 ADP Zones. Katsina State Agricultural and Rural Development Authority (KTARDA), the state apparatus responsible for agricultural extension and rural development, stratified the state into three agricultural zones. namely: Zone I (Ajiwa), Zone II (Funtua) and Zone III (Dutsin-Ma). Street food vendors are wide spread across the state.

The research was conducted to evaluate the food safety knowledge and practices of street food and snack vendors within Katsina state. Data were collected using structured questionnaires. Enumerators were recruited and trained for the data collection exercise. The study was carried out between June and October, 2024.

A multi-stage sampling technique was employed in carrying out this study. In stage 1, four (4) urban areas were selected purposively from the state taking into consideration safety and the size of towns. These are: Katsina metropolis, Daura, Dutsin-Ma and Malumifashi towns. In stage 2, a reconnaissance survey was carried out to have an estimate of those involved in street food sale in the areas and the following were obtained from each of the towns: Katsina (670), Daura (312), Dutsin-Ma (414) and Malumifashi (354). These gave a total of 1750 from across the towns. In stage 3, raosoft sample size calculator was used to determine the appropriate number of respondents to be selected for the study (at 5% margin error and 95% level of confidence) and a sample of 316 vendors was recommended for the study. Proportionate sampling technique was used to determine the number of vendors to be selected in each study location. Finally, simple random sampling via balloting was used to sample street food vendors in each town. (Table 1).

Table 1 Sampling frame of street food vendors

Towns	Reconnaissance survey estimate	Sample selected
Katsina	670	120
Dutsin-Ma	414	76
Malumifashi	354	63
Daura	312	57
Total	1750	316

The formula below was used to determine the number of street food vendors to be sampled in each town.

$x = (X/N) \times n$. Where;

x = sample to be selected

X= population size

N = total population size

n = sample size (gotten from Raosoft calculator)

Descriptive statistics was used to achieve all the objectives of the study. Objective (iii) which is to

determine the food safety status of the street food vendors in the study area was further elucidated using traffic light system model adopted from Grabwosky (2011). The food safety measures were obtained from relevant literatures. Respondent who practiced any of these food safety measures will be scored one and zero otherwise. At the end of the exercise, these scores were summed up and then change into percentage. The score less than forty nine percent (49%) indicated a high-risk food safety status. The score between fifty and

seventy nine percent (50-79%), indicated a medium (moderate) risk food safety status. And the score of eighty percent (80%) and above indicated a low-risk food safety status in the study area.

RESULTS AND DISCUSSION

Awareness of food safety measures among street food vendors

The results in Table 2 show the frequency and percentage of street food vendors who are aware of various food biosafety measures. There is high awareness for seven food biosafety measures with food biosafety scores greater than 80%. Similar studies by Iwu et al., (2017) and Okita et al (2022b) equally

observed that majority of the street food vendors in Nigeria had a good level of knowledge on food biosafety measures. On the other hand, there is moderate awareness for five food biosafety measures while only four biosafety measures have a low awareness level among street food vendors in Katsina state. The result further suggests that street food vendors have high awareness of personal hygiene practices, such as washing utensils and hands, and staying home when sick. This finding is however not in agreement with that of Amoah, et al. (2020) who found that street food vendors in Accra, Ghana had limited knowledge of food safety practices However, they have lower awareness of protective measures like using hand gloves, chef gears, and restricting customer contact with food items. This highlights areas for improvement in biosafety practices among street food vendors in Katsina state.

Table 2 Level of awareness of food biosafety measures

Food safety measures	Frequency	Percentage
Washing of processing utensils before and after	316	100
Covering of wounds properly during food/snacks preparation	246	77
Staying back home when sick	301	95
Using of good and clean containers for storing food articles after processing	236	75
Proper disposing of deteriorated food articles	247	78
Covering of mouth and nose while sneezing or coughing	248	78
Hand washing before preparation of food and after using the toilet	272	86
Neatness of selling location	262	83
Usage of hand gloves/forms to dispense food/snacks items	106	34
Use of chef glass/flies proof containers	145	46
Use of chef gears (Apron and head cover)	129	41
Neatness of packaging/serving materials	265	84
Using clean and neat attendants/vendors	240	76
Getting a very clean and neat processing location	268	85
Restriction of customers to touch or get too close to the food items	214	68
Use of a clean source of water	274	87

Source: Field Survey 2024 * Multiple response allowed

Level of adoption of food biosafety measures

There **was** a high Adoption (>80%) for only two food biosafety measures (Table 3). Street food vendors are highly likely to wash utensils before and after use, indicating good hygiene practices. They will also stay home when sick, reducing the risk of foodborne illness transmission. About half of vendors cover their mouth and nose when sneezing or coughing, indicating some awareness of respiratory hygiene. Most vendors dispose of spoiled food properly, reducing the risk of

contamination. About half of vendors cover wounds during food preparation, indicating some awareness of personal hygiene. Most vendors maintained clean packaging and serving materials. About half of vendors ensured that attendants/vendors are clean and neat. However, there is a low adoption for four food biosafety measures as less than a third of vendors maintain a clean selling location. In addition, few vendors used hand gloves/forks when handling food. While only about a third of vendors use protective containers as well as wear protective gear.

Table 3 Level of adoption of food biosafety measures

Food safety measures	Frequency	Percentage
Washing of processing utensils before and after	316	100
Covering of wounds properly during food/snacks preparation	177	56
Staying back home when sick	290	91
Using of good and clean containers for storing food articles after processing	174	55
Proper disposing of deteriorated food articles	177	56
Covering of mouth and nose while sneezing or coughing	183	58
Hand washing before preparation of food and after using the toilet	164	52
Neatness of selling location	98	31
Usage of hand gloves/forms to dispense food/snacks items	92	29
Use of chef glass/flies proof containers	114	36
Use of chef gears (Apron and head cover)	114	36
Neatness of packaging/serving materials	171	54
Using clean and neat attendants/vendors	174	55
Getting a very clean and neat processing location	161	51
Restriction of customers to touch or get too close to the food items	190	60
Use of a clean source of water	193	61

Source: Field Survey 2024 * Multiple response allowed

The results suggests that while street food vendors have high adoption rates for some food safety measures like washing utensils and staying home when sick, there is room for improvement in other areas like hand washing, using clean containers, and wearing protective gear. Overall, the results indicate that while some food safety practices are widely adopted, others need improvement, particularly hand hygiene, use of protective gear, and maintenance of clean environments. This finding agrees with those of Akolaa *et al.* (2024b) in Accra Ghana who also noted that while some food safety measures were highly adopted, some also had low levels of adoption.

By relating the level of awareness (Table 2) to the level of adoption (Table 3), we can gain new insights as follows. There is high awareness but low adoption for some food biosafety measures. For example, washing hands before preparation of food and after using the toilet (high awareness: 86%, but low adoption: 52%) and also using hand gloves/forms to dispense food/snacks items (high awareness: 77%, but low adoption: 29%). Secondly, there is high awareness and high adoption for other food biosafety measures such as; washing of processing utensils before and after (high awareness: 100%, and high adoption: 100%) and staying back home when sick (high awareness: 95%, and high adoption: 91%)

There is a gap between awareness and adoption for some practices, indicating that awareness alone may

not lead to behavior change (Rosenstock *et al.*, 1988 ; Sheeran, 2002; Mensah *et al.*, 2018). High awareness of certain practices (like washing hands or using protective gear) doesn't always lead to high adoption rates. According to Madaki, and Miroslava (2021) food safety knowledge, food safety attitudes and economic and social control affects the food safety behaviour of the food vendors in Nigeria. This implies that other factors, such as: lack of resources (e.g., soap, water, or protective gear), insufficient motivation, deep-seated habits and competing priorities may hinder the adoption of these practices. Low awareness and low adoption in some areas (e.g., neatness of selling location) highlight the need for targeted interventions to improve both awareness and adoption.

Food biosafety status among Street food vendors in Katsina State

The result in Table 4 shows that 72 vendors have a high risk of compromising food biosafety, indicating a need for immediate attention and improvement while 138 vendors have a moderate risk of compromising food biosafety, suggesting a need for targeted interventions to improve their practices. Only 106 vendors representing about a third of the number of street vendors sampled have a low risk of compromising food biosafety, indicating good practices and a lower need for intervention.

Table 4 Biosafety risk status of Street food vendors in Katsina

Food biosafety status	Biosafety risk score	Frequency	Percentage
High risk	49%	72	23
Medium Risk	50-79%	138	44
Low risk	Greater than 80%	106	33
Total			100

Source: Field Survey 2024

CONCLUSION AND RECOMMENDATION

There is a gap between awareness and adoption for some food biosafety practices, indicating that awareness alone may not lead to behaviour change. By addressing these gaps, street food vendors can improve their food safety practices, reducing the risk of foodborne illnesses and protecting public health. Furthermore, there is a low risk of compromising food safety among street food vendors hence the need for targeted interventions such as training programs, public awareness campaigns, incentives for adopting good practices and regular monitoring and feedback to address food safety issues among street food vendors in the study area.

Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this manuscript.

Acknowledgment

The authors are very grateful to the Tertiary Education Trust Fund (TETFUND) for providing the research grants for the study.

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