Original Research

ASSESSMENT OF HYGIENE PRACTICES AND KNOWLEDGE OF FOOD SAFETY AMONG STREET FOOD VENDORS IN THE VOLTA REGION, GHANA

ABSTRACT

This study investigated the hygiene practices and knowledge of street food vendors in the Volta Region of Ghana, utilizing the Theory of Planned Behavior as a conceptual framework. A descriptive research design was employed, with a multistage random sampling method selecting 254 participants from a pool of 750 vendors in rural and urban areas. Data were collected through questionnaires and observational checklists, with statistical analyses, including chi-square tests, performed using SPSS to examine the relationship between demographic characteristics and hygiene practices. The findings showed that while 87.8% of vendors cleaned utensils with soap and water, only 29.1% consistently washed their hands before handling food. Common practices included wearing aprons (79.1%) and head caps (86.6%), but knowledge of using masks (33.9%) and gloves (41.7%) to prevent food contamination was limited. Environmental hygiene was inadequate, with 61.0% of vendors reporting pest presence near vending sites. Demographic factors such as education and location significantly influenced certain hygiene practices, including utensil cleaning ($p = 0.019^*$) and health status evaluation ($p = 0.019^*$). The study concluded that, despite basic hygiene awareness, knowledge gaps and inconsistent practices compromised food safety. It recommends enhanced training on comprehensive hygiene practices and improved access to water and sanitation facilities to elevate food safety standards and protect public health in the region.

Keywords: Food hygiene, Practice, Knowledge, Street Vendors

Introduction

Food plays a critical role in sustaining health, and ensuring food safety is a priority for individuals and communities alike. Koryo-Dabrah et al. (2021) emphasize that access to healthy food is a fundamental human right. With over 2.5 billion people worldwide consuming street food daily (Kamboj et al., 2020), it serves as a primary source of cooked meals for populations in developing countries (Addo-Tham et al., 2020). However, the journey of food through the supply chain raises concerns about safety, security, and hygiene (Kamboj et al., 2020). Street food, in particular, is expanding rapidly in Africa (Rakha et al., 2022; Wegerif, 2024), but its growth is accompanied by challenges, including weak

regulation, poor vendor knowledge, unhygienic environments, and inadequate infrastructure.

Globally, over 2.5 billion people rely on street food daily (Mohammed & Shehasen, 2020), yet food safety threats impact more than one billion people in sub-Saharan Africa alone (Arias-Granada et al., 2021). Recent global health crises have intensified discussions on the safety and nutritional value of food. According to Kamboj et al. (2020) and Ma et al. (2019), food safety, hygiene practices, and environmental conditions are vital for certifying food as healthy for consumption. UNICEF (2024) highlights that hunger, food insecurity, and unhealthy diets contribute to global public health challenges, including malnutrition and non-communicable diseases.

Food safety and hygiene are integral to the entire food supply chain, from slaughtering or harvesting to processing, storage, transportation, and preparation (Kamboj et al., 2020; Elsahoryi et al., 2024). Street food, a global phenomenon with varied nutritional and safety characteristics (Abrahale et al., 2019; Islam et al., 2023), is commonly referred to by terms such as "street catering," "informal food sector," or "food outside the home" (Guy et al., 2021). Vendors may be stationary or itinerant (Privitera & Nesci, 2015), and while they provide affordable meals to urban and rural populations (Abrahale et al., 2019), concerns about food contamination persist due to poor hygiene practices and unsuitable vending locations (Ceyhun Sezgin & Şanlıer, 2016).

Despite these challenges, not all street food is harmful (Aduah et al., 2021). As Panicker and Priya (2021) argue, street food vending is a response to the busy lifestyles of modern populations and offers economic opportunities and flexibility for city dwellers. Ferrari et al. (2021) further describe street food as a socio-economic and cultural phenomenon deeply embedded in human history. However, in the Volta Region of Ghana, hygiene practices among street food vendors remain inadequate. Vendors prioritize proximity to markets over environmental cleanliness, leading to unhygienic conditions (Aglidza, 2019).

Amedewonu (2020) notes that, despite efforts by environmental officers, many Ghanaian vendors fail to meet hygiene standards. Poor hygiene practices, often resulting from limited knowledge of food safety, contribute to contamination risks (Nortey et al., 2024; Rakha et al., 2022). The informal nature of street food vending means it is frequently overlooked by regulatory authorities, leading to substandard practices, poor infrastructure, and sanitation issues (Rakha et al., 2022). Dundery and Addo (2016) highlight that many Ghanaian vendors lack awareness of basic hygiene measures, such as frequent handwashing and the use of safe water sources.

This study adopts a pragmatic approach to data collection to provide insights into the nutritional security and hygiene measures implemented by street food vendors. It aims to assess the personal and environmental characteristics of street food vendors and explore the practices in place to ensure food safety and safeguard consumer health.

Objectives of the Study

Specifically, the study sought to:

1. Determine hygiene practices among the street food vendors in Volta region.
2. Examine street food vendors' knowledge on street food hygiene practices in Volta region.

Research Hypotheses

H1: Participants demographics have significant positive effect on their hygiene practices of street food security.

H2: Participants demographic is a significant determining factor of knowledge of hygiene practices and adhering to street food security.

Theoretical Perspective

The Theory of Planned Behavior (TPB) is a psychological framework used to understand and predict human behavior, including food consumption. It posits that individual actions, such as dietary choices, can be predicted and explained by three primary factors: attitudes, subjective norms, and perceived behavioral control (Ajzen, 2015). In the context of food consumption, attitudes represent an individual's positive or negative evaluation of a specific behavior, such as eating a particular type of food. It is influenced by the perceived consequences of that behavior. Subjective norms refer to the perceived social pressure and influence from others regarding a specific behavior. In the context of food consumption, this includes the influence of family, friends, and cultural or societal expectations. If an individual perceives that their family and friends support or encourage them to eat healthily, it can positively influence their dietary choices. Perceived Behavioral Control: This factor relates to the individual's perception of their ability to perform a specific behavior. In the context of food consumption, it refers to one's perception of their ability to make healthy food choices.

In the Theory of Planned Behavior, these three factors together determine an individual's intention to engage in a specific behavior, which, in the case of food consumption, would be the intention to eat a particular type of food or make certain dietary choices. Importantly, intentions are considered the immediate precursor to actual behavior. So, if an individual

has a positive attitude, perceives supportive subjective norms, and feels they have control over their food choices, they are more likely to form strong intentions to make healthy dietary choices. It is important to note that the TPB acknowledges that factors beyond the model, such as external constraints or unforeseen circumstances, can also influence behavior. Nonetheless, the Theory of Planned Behavior remains a valuable framework for understanding and predicting food consumption behavior, as it takes into account the interplay of cognitive, social, and control-related factors in shaping dietary choices.

Methods and Material

The study employs a descriptive research design, aiming to gather information on the current state of phenomena to depict concerning variables or conditions in a given situation. The choice of research design is guided by the shape of the problem, the desired end result, and the questions raised during the investigation. Research design is a set of guidelines and instructions to address the research problem. It is the structure that researchers use to ensure that their studies are organized, well-structured, and capable of addressing the research problem effectively (Sileyew, 2019). The population for this study comprised approximately 750 well-known and popular street food vendors located in Volta region of Ghana. Notably, there is currently no existing record documenting these specific food vendors within the region. However, the region maintains records of other food establishments such as canteens, restaurants, and hotels. A multistage random sampling technique was used to categorize street food vendors based on their locations within the region. Two stratums were identified, thus the Urban towns and rural towns. At the first stage, Krejcie and Morgan (1970) sample size table was used to obtain 254 participants. This is based on the population. The second stage was based on the number identified population in each stratum. The third and final stage is, a simple random sampling was used in selecting the food vendors to respond to researcher assisted questionnaire. This was done by writing numbers on pieces of papers from 1 to 117 for those rural town and 1 to 137 for those in the urban towns. This method made it easier for any food vendor to be selected at random. The study adapted a structured type of questionnaire from Verma and Mishra, (2022) which offered assurance of validity and reliability of the questions asked. The questionnaires were used because the study objectives and the nature of the research problem aligned the items. Three data collectors were recruited and provided with instructions regarding the objectives of the study, the proper administration of the adapted questionnaires, and the content of the questionnaire components. The questionnaire

includes closed-ended questions using ‘yes’ or ‘no’ response. In addition, there were items on participants’ demographic information. The study also made use of an observational checklist to observe the environment within which the street food vendors operate. The analysis of quantitative data was done with the statistical analysis tool SPSS to compute frequencies and percentages to summarize the data. Inferential statistics (chi-square tests) conducted to identify relationships and differences among variables.

Ethical Considerations

Street food vendors were made aware of the objectives of the study, potential risks, and benefits, and they willingly agreed to participate without any form of coercion. Protecting participants' privacy and maintaining their anonymity was equally sought, giving the sensitivity of the study's subject matter. All data collected were anonymized to safeguard individual identities. Cultural sensitivity is a crucial ethical consideration, as street food vending often has deep roots in local culture. To ensure data security, all collected information were stored in a secure manner, with access restricted to authorized personnel.

Results

Table 1: Demographic Frequency and Percentage Descriptive Statistics

Variable Item	Frequency	% of Total
GENDER		
Female	249	98.0%
Male	05	2.0%
AGE		
18-24	36	14.2%
25-34	80	31.5%
35-44	68	26.8%
45 and above	70	27.6%
WORK EXPERIENCE (MONTH)		
<1	24	9.4%
1-5	81	31.9%
6-10	71	28.0%
≥11	78	30.7%
EDUCATION LEVEL		
BS	26	10.2%
SSS/SHS	150	59.1%
TE	78	30.7%
LOCATION		
Urban	137	53.9%
Rural	117	46.1%

Source: Field data (2024)

Key: Basic Education (BS), Senior Secondary School/Senior High School (SSS/SHS) Tertiary Education (TE)

The demographic characteristics of the surveyed sample are presented in Table 1, the study participants result explain the following: The majority of the respondents identified as female, constituting 98.0% of the total sample. In contrast, male respondents represented a smaller proportion, accounting for 2.0%. This indicates a notable gender imbalance in the surveyed population. The age distribution among the respondents is varied, with the majority falling within the 25 – 34 years and 45 and above categories, each comprising 31.5% and 27.6%, respectively. The 18 – 24 years and 35 – 44 years categories contribute 14.2% and 26.8%, respectively. This diversity in age groups is reflective of a broad spectrum of participants. Regarding experience levels in the surveyed population, respondents with 1 – 5 months of experience constituted the largest group at 31.9%, followed closely by those with 11 months and above, comprising 30.7%. Individuals with 6 – 10 months of experience accounted for 28.0%, while those with less than a month of experience represented 9.4%. This distribution showcases a range of experience levels among the participants. Educationally, the surveyed population displays a diverse profile. A significant proportion, 59.1%, holds a Secondary/Senior High School education. Tertiary-educated individuals constitute 30.7%, while those with a Basic School education are at 10.2%. This variation in educational backgrounds highlights the inclusivity of the study across different educational levels. The geographic distribution of respondents reveals that 53.9% are from Ho Township, while 46.1% are from outside Ho Town. This suggests a substantial representation from "both within and outside the town, providing a comprehensive perspective on the study area.

Table 2: Frequency Count and Percentage Statistics on Responses to the items

SN	Variable Items	Freq.		%Freq.	
	Hygiene Practices in Handling and Serving Food	**A**	**DA**	**A**	**DA**
1	Water source close to vending area	78	176	30.7%	69.3%
2	Washed dirty utensils with soap and clean water	223	31	87.8%	12.2%
3	Used apron when handling food	201	53	79.1%	20.9%
4	Vendor washed hands with clean water	74	180	29.1%	70.9%
5	Animals or pests around vending area	155	99	61.0%	39.0%
	Knowledge of hygiene practices during food Preparation and handling				
6	Wearing mask reduces risk of food contamination	86	168	33.9%	66.1%
7	Wearing cap reduces risk of food contamination	220	34	86.6%	13.4%
8	Wearing gloves reduces risk of food contamination	106	148	41.7%	58.3%
9	Cleaning and sanitization of utensils reduce the risk of food contamination	238	70	72.4%	27.6%
10	Abstaining from work during infectious skin disease is necessary	236	16	93.7%	6.3%
11	Microbes are in the skin, nose, and mouth of healthy handlers	197	77.6%	57	22.4%
12	Examination of workers' health statuses before employment	240	94.5%	14	5.5%

The Table 2 presents the frequency count and percentage statistics related to the responses of food vendors to various hygiene and knowledge-related items. Below is an interpretation of the findings: For hygiene practices, it was revealed that: Approximately 30.7% of respondents confirmed the availability of a water source near their vending area, while 69.3% indicated otherwise. A significant majority (87.8%) reported using soap and clean water to clean their dirty utensils, with only 12.2% stating otherwise. The majority of operators (79.1%) reported

using an apron when handling, preparing, and serving food, while 20.9% did not. About 29.1% mentioned washing hands in clean water before handling, preparing, and serving food, while 70.9% did not consistently follow this practice. A notable 61.0% observed the presence of animals or pests around their vending stalls during food service, while 39.0% did not report such observations. In the case of knowledge of hygiene practices, the study indicates that: 33.9% believed that using a mask reduces the risk of food contamination, while 66.1% disagreed. A substantial 86.6% acknowledged that using a head cap reduces the risk of food contamination, while 13.4% said no. 41.7% believed that using gloves reduces the risk of food contamination, while 58.3% held a contrary view. A majority (72.4%) perceived that eating and drinking in the workplace increase the risk of food contamination, while 27.6% did not share this belief. The majority (93.7%) recognized that proper cleaning and sanitization of utensils decrease the risk of food contamination, with only 6.3% holding a different view. A high percentage (92.9%) believed it is necessary to take leave from work during infectious skin diseases, while 7.1% responded no. A majority (77.6%) acknowledged the presence of microbes in the skin, nose, and mouth of healthy handlers, while 22.4% disagreed. A significant 94.5% endorsed the idea of evaluating the health status of workers before employment, while 5.5% opposed this practice.

Table 3: Association of Hygiene Practices and Demographic Characteristics of Participants

χ^2 Tests(N=254)	Use of Apron	Availability of water Sources	Clean with Soup	Washing hand	Animals
Gender	0.207(0.65)	0.709(0.40)	0.002(0.96)	0.292(0.59)	0.772(0.38)
Age	1.190(0.76)	0.722(0.87)	3.490(0.32)	3.360(0.34)	0.68(0.88)
Experience	1.120(0.77)	2.650(0.45)	0.950(0.81)	1.190(0.76)	1.070(0.78)
Educational Level	2.17(0.34)	1.080(0.58)	3.190(0.14)	3.380(0.19)	3.080(0.21)
Location	2.620(0.11)	2.710(0.10)	2.020(0.16)	0.731(0.39)	4.110(0.04*)

From Table 3, there was no statistically significant association between gender and any of the hygiene practices assessed, as evidenced by non-significant p-values for the use an apron when handling, preparing, and serving food ($p = 0.65$), availability of water sources nearest to your vending area ($p = 0.40$), dirty utensils are cleaned with soap and cleaned water ($p = 0.96$), wash

their hands in clean water each time before the handling, preparation, and serving of food (p = 0.59), and dealing animals or pests evident around the vending stall during serving foods (p = 0.38). Similarly, age did not demonstrate a significant association with hygiene practices. The p-values for the use of apron (p = 0.76), availability of water sources (p = 0.87), cleaning with soup (p = 0.32), washing hands (p = 0.34), and dealing with animals (p = 0.88) were all greater than the conventional significance level of 0.05. Participants' level of experience also showed no significant association with hygiene practices. The p-values for the use of apron (p = 0.77), availability of water sources (p = 0.45), cleaning with soup (p = 0.81), washing hands (p = 0.76), and dealing with animals (p = 0.78) exceeded the 0.05 threshold. Regarding educational level, a significant association was observed for the hygiene practices of cleaning with soup (p = 0.14) and washing hands (p = 0.19), suggesting that individuals with different educational backgrounds might exhibit variations in these specific practices. However, the use of apron (p = 0.34), availability of water sources (p = 0.58), and dealing with animals (p = 0.21) did not yield significant associations. Again, no significant associations were identified between participants' location and hygiene practices except dealing with animals. For instance, the use of apron (p = 0.11), availability of water sources (p = 0.10) demonstrated no significant association, while dealing with animals (p = 0.04) exhibited a significant relationship with participants' location. This suggests that there is a statistically significant relationship between the location (rural towns and urban towns) of participants and their hygiene practice related to animals."

Table 4: Association of Knowledge of Hygiene Practices and Demographic Characteristics of Participants

χ^2 Tests (N=254)	***Using Mask***	***Using a Head Cap***	***Using Gloves***	***Eating and Drinking at Workplace***	***Cleaning and Sanitization of Utensils***	***Taking Leave during Infectious Skin Diseases***	***Microbes on Skin, Nose, and Mouth***	***Health Status Evaluation Before Employment***
Gender	2.610(0.106)	0.192(0.66)	0.700(0.40)	0.395(0.53)	1.620(0.20)	1.290(0.26)	0.018(0.89)	0.298(0.59)
Age	6.580(0.08)	3.00(0.39)	3.50(0.32)	5.14(0.162)	2.37(0.500)	1.44(0.69)	10.4(0.015*)	6.15(0.105)
Experience	2.45(0.484)	3.24(0.356)	8.16(0.043*)	7.41(0.060)	2.05(0.562)	0.973(0.808)	4.70(0.195)	7.86(0.049*)

Educational Level	2.09(0.352)	1.36(0.507)	0.817(0.665)	0.154(0.926)	1.41(0.493)	2.22(0.330)	4.51(0.105)	7.91(0.019*)
Location	0.011(0.918)	0.016(0.900)	1.13(0.287)	0.400(0.527)	0.037(0.848)	1.26(0.261)	0.965(0.326)	0.732(0.92)

It was found in Table 4 that gender did not show a significant association with most of the knowledge variables. Notably, there were no statistically significant differences between genders regarding the use of a mask, head cap, gloves, eating and drinking at the workplace, cleaning and sanitization of utensils, taking leave during infectious skin diseases, microbes on the skin, nose, and mouth, and health status evaluation before employment. Age exhibited significant associations with certain hygiene practices. Older food vendors were more likely to possess knowledge about the use of a mask, though not significant ($\chi^2 = 6.58$, $p = 0.08$), taking leave during infectious skin diseases is highly associated with food vendors age ($\chi^2 = 10.4$, $p = 0.015$*). However, health status evaluation before employment has no significant relationship with food vendors age ($\chi^2 = 6.15$, $p = 0.105$). This implies that age may influence awareness and understanding of infectious skin diseases as hygiene practices. The next variable, experience of food vendors showed a significant association with knowledge about using gloves ($\chi^2 = 8.16$, $p = 0.043$*), before employment ($\chi^2 = 7.86$, $p = 0.049$*) but not taking leave during infectious skin diseases ($\chi^2 = 4.70$, $p = 0.195$), and health status evaluation. Individuals with more experience tended to have greater awareness of these hygiene practices, highlighting the potential impact of professional background on knowledge. Educational level did not demonstrate a significant association with the use of gloves ($\chi^2 = 2.09$, $p = 0.352$), taking leave during infectious skin diseases ($\chi^2 = 4.51$, $p = 0.105$), but showed that there is a significant association of food vendors health status evaluation before employment and their educational level ($\chi^2 = 7.91$, $p = 0.019$*). These findings suggest that participants with higher education levels may have a more knowledge of specific hygiene practices. Finally, location of food vendors did not significantly associate with knowledge about all hygiene practices. There is no significant association with taking leave during infectious skin diseases ($\chi^2 = 0.965$, $p = 0.326$).

Discussion

Association between Knowledge of Hygiene Practices and Demographic Characteristics of Food Vendors

The findings of this study highlight the importance of age, experience, and education in promoting food hygiene practices among food vendors in Ho Municipality. These factors can influence an individual's knowledge and understanding of food safety, which can ultimately

impact their hygiene practices. Contrary to this study, Ma et al. (2019) found that older food vendors were more likely to have better knowledge of food safety and hygiene practices. Similarly, Elsahoryi et al. (2024) found that experienced food vendors were more likely to have better food safety knowledge and practices. Islam et al. (2023) also found that individuals with higher educational attainment were more likely to have better knowledge of food safety and hygiene practices.

Association between knowledge on food Nutritional Security Practices while Preparing food and Demographic Characteristics of Food Vendors

The findings are consistent with previous research on the association between food vendors' knowledge and practices and food safety. It was found that food vendors with more experience are more likely to follow food safety practices, such as washing hands and using clean utensils (WHO, 2002). This is likely due to the fact that they have had more opportunities to observe the consequences of unsafe food handling practices, such as food spoilage or illness. Additionally, food vendors with higher levels of education are more likely to be aware of the risks associated with certain food preparation practices, such as reheating cooked food (Muyanja, 2011). This is because they have had more exposure to information about food safety and nutrition. International Food Policy Research Institute (IFPRI) also found that a training program for food vendors in Ghana resulted in a significant reduction in the incidence of foodborne illness among their customers (Fan, 2019). This suggests that interventions that focus on providing food vendors with information about food safety and nutrition, as well as training on safe food handling practices, can be effective in improving the safety of food sold in informal markets.

Conclusion and Recommendation

The study revealed mixed practices among street food vendors in the Volta region regarding hygiene and sanitation. While the vendors demonstrated commendable efforts in some areas, such as washing cooking utensils with water and soap, wearing aprons, and using head caps, there were critical gaps in other practices. Handwashing before handling food was not common, and the surrounding environment often lacked cleanliness, with pests present. Although the vendors showed awareness of the importance of sanitizing utensils and maintaining personal health to prevent contamination, their knowledge and use of masks and gloves as preventive measures were insufficient.

Recommendations

1. **Intensify Hygiene Education and Training:**

Stakeholders such as local health authorities and NGOs should organize regular training programs for street food vendors.

2. **Improve Access to Water and Sanitation Facilities:**
   Region, Municipal and district assemblies should prioritize the provision of adequate water sources and sanitation facilities in areas where street food vendors operate.

Key findings

1. Most street food vendors lacked access to reliable water sources; however, the majority reported washing their cooking utensils with soap and water.
2. While personal hygiene practices, such as wearing aprons, were widely observed, the majority of vendors did not wash their hands before handling or serving food.
3. Street food vendors in the Volta Region demonstrated a good understanding of the importance of wearing head caps and cleaning or sanitizing cooking utensils to minimize the risk of food contamination.
4. Participants showed limited knowledge about the use of masks and gloves as measures to reduce street food contamination.

Declarations

Disclaimer (Artificial intelligence)

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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DECLARATIONS

- **Competing interests**

The authors declare no competing interest

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- **AUTHORS' CONTRIBUTIONS**

CWK- Study conception, design, draft manuscript preparation, analysis and interpretation of results
GOS reviewed the results and approved the final version of the manuscript.

Reference

1. Abrahale, K., Sousa, S., Albuquerque, G., Padrão, P., & Lunet, N. (2019). Street food research worldwide: a scoping review. Journal of Human Nutrition and Dietetics, 32(2), 152–174. https://doi.org/10.1111/jhn.12604
2. Addo-Tham, R., Appiah-Brempong, E., Vampere, H., Acquah-Gyan, E., & Gyimah Akwasi, A. (2020). Knowledge on Food Safety and Food-Handling Practices of Street Food Vendors in Ejisu-Juaben Municipality of Ghana. Advances in Public Health, 2020. https://doi.org/10.1155/2020/4579573
3. Aglidza, E. M. (2019). Assessment of hygienic practices among street food vendors in Sekondi, Ghana (Doctoral dissertation, University of Cape Coast).
4. Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179–211. https://doi.org/10.1016/0749- 5978(91)90020-T
5. Aovare, O. P. (2017). Food Vending Hygiene Practices in the Bolgatanga Municipality of the Upper East Region. Food Vending Hygiene Practices in the Bolgatanga Municipality of the Upper East Region, February, 4–5.
6. Ceyhun Sezgin, A., & Şanlıer, N. (2016). Street food consumption in terms of the food safety and health. Journal of Human Sciences, 13(3), 4072. https://doi.org/10.14687/jhs.v13i3.3925
7. Dundery, E. J., & Addo, H. O. (2016). Food Hygiene Awareness, Processing and Practice among Street Food Vendors in Ghana. Journal of Food and Public Health, 6(3), 65–74. https://doi.org/10.5923/j.fph.20160603.02
8. Ferrari, A. M., Oliveira, J. de S. C., & de SÃO JOSÉ, J. F. B. (2021). Street food in Espírito Santo, Brazil: A study about good handling practices and food microbial quality. Food Science and Technology (Brazil), 41(December), 549–556. https://doi.org/10.1590/fst.31620
9. Guy, K., Bouafou, M., Flora, G., Beugré, C., & Amani, Y. C. (2021). Street Food around the World: A Review of the Literature. 557–575. https://doi.org/10.4236/jssm.2021.146035
10. Kamboj, S., Gupta, N., Bandral, J. D., Gandotra, G., & Anjum, N. (2020). Food safety and hygiene: A review. International Journal of Chemical Studies, 8(2), 358– 368. https://doi.org/10.22271/chemi.2020.v8.i2f.8794
11. Koryo-dabrah, A., Sciences, A., Ansong, R. S., Setorglo, J., & Steiner, M. (2021). Food And Nutrition Security Situation In Ghana: Nutrition Implications For National Development. July. https://doi.org/10.18697/ajfand.100.20160
12. Mohammed, A. S., & Shehasen, M. Z. (2020). Street Food Consumption and Associated Health Risk. International Journal of Research Studies in Agricultural Sciences, 6(7). https://doi.org/10.20431/2454-6224.0607002
13. Nortey, A. N., Amu, H., Senu, E., & Effah, A. (2024). Knowledge, Attitude, and Food Safety Practices among Street Food Vendors at a Metropolitan District in Ghana: A Cross-sectional Study. International Journal of Food Science, 2024. https://doi.org/10.1155/2024/5553942
14. Panicker, R., & Priya, R. S. (2021). Paradigms of street food vending in sustainable development–a way forward in Indian context. Cities and Health, 5(3), 234–239. https://doi.org/10.1080/23748834.2020.1812333
15. Privitera, D., & Nesci, F. S. (2015). Globalization vs. Local. The Role of Street Food in the Urban Food System. Procedia Economics and Finance, 22(November 2014), 716–722. https://doi.org/10.1016/s2212-5671(15)00292-0
16. Rakha, A., Fatima, M., Bano, Y., Khan, M. A., Chaudhary, N., & Aadil, R. M. (2022). Safety and quality perspective of street vended foods in developing countries. Food

Control, 138(August). https://doi.org/10.1016/j.foodcont.2022.109001
17. Wegerif, M. C. A. (2024). Street traders' contribution to food security: lessons from fresh produce traders' experiences in South Africa during Covid-19. 115–131.
18. WHO - World Health Organization. (2002). Towards stronger food safety systems and global cooperation. https://www.who.int/publications/i/item/9789240057685
19. Arias-Granada, Y., Neuhofer, Z. T., Bauchet, J., Ebner, P., & Ricker-Gilbert, J. (2021). Foodborne diseases and food safety in sub-Saharan Africa: Current situation of three representative countries and policy recommendations for the region. *African Journal of Agricultural and Resource Economics*, *16*(2), 169-179.
20. UNICEF. (2024). The state of food security and nutrition in the world 2024: Financing to end hunger, food insecurity and malnutrition in all its forms.
21. Amedewonu, D. K. (2020). *Assessment of food hygiene practices among street food vendors in Ayensuano District Ghana* (Doctoral dissertation, University of Cape Coast).
22. Krejcie, R. V., & Morgan, D. W. (1970). Sample size determination table. *Educational and psychological Measurement*, *30*, 607-610.
23. Sileyew, K. J. (2019). *Research design and methodology* (Vol. 7). Cyberspace.
24. Islam, M. N., Roy, N., Amin, M. B., Madilo, F. K., Karmakar, K., Hossain, E., ... & Airin, N. J. (2023). Food safety knowledge and handling practices among household food handlers in Bangladesh: A cross-sectional study. *Food Control*, *147*, 109578.
25. Ma, L., Chen, H., Yan, H., Wu, L., & Zhang, W. (2019). Food safety knowledge, attitudes, and behavior of street food vendors and consumers in Handan, a third tier city in China. *BMC public health*, *19*, 1-13.
26. Elsahoryi, N. A., Olaimat, A., Abu Shaikha, H., Tabib, B., & Holley, R. (2024). Food safety knowledge, attitudes and practices (KAP) of street vendors: a cross-sectional study in Jordan. *British Food Journal*, *126*(11), 3870-3887.
27. Muyanja, C., Nayiga, L., Brenda, N., & Nasinyama, G. (2011). Practices, knowledge and risk factors of street food vendors in Uganda. *Food control*, *22*(10), 1551-1558.
28. Fan, S. (2019). Food policy in 2018–2019: Growing urgency to address the SDGs. *International Food Policy Research Institute (IFPRI), 2019 global food policy report*, 6-15.