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

Abstract

This study examined hygiene practices and knowledge of street food vendors in the Volta region, Ghana, using the Theory of Planned Behavior as a framework. The study adopted a descriptive research design, with a multistage random sampling technique used to select 254 participants out of 750 from rural and urban areas in Volta region of Ghana. Data collection involved questionnaires and observational checklists. Statistical analyses, including chi-square tests, were conducted using SPSS to explore relationships between demographic characteristics and hygiene practices. Findings revealed that while most vendors (87.8%) washed utensils with soap and water, only 29.1% consistently washed their hands before handling food. Hygiene practices such as wearing aprons (79.1%) and head caps (86.6%) were common, but knowledge about using masks (33.9%) and gloves (41.7%) to reduce food contamination was limited. Environmental hygiene was suboptimal, with 61.0% of vendors reporting pest presence around vending areas. Demographic factors such as education and location influenced certain hygiene practices and knowledge, with significant associations found between education level and practices like utensil cleaning ($p = 0.019^*$) and health status evaluation ($p = 0.019^*$). The study concluded that although vendors demonstrated awareness of basic hygiene, gaps in knowledge and inconsistent practices posed risks to food safety. It is recommended include intensifying training on comprehensive hygiene practices and improving access to water and sanitation facilities. These measures aim to enhance food safety standards and public health outcomes in the region.

Keywords: Food hygiene, Practice, Knowledge, Street Vendors

Introduction

Food is an important source for health sustenance and the safety of the food is the prime aim of everyone. Koryo-dabrah et al. (2021) state that people have the fundamental right to healthy food. The total number of people who consume street food is over 2.5 billion (Kamboj et al., 2020) and it is a major source of cooked food for the masses in most developing countries (Addo-Tham et al., 2020). However, these foods we eat as humans, travel along a chain of supply and the safety, security and factors have become issues of

concern (Kamboj et al., 2020). Critical to this food supply chain is the street food that is developing faster in Africa (Rakha et al., 2022; Wegerif, 2024). The call for concern for street food are due to: less regulation of the industry, locational factors of the practitioners, the practitioners' knowledge in handling food and the scene or the environment created around the food. Globally, over 2.5 billion people patronise street food on daily basis (Mohammed & Shehasen, 2020). Meanwhile, in sub-Saharan Africa, food safety threat affects over one billion people (Arias-Granada et al., 2021). The world is at a crossroad in the face of recent pandemic and issues of health have become topical. The food we eat is at the center of such discussions. Food and its nutritional requirements, food safety and hygienic practices in addition to the scene created around the food as well as its security are certification of food as healthy for consumption (Kamboj et al., 2020; Ma et al., 2019). UNICEF (2024) indicated: hunger,food insecurity and unhealthy diets are fundamental to public health challenges worldwide including malnutrition and non-communicable diseases. Again, food safety and security and hygiene practices involve stages and all hands-on-deck approach to ensure healthy food is an answer.

According to Kamboj et al. (2020) and Elsahoryi et al. (2024) food safety, nutritional security and food hygiene are part of the food processing channel and forms part of the global food supply chain. They indicated that, right form slaughtering or harvesting, processing, storage, distribution, transportation and preparation, the safety of the foods are pivotal. Street food, sold on streets, at festivals (Ceyhun Sezgin & Şanlıer, 2016) is a global phenomenon with many names attached to it: "street catering", "the informant food sector", "eating out", "popular catering" or "food outside the home" (Guy et al., 2021) with varied nutritional value and safety characteristics (Abrahale et al., 2019; Islam et al., 2023). The street food vendors are either stationary at one place or most of them too are itinerants (Privitera & Nesci, 2015). The way and manner street food vendors serve the public especially in developing countries is a source of concern. Although street food vendors serve large population both in urban and rural areas (Abrahale et al., 2019), they are often criticized over high level of food contamination due to the places they sell their products, and the substandard hygiene practices they put in place right from the preparation of the foods to the street for selling (Ceyhun Sezgin & Şanlıer, 2016). However, it is worth noting that, not all street foods are bad (Aduah et al., 2021).

Street food vending has become a way of life due to busy nature of the masses and as emphasized by Panicker & Priya, (2021). The practice has provided some opportunities namely market heterogeneity and economic flexibility of the city dwellers. Ferrari et al.

(2021) noted that, street food is a social, economic and cultural phenomenon happening all over the world and has become part of the social fabric and this practice has been part of humanity throughout history. However, in Volt region of Ghana, among the street food vendors, there are poor hygiene practices among the food vendors. Street food vendors in cities in Ghana do not choose their location wisely as their main consideration is nearness to market. Cleanliness and environmental factors are not considered, resulting in poor hygiene problems (Aglidza, 2019). Amedewonu (2020) posited that, among most Ghanaians street food vendors, hygiene conditions are not met despite the great efforts from the environmental officers. Food safety problems as a result for poor hygiene practices is due to lack or inadequate knowledge of the food safety and hygiene practices among the Ghanaian street food vendors (Nortey et al., 2024; Rakha et al., 2022). These practices lead to unclean food with high tendency of contaminations from different sources. Rakha et al. (2022) indicates that, due to the informal nature of the street food vending, they are often ignored by the regulatory authorities. These result in unwholesome practices, poor infrastructure, sanitation problems and the improper food content treatment. In Ghana most food vendors are not aware of a number of food safety practices (Dundery & Addo, 2016). This ranges from adhering to basic hygiene practices, relating to frequent hand washing, safe water source, among such issues (Dundery & Addo, 2016). This study takes a pragmatic approach in its data collection to provide better understanding of the study. The aim of the study is to explore the nutritional food security and its associated hygiene measures put in place to safeguard the health of the consumers among the street food vendors as well as assessing the personal and environmental characteristics of the street food practitioners.

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. The majority of the street food vendors did not have access to water sources but the result also indicated that, majority of them washed their cooking utensils water and soap.
2. Personal hygiene such wearing of apron was high among them but majority of them did not wash their hands before handling or serving the food.
3. The street food vendors in Volta region showed positive knowledge of using head cap and cleaning and sanitizing the cooking utensils reduced the risk of street food contamination.
4. The participants lacked knowledge on mask wearing and hand gloves to reduced the street food contamination.

Declarations

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT) have been used during the writing and editing of this manuscript.

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