Food Safety and Hygiene Practices among Food Vendors in Alvan Ikoku Federal University of Education, Owerri, Imo State Nigeria

Mary Ndubuisi Fidelis[1*], Akhere Ibhafidon[2], Confidence Ngozi Amanze-Njoku[3]

[1-3]Department of Health Education, Alvan Ikoku Federal University of Education, Owerri, Imo State
*Corresponding author: Mary Ndubuisi Fidelis; E-mail: maryfidelis@alvanikoku.edu.ng; 08037087787

Abstract

This study investigated food safety and hygiene practices among food vendors in Alvan Ikoku Federal University of Education, Owerri, Imo State Nigeria. The study employed a descriptive cross-sectional survey design. The population of the study consisted of all the 143 registered food vendors in Alvan Ikoku Federal University of Education, Owerri. An adapted instrument from similar past studies was used as the instrument for data collection. The instrument was distributed on face-to face basis to only 138 vendors who declared interest after their consent was sought and gained. All the 138 copies of the instrument were returned but only 135 well filled copies were used for the study. Data collected were analyzed using descriptive statistic of frequency and percentage while inferential statistics of chi-square was used to test the hypothesis at 0.05 level of significance. The result revealed poor for safety and hygiene practices before food preparation and during preparation but moderate food safety and hygiene practices during food service among food vendors. The findings also revealed that education has an influence on food safety and hygiene practices among food vendors. It was recommended among others, that consultancy department in-charge of food business establishments within the institution should frequently supervise the hygienic condition under which food vendors operate during food preparation and serving. Also, that health educators should organize seminars and workshops periodically, to sanitize food vendors and the general public on the importance of food safety and hygiene practices in eradicating food borne illnesses.

Key words: Food, Food safety, Hygiene practices, Food vendors.

Introduction

Food borne illnesses is one of the leading global public health concerns due to their contribution to increased rate of morbidity and mortality rates in both developed and developing countries. It is estimated that around 600 million cases of foodborne diseases occur each year globally (Siqueira et al., 2022). On the mortality rate, World Health Organization [WHO] (2020), reported that 230 die daily due to diarrhoeal disease associated with the ingestion of foods contaminated by microbial pathogens. Mensah et al. (2022) revealed common food microbial pathogens reported in vending food to include Salmonella, Escherichia coli, Staphylococcus aureus, and Bacillus cereus. In Nigeria, 200,000 people die annually from foodborne pathogens (Igbinosa et al., 2021). Undergraduates have been identified as potentially susceptible to foodborne diseases (Udujih et al., 2024) because they are regular consumers of street or vending foods (Sezgin & Saniher, 2016). Absence of kitchen in university dormitories, demanding academic load with long hours of lecture time,

and financial challenges expose university undergraduates to rely on vendor-prepared foods because they are readily available and affordable (Ahmmed et al., 2025; Kabiru et al., 2012).

The large population of university community comprising the students, staff and visitors play a vital role in attracting food vendors to converge in the institution to make food accessible to the community members. The safety of vendor-prepared foods has been of concern to the general public regarding the unhygienic environment in which such foods are prepared. Food as one of the basic needs of man need to be safe in order to enhance health. Food safety as according to Australian Institute of Food Safety (2019) refers to handling, preparing, and storing food in a way to best reduce the risk of individuals from becoming sick from foodborne illnesses. Food safety encompasses proper cleaning and sanitizing all surfaces, equipment and utensils; maintaining a high level of personal hygiene especially in hand washing; storing, chilling and heating food correctly with regards temperature environment and equipment; implementing effective pest control; and comprehending food allergies, food poisoning, food intolerance. Kamboj et al. (2020) stated that food safety and hygiene can be maintained through good manufacturing; sanitation standard operating procedures, good hygiene practices, and hazard analysis of critical control points.

Food safety and food hygiene mean almost the same thing because according to Food and Agricultural Organization of the United Nations and World Health Organization (2022), both terms connote all conditions and measures that are required during production, processing, storage, distribution and preparation of food to ensure it is safe, wholesome, and fit for human consumption. Therefore, food safety and hygiene practices are those practices geared towards protecting food from contamination, preventing microorganism already present from multiplying to the extent of that would cause illness or early food spoilage, destroying harmful microorganism in food through thorough cooking and processing, and discarding contaminated food. Such practices include separating raw food from cooked food, washing all utensils as soon as used, cooking food thoroughly and the appropriate temperature and using safe water during food preparation (Leslie et al., 2021). Proper hand washing before and during food handling, wearing of protective materials such as apron, head cover, gloves and mask, keeping food surfaces clean, and not exchanging money while preparing or selling food were identified by Udujih et al. (2012); Igbinosa, et al. (2021); Ahmed et al. (2024), and Adeyanju et al. (2025) as food safety and hygiene practices. To ensure food safety, Department of Nutrition and Food Safety, WHO Secretariat (2022) pointed that care and treatment of animals is significant in preventing animal originating food contamination. These practices will be grouped in this paper into three- food safety and hygiene practices before food preparation, during preparation and during serving.

Food safety and hygiene practices play a vital role in preventing food borne illnesses. Adherence to these practices by food vendors as important source of food for university students, will contribute to reduction of food borne diseases among undergraduates. Food vendors are food handlers who sell food to the public using semi-static or temporary structures or moveable vending sites, rather than permanent structure. As reported by the Grech et al. (2017), university environment is one of the several settings that promote vending and influence students' food choices and eating habits. Therefore, there is an urgent need to protect undergraduates' health through food safety and hygiene practices among vendors (Jaffee et al., 2019). Food safety and hygiene practices aim at prevention of food stuff from being contaminated at all food and feeding stages ranging from production, collection, transportation, storage, preparation to serving (Mensah et al., 2022). Neglect of these practices put students at risk of foodborne illness (Leslie et al., 2021). The role of food vendors in the transmission of food borne diseases was reiterated by Hamed and Mohammed

(2020). In the same vein, Dun-Dery and Addo (2016) highlighted that vending food serves as a potential source of food borne diseases. Factors that may contribute to this may include; deficiency in knowledge of food safety and hygiene practices, among vendors lack of access to clean water and lack of training on food preparation and handling (Uwemedimo et al., 2022). More so, as revealed by the Government of United Kingdom (2024), lack of access to adequate resources for safe food handling and storage, either due to unaffordability or unavailability as a key constraint to food safety and hygiene practices among food vendors.

Several studies have been conducted internationally, nationally and within the state on this area. Ahmed et al. (2024) reported an overall very poor (12%) food safety and hygiene practice among vendors. Bamidele et al. (2015) reported that 81.2% of food vendors handle money during food preparation and serving while Ahmed et al. (2024) revealed that 92.5% of vendors handle money while serving food. In another study conducted by Kanu and Turay (2024), the result revealed that 95% of food vendors handled food with bare hands, 83% did not cover their head, 78% did not wear apron while handling, preparing and serving food, 61% do not keep their fingers clean and short, 57% did not wash their hands before preparing and serving food, and 51% had no access to toilet around their shops. Adeyanju et al. (2025) revealed that vendors do not wear protective clothing and do not wash their hands regularly during food preparation and serving. Igbinosa et al. (2021) reported that 27.7% of food vendors do not wash their hands before food preparation and 28.1% use water and soap to wash their hands after using the toilet. Uwemedimo et al. (2022) showed that 67.3% of vendors do not excuse themselves or staff from handling or preparing food when they have frequent stool, catarrh, or cough , or open wounds (56.7%), 52% do not wash their hands with soap and water before handling food after touching money, 61.3% wash their hands after using the toilet and after sneezing into palms, 66% do not use separate processing kitchen utensils for ready-to-eat food like fruits and vegetables and non-ready-to-eat foods like raw meat so as to prevent cross contamination. On the contrary, the finding of Ferami et al. (2018) revealed that 78% of vendors demonstrated satisfactory food safety and hygiene practices. Klutse and Sampson (2024) revealed that 87.8% cleaned utensils with water and soap, 29.1% consistently wash their hands before handling food, 79% wear apron, 86.6% wear head cap, 33.9% use mask and 41.7% use gloves. Another study by Mensah et al. (2022) revealed that majority (79.8%) of the respondents checked for expiring date of all products before purchase, 54% had never used a thermometer to monitor food temperature, 32.2% always cover their heads serving or preparing food. Only 12.2% work while ill. Overall, 78.2% demonstrated acceptable practice while 19.0% demonstrated unsatisfactory practice. From the vast literature reviewed, there is a conflicting finding by previous authors. Moreover, to the best knowledge of the researcher as also revealed by literature review, no empirical in study has specifically examined food safety and hygiene practices among undergraduate students in Alvan Ikoku Federal university, Owerri. This constitutes a significant gap in the existing body of knowledge, which this study is designed to address.

Methods

Study design and setting

The study employed the descriptive survey design to investigate food safety and hygiene practices among food vendors in Alvan Ikoku Federal University of Education, Owerri.

Study population

The population of the study comprised all the 143 registered food vendors. (Source: Consultancy). All the registered vendors were intended to be used for the study because the population is small and can be managed by the researchers.

Data collection instrument

An adapted instrument from similar past studies (Ferdaus et al., 2020; Ma et al., 2019) was used for data collection. Score 0-49% is graded as low practice, 50%-75%, moderate practice, and 76% and above acceptable practice (Ferdaus et al., 2020). The instrument was distributed to only vendors who declared interest after their consent was sought and gained

Data collection procedure and analysis

The data collected were sorted out and entered into the Statistical Package for Social Sciences (SPSS) version 20 for analysis. Descriptive statistics of frequency and percentage were used to analyze the demographic data and the research questions. Inferential statistics of chi-square was used to test the null hypothesis at 0.05 level of significance.

Results

Table 1**: Demographic Characteristics of Respondents (n=135)**

S/N	Variable	Frequency	Percent (%)
1	Level of Education		
	Primary level	43	31.9
	Secondary level	57	42.2
	Tertiary level	35	25.9

Data in Table 1 show that 43(31.9%) had primary education, 57(42.2%) had secondary education while 35(25.9%) had tertiary education as their highest level of education.

Table 2: **Responses on food hygiene practices before food preparation among food vendors in Alvan Ikoku Federal University of Education, Owerri (n=135)**

S/N	Items	Always F (%)	Sometimes F (%)	Never F (%)	Total
1	Do you wash your hands before touching unwrapped raw food?	45(33.3)	59(43.7)	31(23.0)	135(100)
2	Do you remove jewelry before preparing food?	46(34.1)	47(34.8)	42(31.1)	135(100)
3	Do you keep your finger nails short and clean before preparing food?	65(48.1)	49(36.3)	21(15.6)	135(100)
4	Do you wash your hands with soap and water in the event of sneezing or blowing your nose before preparing food?	89(65.9)	38(28.1)	8(6.0)	135(100)
5	Do you check the expiring date of food products before purchase?	38(28.1)	65(48.2)	32(23.7)	135(100)
6	Do you tidy the kitchen before food preparation?	56(41.5)	41(30.4)	38(28.1)	135(100)
7	Do you wash utensils before use?	68(50.3)	58(43.0)	9(6.7)	135(100)
	Grand Mean	**58(43.0)**	**51(37.8)**	**26(19.2)**	**135(100)**

Table 2 reveals that 33.3% of the respondents always wash their hands before touching unwrapped raw food, 28.1% always remove jewelry, 48.1% always keep their finger nails short and clean, 65.9% always wash their hands with soap and water in the event of sneezing or blowing their nose before preparing food, 34.1% check expiring date of food products

before purchase, 45.5% always tidy the kitchen before food preparation while 50.3% always wash their utensils before and after use. Overall, the result showed poor food safety and hygiene practices among food vendors before food preparation as only 43% demonstrated acceptable practice.

Table 3: **Responses on Food Hygiene Practices During Food Preparation among Food Vendors in Alvan Ikoku Federal University of Education, Owerri (n=135)**

S/N	Items	Always F (%)	Sometimes F (%)	Never F (%)	Total
1	Do you wear glove when preparing food?	35(25.9)	48(35.6)	52(38.5)	135(100)
2	Do you use separate utensils for preparing ready-to- eat and non-ready- to- eat foods?	43(31.9)	39(28.9)	53(39.2)	135(100)
3	Do you wash your hands with water and soap before and after touching unwrapped or cooked food?	78(57.8)	36(26.7)	21(15.5)	135(100)
4	Do you excuse yourself from cooking when ill with a fever, cold or diarrhea?	54(40.0)	43(31.9)	38(28.1)	135(100)
5	Do you melt frozen food at room temperature?	58(43.0)	42(31.1)	35(25.9)	135(100)
6	Do you sanitize cutting boards, meat slicer and knives after each use?	53(39.2)	49(36.3)	33(24.5)	135(100)
7	Do you clean hands with clean towels while preparing food?	51(37.8)	58(43.0)	26(19.2)	135(100)
	Grand Mean	**53(39.3)**	**45(33.3)**	**37(27.7)**	**135(100)**

Table 3 shows an overall poor food safety and hygiene practices among food vendors during food preparation as only 39.3% demonstrated acceptable practice. The table also revealed that 25.9% of the respondents always wear glove when preparing food, 31.9% always use separate utensils for preparing ready-to- eat and non- ready- to- eat foods.57.8% of the respondents always wash their hands with water and soap before and after touching unwrapped or cooked food, 40.0% do not cook when ill with a fever, cold or diarrhea. Furthermore, the result showed that 43.0% of the respondents you melt frozen food at room temperature, 39.2% sanitize cutting boards, meat slicer and knives after each use, 37.8% clean their hands with clean towels while preparing food.

Table 4: **Responses on Food Hygiene Practices When Serving Food among Food Vendors in Alvan Ikoku Federal University of Education, Owerri (n=135)**

S/N	Items	Always F (%)	Sometimes F (%)	Never F (%)	Total
1	Do you use protective clothing like apron, head covering, glove and mask when serving food?	94(69.7)	29(21.5)	12(8.8)	135(100)
2	Do you excuse yourself or staff from serving food when they have frequent catarrh, cold or stool?	103(76.3)	27(20.0)	5(3.7)	135(100)
3	Do you wash your hands with soap and water before serving food?	125(92.6)	8(5.9)	2(1.5)	135(100)
4	Do you keep foods that need to be kept hot or reheat food at required temperature before serving?	75(55.6)	43(31.9)	17(12.5)	135(100)
5	Do you wash your hands with soap and water before serving food after touching money?	58(43.0)	36(26.7)	41(30.3)	135(100)
	Grand Mean	**91(67.4)**	**29(21.5)**	**15(11.5)**	**135(100)**

Table 4 reveals the responses on food hygiene practices during food serving among food vendors in Alvan Ikoku Federal University of Education, Owerri. The table showed that 69.7% of respondents use protective clothing like apron, head covering, glove and mask when serving food, 76.3% do regularly you excuse yourself or staff from serving food when

they have frequent catarrh, cold or stool, (92.6% of the respondentswash their hands with soap and water before serving food, 55.6% keep foods that need to be kept hot or reheat food at required temperature before serving, 43.0%wash their hands with soap and water before serving food after touching money . Overall, respondents showed moderate (67.4%) food safety and hygiene practices during food serving.

Table 5: **Responses on Food Hygiene Practices Among Food Vendors in Alvan Ikoku Federal University of Education, Owerri Based on Level of Education (n=135)**

S/N	Food hygiene practices	Primary education = 43(31.9%)		Secondary education = 57(42.2%)		Tertiary education = 35(25.9%)	
		AP F (%)	PP F (%)	AP F (%)	PP F (%)	AP F (%)	PP F (%)
1	Practices before food preparation	16 (37.2)	27 (27.9)	21 (36.8)	36 (19.3)	31 (88.6)	4 (11.4
2	Practice during food preparation	14 (32.6)	29 (13.9)	24 (42.1)	33 (10.5)	27 (77.1)	8 (5.8)
3	Practices during food serving	15 (34.9)	28 (27.9)	26 (45.6)	31 (8.8)	33 (94.3)	2 (5.7)
	Grand Mean	**15 (34.9)**	**28 (65.1)**	**24 (42.1)**	**33 (57.9)**	**31 (85.7)**	**4 (14.3)**

AP=Acceptable Practice; PP=Poor Practice

Table 5 reveals the responses on food hygiene practices among food vendors in Alvan Ikoku Federal University of Education, Owerri based on level of education. The result revealed poor food hygiene practices(34.9% and 42.1% respectively) among respondents with primary and secondary education while that for tertiary education was high (85.7%). The table also showed that respondents with tertiary education demonstrated acceptable food safety and hygiene practices (96.9%) more than their counterparts with secondary education (42.1%) and primary education (34.9%).

Table 6: **Chi-Square Analysis of Food Safety and Hygiene Practices among Food Vendors in Alvan Ikoku Federal University of Education, Owerri Based on Level of Education**

Education	N	Cal χ^2	Tab χ^2 value	Level of significance	Df	Decision
Primary	43					
Secondary	57	23.5	5.99	0.05	2	Rejected
Tertiary	35					

Table 6 shows that the calculated χ^2 value of 23.5 is higher than χ^2 tabulated value of 5.99 at 0.05 level of significance and at 2 degree of freedom; the null hypothesis is therefore rejected. This implies that there is a significant difference in food safety and hygiene

practices among food vendors in Alvan Ikoku Federal University of Education, Owerri based on level of education.

Discussion

The findings in table 2 revealed poor (40.3%) food safety and hygiene practices before food preparation among food vendors. This finding was not surprising but expected. Reason being that most vendors live in suburb areas associated with poor living conditions such poor power supply, inadequate and poor-quality water supply, and poor sanitary and poor housing conditions. The finding corroborated the finding of Kanu and Turay (2024) who reported poor food safety and hygiene practices before food preparation among vendors. On hand washing, the result revealed that 65.9% of vendors wash their hands after coughing or sneezing into their palms while 34.1% do not. The finding corroborated the finding of Igbinosa et al. (2021) and Uwemedimo et al. (2022) who reported that 27.7% and 38.7% respectively do not wash their hands before food preparation or after sneezing and coughing. This finding contradicted the finding of Kanu and Turay (2024) who reported that 57% of vendors do not wash their hands before food preparation. Vendors demonstrated moderate food safety and hygiene practices in washing after sneezing and washing utensil before food preparation only but poor practice in the rest.

The findings in table 3 revealed the responses on food safety and hygiene practices during food preparation among food vendors in Alvan Ikoku Federal University of Education, Owerri. The table revealed poor (39.3%) food safety and hygiene practices among food vendors during food preparation. This finding was expected and therefore not surprising. Most road side and institution-based vendors prepare food under no supervision by food hygienists and in shanties. In the absence of effective oversight and enforcement by food safety regulatory authorities, food vendors may be less likely to comply with established food safety and hygiene regulations during food preparation. This finding is consistent with the finding of Ahmed et al. (2024) and Mensah et al. (2022) but disagreed with Ferami et al. (2018) who reported that majority (78%) of vendors demonstrated satisfactory food safety and hygiene practices. The result showed that 25.9% of respondents indicated wearing glove, 31.9% use separate utensils for preparing ready-to-eat- and non- ready-to-eat foods. This finding is in consonant with Uwemedimo et al. (2022) and Adeyanju et al. (2025) report of poor use of protective wears and use of separate utensil to avoid cross contamination among vendors. The finding also revealed poor practice (39.2%) of sanitizing cutting boards, knives and meat slicers, 40% do not excuse themselves or their staff from cooking when ill with fever, cold or diarrhea and 43% do not melt frozen food at room temperature. The finding agreed with previous findings o (Mensah et al. (2022) but contradicted Eke-Ejiofor, et al., (2020), who submitted that 65.0% of their respondents demonstrated food safety practices during food preparation.

The findings in table 4 revealed the responses on food safety and hygiene practices during food serving among food vendors in Alvan Ikoku Federal University of Education, Owerri. The table revealed moderate (67.4%) food safety and hygiene practices among vendors during food service. The respondents demonstrated acceptable (92.6%) practice of washing hands before serving food and excusing self and staff when ill (76.3%); moderate (69.7%) practice of using protective clothing when serving food and keeping the food hot at the appropriate temperature (55.6%). The finding is consistent with the finding of Klutse and Sampson (2024) of good practice of wearing apron and head cap among food vendors when serving food to their customers.

The findings in table 5 revealed responses on food safety and hygiene practices among food vendors in Alvan Ikoku Federal University of Education, Owerri based on level of education. The table revealed that respondents with tertiary education demonstrated acceptable (96.9%) practices than their counterparts with secondary education (87.7%) and primary education (76.8%). The findings agreed with Tuglo, et al. (2021), who reported good food safety and hygiene practices among the highest level of educated food vendors in Jos.

The findings in table 6 revealed that there was a significant difference in food safety and hygiene practices among food vendors in Alvan Ikoku Federal University of Education, Owerri based on level of education. Therefore, education has an influence on food safety and hygiene practices among food vendors in Alvan Ikoku Federal University of Education, Owerri. The finding agreed with Faremi et al. (2018) who revealed that significant difference exists in the practice of food safety and hygiene food vendors based on level of education.

Conclusion

On the basis of the findings and discussions, the following conclusions were made:
Food vendors showed poor food safety and hygiene practices before food preparation to an extent. Food vendors demonstrated poor food safety and hygiene practices during food preparation. Food vendors demonstrated moderate food safety and hygiene practices during food service. Vendors with tertiary education demonstrated food safety hygiene practices more than their counterparts with secondary and primary education as their highest level of education There was a significant difference in the food safety and hygiene practices among vendors in Alvan Ikoku Federal University of Education based on level of education

Recommendations

Based on the findings, following recommendations were made by the researchers:

1. Regular training and retraining: Food vendors should receive regular training and refresher courses on food safety and hygiene practices, with particular emphasis on activities before and during food preparation. Such training should be organized by relevant health authorities and institution management.

2. Strengthened monitoring and enforcement: university management and environmental health officers should strengthen routine inspection and monitoring of vending outlets to ensure compliance with established food safety and hygiene standards. Appropriate corrective measures should be taken against vendors who fail to comply.

3. Mandatory certification: The management should permit only food vendors who have received adequate food safety and hygiene training and have been certified to operate within the institution premises. Periodic recertification should also be required to ensure sustainable compliance with current food safety standards.

4. Health education campaigns: Continuous health education and awareness programmes on safe food handling practices should be organized by health educators for food vendors, to improve their knowledge, attitude, and compliance with recommended food safety practices.
5. Educational requirements for food vendors: Priority should be given to vendors with at least secondary education during vendor selection. In addition, food safety education should be made mandatory for all vendors, especially those with lower educational attainment, to bridge the knowledge and practice gap

References

Adeyanju, B. E., Loto, A. O., Bello, M., &Adebisi, T. (2025). Food safety and hygiene practices among street food vendors in Ife East Local Government Area, Osun State, Nigeria *International Journal of Research of Scientific Innovation, 12*(15), 468 – 477.

Ahmed J., Ali .M, Alam K.K., Mamun M., Bhuiyah I. H., Bhandari P., Chalise, R., Naem, S. M. Z., Rahi, A. I., Islam, K. Bristy, F., Khatan, A., & Sabrin, M. S. (2024). Assessing knowledge, attitude and practices (KAP) of food safety among Dhaka City's street food vendors: *A public health issue. Research Square, 1*(1). 1-122.

Ahmed, F. H., & Nesreen, A. M. (2020).Food safety knowledge, attitudes and self-reported practices among food handlers in Sohag Government. *Egypt Eastern Mediterranean Health Journal, 26*(14), 144-152.

Ahmmed, T., Zanan, S. Ali, Jahan, I., Hassan, J., Tamama, S. T., Diba, A. A., & Ahmed, E. (2025). *Assessment of knowledge, Attitudes and practices regarding food safety among street food vendors and consumer:* Om Bangladesh. 468 – 477.

Australia Institute for Food safety (2019). *What is food safety? Complete guide for food business.* https://blog.foodsafety.com.au.

Bamudele, J., Adebimpe, W., Oladele, E., & Adeoye, O. (2015). Hygiene practices among workers in local eateries of Orolu Community in South Western Nigeria. *Annals of Medical and Health Science Research, 5*, 235 – 240.

Department of Nutrition and Food Safety, WHO secretariat (2022). WHO draft global strategy food safety 2020 – 2030.*Journals stronger food safety systems and global cooperation.*Geneva; WHO.

Dun-Dery, E. J., & Addo, H. O. (2016). Food hygiene awareness, processing and practice among street food vendors in Ghana Food and Public Health, *6*(3), 14-24.

Faremi, F.A., Olatubi, M. I., & Nwaabuye, G. C. (2018). Food safety and hygiene practices among good vendors in a tertiary education institution in South Western Nigeria. *Journal of Nutrition and Safety Education, 8*(2), 59 -70.

Ferdaus, M J. Hassan, M. M., Lina, N. W,, Das, K. K., Barnan, S. K., Paul, D.. K., & Roy, R. K. (2020).Food safety knowledge attitude and practices of street food vendors in Jashore region Bangladesh.*Journal of Food Science Technology, 1*, 1 -14.

Government of United Kingdom (2024). *Guidance on food safety and kitchen hygiene*. https://assets.publishing.serice.gov.uk//government/uploads/systems/up loads/ attachment-data/file/683730/HS-10-2-food-safety-and-ktichen-hygiene-pdg.,

Igbinosa, E. O., Beshiru, A.; Igbinosa, I. H., Ogofure, A. G., &Uwhba, K. E. (2021).Prevalence and characterization of food-borne vibrio parahaemologititus from African Saladin Southern Nigeria.*Front Microbiology, 12*, 248 – 256.

Jaffee, S., Henson, S., Umavehr, L., Graci, D., & Cassou, E. (2019). The food safety imperative: Accelerating progress in low-and middle-income countries

(Agricultural and Food series) World Bank: https://doi.org/10.1596/978-1-4648-1345-0.

Kabiru, O. A., Yetunde, O. O. Oladeji, G. O., & Akiloye, O. C. (2012). A retrospective study of community acquired Salmonella infections in patients attending public hospitals in Lagos, Nigeria. *Journal of Infection in Developing Countries, 5*(6), 381 – 395.

Food and Agricultural Organization of the United Nations and World Health Organization (2022). *General principles of food hygiene* (*CXC 1-1969).* Codex Alimentarius Commission. https://www.fao.org/fao-who-codexalimentarius

Grech, A., Hebden, L., Roy, R., & Allman-Farinelli, M. (2017). Are products sold in the university vending machines nutritionally poor? A food environment audit. *Nutrition & Dietetics, 74*(2), 185-190. https://doi.org/10.1111/1747-0080.12332.

Kamboj, S., Gupta, N., Bandral, J. O., Gandotra, & Anjum, N. (2020). Food safety and hygiene: A review. *International Journal of Chemical Studies, 8*(2), 358 – 368.

Kanu, P. T., & Turay, H. (2024). Food hygiene and safety practice among food vendors in Western area, Sierra Leone. *Food and Nutrition Sciences, 15*(6), 421 – 431.

Klutse, C. M., & Sampson, G. O. (2025).Assessment of hygiene practices and knowledge of food safety among street food vendors in Volta Region, Ghana.*European Journal of Nutrition and Food Safety, 17*(1), 1 - 10

Leslie, T., Bitius, H. S., Abanbe, C. E., Okwuikpo, M. I., &Maitanmi, J. O. (2021) Patterns of food safety and hygiene practice among food vendors in government primary school, Ikene Local Government, Ogun State. *African Journal of Health, Nursing and Midwifery, 4*(4), 1-13.

Ma, L., Chen, H., Yah, H., Wu, L., & Zhang, W. (2019).Food safety knowledge, attitude and behaviour of street food vendors and consumers in Handan, A third tier City of China. *Journal of Public Health, 19,* 11 -28.

Mensah, P., Teboah, Man, D., Owusu- Darko, K ,& Ablordey, A. (2022). Type, density and healthiness of food-outlets in University foodscape: a geographical mapping and characterization of food sources in Ghanaian University camps. *BMC Public Health, 22* (19) 12. https://dio.org/10.1186/s/2889-62214266-7.

Mohammed, A. S., & Shehasen, M. Z. (2020). Street food consumption and associated health risks.*International Journal of Research Studies .Agricultural Sciences 6*, 8 -18.

Sezgin, A. C., & Sanilier.N. (2016). Street food consumption in terms of food safety and health. *Journal of Human Sciences, 13*, 4072 – 4086.

Siqueira, R., Simoes, Q , & Rodirguez-Lagoro, D. (2022). *Enteric viruses in food safety.* New *threats for an old problem*. https://www.sciencedirect.com.

Udujih, H. I., Otti, C. O., Ndubueze, C. W., & Udujih, M. I. (2004).Prevalence of Salmonella among undergraduate students in Owerri Metropolis, Nigeria.*European Journal Nutrition and Food Safety, 16*(10), 25 -30.

Uwemedimo, F. O., Bassi., A. & Olukun, A. I. (2022). Food safety cultures: A study of food vendors in Abuja Municipal Area Council (AMMI). *Nigeria Asian Food Science Journal, 12*(12), 13 -27.

World Health Organization. (2020). *Food safety*. https//www.who.int