Assessment of Hygiene Practices Among Food Vendors in Elele Community of Ikwerre Local Government Area of Rivers State

HOPE AGBAM[1], EUNICE ANYALEWECHI NWOKE[2], CHIDINMA ONYEBUCHI AKANAZU[3], COLLINS CHIBUEZE ANOKWURU[4], UGONMA WINNIE DOZIE[5]
[1, 2, 3, 4, 5]*Department of Public Health, Federal University of Technology, Owerri*

Abstract –

Background: Street food vending is a vital economic activity in developing countries like Nigeria, providing affordable meals and livelihoods, yet it poses significant public health risks due to potential foodborne illnesses linked to poor hygiene practices. This study evaluated hygiene practices among street food vendors in Elele community, Ikwerre Local Government Area, Rivers State, Nigeria, where food safety concerns are heightened due to inadequate sanitation and regulatory oversight.

Methods: A descriptive cross-sectional design was employed, utilizing mixed methods (structured interviewer-administered questionnaire and observational checklists) to collect data from 190 street food vendors using probability sampling method. Data were analyzed using SPSS version 25, with descriptive statistics computed to assess knowledge and hygiene practices.

Results: Knowledge of food hygiene was high (88.9%), with strong recognition of microbial risks in raw meat (83.2%) and diarrheal disease transmission (90.5%). However, misconceptions persisted regarding canned food safety (48.4% awareness) and handling wounds during food preparation (52.6% correct). Vending sites exhibited satisfactory cleanliness, with 86.8% having clean floors and 88.9% using clean utensils, but 37.9% were near open gutters, 62.6% had pest presence, and 33.7% practiced irregular waste disposal. Hygiene practices showed inconsistencies: 93.8% always washed hands after toilet use, but only 16.9% consistently used aprons and head covers, and 60.3% cooked despite having wounds or infections.

Conclusion: Food vendors, whether stationary or on the move, have a responsibility to the public's health while running their businesses. The study highlights the need for enhanced training, regular inspections, and stricter enforcement of food safety regulations to mitigate health risks and improve food hygiene in Elele's street food sector.

I. INTRODUCTION

Food is a basic necessity of life without which human being cannot survive and the accessibility and obtainability of wholesome food is a fundamental human right (FAO, 2019). Conversely, unsafe food can cause foodborne illnesses that not only affect health but also impose severe economic burdens on individuals, families, and governments through loss of income, healthcare costs, and reduced productivity (World Health Organization, 2002). Street food does not only provide expediency for larger portion of the population but is also a means of income for millions of low-income people creating a great contribution to the economy of many developing countries (FAO, 2009).

The food and agricultural organization have defined street food as ''ready –to –eat foods and beverages prepared and/or sold by vendors or hawkers in the street or other public places. Street food provides convenience in the choice of diet for larger number of the population living in developing countries. An estimated population of close to 2.5 billion people consume street food every day (FAO, 2012).

Street foods are gaining increasing patronage as a result of urbanization and modernization which is compelling many urban dwellers to eat their major daily meals out of home. However, poor hygiene practices among vendors pose serious public health risks, including outbreaks of foodborne diseases. These unwholesome and unsafe actions have traversed the entire chain of street food enterprise ranging from agriculture raw materials to the final retail street foods and have been fingered in the epidemics of diseases and illnesses (Muyanja et al., 2011; Sakiru, Akabanda et.al, 2017). These risks are exacerbated by factors such as inadequate access to clean water, lack of proper waste disposal, and insufficient knowledge of food safety principles.

Studies have shown that the cost of managing foodborne illnesses in developing countries diverts scarce resources from essential infrastructure and development programs (Haleegoah et.al, 2015; El-Sherbeeny et al., 1985).

Despite its economic significance, the street food sector remains largely informal and poorly regulated. This creates vulnerabilities in food safety management and increases exposure to microbial, chemical, and physical contaminants. The assessment of the street food vending environment is one pragmatic approach in understanding the nature and extent of the discrepancies in the availability of nutritious and affordable diet to populations and also helps in undertaking healthy food retail initiative (Center for Disease Control, 2014). Food hygiene practices involves the protection of supply from microbial, chemical, as well as physical hazards which could occur in the process of food preparation, handling, serving, storing and consuming to prevent food borne diseases.

Food borne illness do not only impact the health and well-being of people they also have some economic implication for individuals, families, communities, businesses and even nation. These diseases put a significant burden on the health care delivery system and greatly bring down the productive activity of the economy (WHO, 2002). The WHO (2019) reports that foodborne and waterborne illnesses cause approximately 1.8 million deaths annually, predominantly in low- and middle-income countries. In Nigeria, many cholera and other gastroenteritis outbreaks have been linked to the consumption of contaminated street-vended foods (Odonkor et al., 2011).

In Elele community, informal observations reveal that many food vendors fail to adhere to basic sanitary and hygienic practices, potentially contributing to the frequent food-related illnesses reported in local health facilities. Understanding the hygiene practices of street food vendors is therefore essential for designing effective interventions to improve food safety and protect public health. This study was conducted to assess the current hygiene practices among street food vendors in Elele community, with the goal of identifying gaps and informing evidence-based strategies for improving food safety standards in the area.

II. MATERIALS AND METHODS

Study Area

The study was carried out in Elele Municipal, located in Ikwerre Local government Area in Rivers State. It has an area of 200.4 square km and a provisional population of 148,099 persons (NPC, 2022 projection). The Municipal belongs to the rain forest zone with undulating topography which predisposes it to erosion menace. In addition to a plentiful number of professionals, semi-skilled workers, and unskilled laborers, the area is blessed with an abundance of mineral and agricultural resources attributed to the rich soil. When contrasted with commercial and industrial hubs like Port Harcourt, the level of economic and social activity is modest. Christians make up a large portion of the population, and the Ikwerre language is also extensively spoken there

Study design and Population

This was a cross-sectional study carried out among street food vendors who sell cooked foods on the major streets within the Elele municipality during the day but excluding restaurants and big chop bars which clearly are being monitored by the Tourism Authority. A total of 200 vendors who gave consent for the study were selected using a probability sampling method. A structured questionnaire was used for interview. The questionnaire was prepared in English language but translated and communicated in local languages when necessary.

Ethical clearance

Ethical approval for the study was obtained from the Research and Ethical Review Committee of the Department of Public Health, Federal University of Technology Owerri, Notification and permission to carry out the study was obtained from the office of the Mayor of Elele Municipal while an informed written consent was obtained from the respondents. Before asking consent from the food vendors, the objectives and procedures of the study were explained clearly to them in a both local language (Ikwerre) and English language. Vendors were given the right to refuse to take part in the study as well as to withdraw any time during the interview. Privacy and confidentiality were maintained throughout the study.

Data Collection

A pretested interviewer administered questionnaire was used to harvest relevant information on socio demographic characteristics of the Food vendors, knowledge on Food hygiene knowledge and food hygiene practices with the help of two trained research assistants which were employed for the survey. On-the-spot strategy was used to avoid loss of material. All the distributed copies of the questionnaire were collected from them on completion.

Data analysis

The data was analysed using IBM Statistical Product for Service Solutions (SPSS) version 25. Descriptive statistics were carried out to measure relative frequencies, percentages, averages, and relative frequencies of the variables.

III. RESULTS

Sociodemographic characteristics of the study population

A total of 200 eligible food vendors were recruited. However, only 190 responses were analyzed in this study; 10 were excluded during analysis due to severe missing data of important information. This gives the response rate of 95%, which is enough for this study. There were 187 (98.4%) females and 3 (1.6%) males giving a male:female ratio of 1:62 the mean age of the respondents was 36.3 years (Table 1). Table 1 shows that most of the participants had obtained no formal education 93 (48.9%) while only 10 (5.3%) has a tertiary degree. The marital status of the vendors showed that 149 (78.4%) were married and 26 (13.7%) were not married (Table 1). Christianity was the predominant religion with 165 (86.8%) respondents and Islam with only 25 (13.2%) respondents. The sociodemographic characteristics of the study population are presented in Table 1 below.

Socio-demographics	Frequency (N=190)	Percent (%)
Age category		
Below 20	11	5.8
20 – 29	35	18.4
30 – 39	72	37.9
40-49	48	25.3
50-59	24	12.6
Total	190	100
Educational status		
No formal education	93	48.9
Primary	26	13.7
Secondary	61	32.1
Tertiary	10	5.3
Total	190	100
Sex of respondents		
Female	187	98.4
Male	3	1.6
Total	190	100
Marital status		
Married	149	78.4
Never married	26	13.7
Widowed	7	3.7
Divorced	8	4.2
Total	190	100
Religious affiliation		
Islam	25	13.2
Christian	165	86.8
Total	190	100

4.2 Knowledge Level of Street Food Vendors on Food Hygiene

A large majority of respondents 158 (83.2%), recognized that fresh meat always carries microbes on its surface. While 92 (48.4%) acknowledged canned foods can habour pathogens. Furthermore, most respondents 144 (75.8%) were aware that healthy individuals can carry and transmit germs to food. On contamination during food handling, 170 (89.4%) knew that touching the face or hair, or sneezing/coughing toward food could cause contamination. Encouragingly, 100% of respondents correctly identified that keeping raw meat separate from cooked food and cooking it thoroughly prevents contamination. Over half of the respondents 103 (54.2%) were aware that HIV, Hepatitis B, and other viral diseases can spread through food. In contrast, knowledge about diarrheal diseases was much stronger, with 173 respondents (90.5%) recognizing that diarrhea and cholera can be spread through food. Over half 106 (55.7%) associated surface cleanliness with reduced flies and rodents while 59 (31.1%) believed it mainly attracts customers. Nearly all respondents 181 (95.3%) correctly stated that soap can be used to disinfect preparation surfaces after handling raw meat. However, Only 100 (52.6%) disagreed that food should be prepared with a bandaged wounds as reported in Table 2 below.

Variable	Frequency (n=190)	Percent (%)
There are always microbes on the surface of fresh meat		
Yes	158	83.2
No	10	5.3
Don't know	22	11.5
Total	190	100
Canned food harbors disease causing Organisms		
Yes	92	48.4
No	74	38.9
Don't know	24	12.6
Total	190	100
Healthy people may cause illness by carrying germs to food		
Yes	144	75.8
No	25	13.2
Don't know	21	11.0
Total	190	100
Contamination of food can occur when food handlers touch their face/hair, sneeze or cough toward food.		
Yes	170	89.4
No	6	3.2
Don't know	14	7.4
Total	190	100
How can you prevent germs in raw food from contaminating cooked food?		
Keep raw meat separate from cooked food and cook it thoroughly	190	100
Always place raw meat on top of cooked food	0	0.0
Use the same utensils for raw and cooked foods without washing	0	0.0
Leave raw and cooked food together	0	0.0
Total	190	100
HIV and Hep-B, including other viral diseases may spread through food		
Yes	103	54.2
No	48	25.3
Don't know	39	20.5
Total	190	100

Diarrhea/cholera may be spread through food		
Yes	172	90.5
No	12	6.3
Don't know	6	3.2
Total	190	100
Keeping your cooking area and surroundings clean helps		
Attract more customers	59	31.1
Reduce flies and rodents that can contaminate food	106	55.7
Make cooking faster	14	7.4
Increase your earnings	11	5.8
Total	190	100
Soap can be used to disinfect the surface of food preparation surfaces after preparing raw meat		
Yes	181	95.3
No	4	2.1
Don't know	5	2.6
Total	190	100
When you bandage the wound on your hand you can still prepare food with it		
Yes	78	41.1
No	100	52.6
Don't know	12	6.3
Total	190	100
Hands should be correctly and adequately washed after blowing your nose or sneezing.		
Yes	189	99.4
No	0	0
Don't know	1	1
Total	190	100

Food Hygiene Practices among Street Food Vendors Only 32 (16.9%) of the respondents always used an apron and cover their heads with headcover whenever they are cooking, most respondents while 19 (10.2%) never do. Almost all respondents 178 (93.8%) wash their hands after every visit to the toilet. However, 115 (60.3%) food vendors sometimes still cook when they have an open wound, skin disease or upper respiratory tract infections. Majority 183 (96.3%) of the respondents always "clean their work surfaces regularly". At least 108 (57.3%) respondents "Always" have adequate water supply access points at their food vending points. Furthermore, all of the respondents 403 (100%) indicated they wash their vegetables and food items with clean water always before use. Answering further, 142 (74.9%) respondents always "inspect their cooking raw materials for freshness and spoilage". Finally, at least 87 (45.6%) respondents always shower at least two times a day, 89 (46.9%) indicated they shower twice a day sometimes while 14 (7.4%) indicated they never shower twice a day as shown in Table 3 below.

Variable	Frequency (n=190)	Percentage (%)
I use an apron and cover my head with headcover always to cook		
Always	32	16.9
Sometimes	139	72.9
Never	19	10.2
Total	190	100
I wash my hands after every toilet visit?		
Always	178	93.8

Sometimes	12	6.2
Never	0	0.0
Total	190	100
I cook whenever I have an open wound, skin disease or upper respiratory tract infections.		
Always	7	3.7
Sometimes	115	60.3
Never	68	36.0
Total	190	100
I cover prepared food to prevent exposure to dust and flies		
Always	183	96.3
Sometimes	7	3.7
Never	0	0.0
Total	190	100
I have adequate water supply access points at my food vending point?		
Always	108	57.3
Sometimes	54	28.5
Never	27	14.1
Total	190	100
I wash vegetables and food items with clean water.		
Always	190	100
Sometimes	0	0.0
Never	0	0.0
Total	190	100
I inspect cooking raw materials for freshness and spoilage		
Always	142	74.9
Sometimes	48	25.1
Never	0	0.0
Total	190	100
I resell leftover food the next day(s)		
Always	87	45.6
Sometimes	89	46.9
Never	14	7.4
Total	190	100

IV. DISCUSSION

This study looked at Assessing Hygiene Practices Among Food Vendors In Elele Community Of Ikwerre Local Government Area Of Rivers State, Nigeria. It is widely understood that vendors are in a better position to control contamination and ensure food hygiene if they are knowledgeable on the sources of contamination, though knowledge alone may not influence necessary practice. Foremost, the vast majority (83.2%) correctly recognized that fresh meat always carries microbes, reflecting awareness of the microbial risks associated with raw animal products. This finding is consistent with the study by Omemu & Aderoju (2008) and Chukuezi (2010), who reported that most food vendors in Abeokuta and Owerrri, Nigeria respectively, understood that raw meat could be a source of contamination. However, misconceptions persist in certain areas. Less than half (48.4%) acknowledged that canned foods can harbor disease-causing organisms, with a substantial proportion either disagreeing (38.9%) or unsure (12.6%). This knowledge gap contrasts with the findings of Monney et al. (2014) in Ghana, where a higher proportion of vendors were aware that improperly stored or damaged canned foods pose microbial risks.

Awareness that healthy individuals can carry and transmit germs to food was also high (75.8%), aligning with findings from Muyanja et al. (2011) in Uganda and Ackah et al. (2011) in Accra, Ghana, where the majority of vendors recognized the role of asymptomatic carriers in foodborne disease

transmission. This means that food vendors are fully aware of the fact that if proper care is not taken germs can easily be transmitted from their bodies or as a result of their activities to food especially during food preparation and handling.

Despite these strengths, gaps remain in understanding disease transmission. While knowledge about diarrheal diseases (90.5%) was strong, awareness that HIV and Hepatitis B can spread through food was lower (54.2%). This pattern of selective knowledge is also noted in the study by Donkor et al. (2009) in Ghana, where awareness of bacterial foodborne illnesses exceeded knowledge of viral and other non-bacterial transmission routes. When food vendors do not have sufficient disease transmission knowledge, it becomes a recipe for food contamination as emphasized by Galgamuwa et al, (2016) who concluded that consumption of contaminated foods is a major reason for more than half of diarrheal disease in most communities in developing countries. As a result, knowledge of food hygiene practices are crucial to food safety and hygiene at food establishments or joints.

One concerning finding is that only 52.6% correctly stated that a bandaged hand wound should not be used in food preparation. This is lower than the 68% reported by Bas et al. (2006) in Turkey, suggesting a significant knowledge gap in understanding cross-contamination risks from wounds, even if covered. Conversely, almost all respondents (99.4%) agreed that hands should be washed after blowing the nose or sneezing, aligning with WHO's (2020) "Five Keys to Safer Food" recommendations. This result also parallels findings from Barro et al. (2006) in Burkina Faso, where handwashing knowledge was nearly universal among food vendors.

In this study, while certain aspects of hygiene were commendable, others revealed gaps that could compromise food safety. The use of personal protective clothing such as aprons and head covers was notably inconsistent, with only 16.9% of vendors reporting they always wore them while cooking, and the majority indicating they only sometimes used them. This inconsistency mirrors findings from Ghana, where Akabanda et al. (2017) also observed irregular use of protective clothing among institutional food handlers, and from Ethiopia, where Negassa et al. (2023) reported similar trends among street vendors. Inadequate use of aprons and head covers increases the risk of food contamination from hair and clothing fibers, a point well-established in food safety literature.

Hand hygiene after toilet use, on the other hand, was largely satisfactory, with 93.8% reporting they always washed their hands. This is higher than the rates reported in studies from Ile-Ife, Nigeria (Aluko et al., 2014), and Benin City, Nigeria (Okojie & Isah, 2014), where compliance was considerably lower. However, it is important to interpret this with caution, as self-reported hygiene behavior can be overstated compared to actual observed practices. Even with high reported compliance, lapses in other related hygiene measures, such as environmental sanitation, can offset the benefits of proper handwashing.

A concerning gap emerged in the finding that 60.3% of vendors sometimes continued cooking even when they had open wounds, skin diseases, or upper respiratory infections, and 3.7% reported they always did so. This behavior contradicts the World Health Organization's (2006) *Five Keys to Safer Food*, which emphasize excluding sick food handlers from food preparation and ensuring wounds are covered with waterproof dressings. Similar risky practices have been reported in Benin City (Okojie & Isah, 2014) and Gedeo Zone, Ethiopia (Negassa et al., 2023), suggesting that across various contexts, economic pressures and lack of substitutes often compel vendors to work while ill, thereby increasing the likelihood of foodborne disease transmission.

V. CONCLUSION AND RECOMMENDATION

To sum up, street food sellers are rather visible and can be found in almost any city. People rely on the street food trade for sustenance and money This study shed light on the shortcomings in knowledge and practices of food handlers, which is particularly concerning given the critical nature of their work. Although street vendors' knowledge does not always convert into behaviors, the survey indicated that they had appropriate understanding on safe food handling techniques. Food vendors, whether stationary or on the move, have a responsibility to the public's health while running their businesses. In order to control the spread of food borne diseases, this study recommends that government at all level must fortify and enforce food safety laws, good hygiene practices, and precautions rigorously. It would be

helpful to add a provision that states that certification is contingent upon both the premises and the correct training of food handlers and owners.

REFERENCES

[1] Ackah, M., Gyamfi, E. T., Anim, A. K., Osei, J., Hansen, J. K., & Agyemang, O. (2011). Socio-economic profile, knowledge of hygiene and food safety practices among street-food vendors in some parts of Accra, Ghana. *Internet Journal of Food Safety, 13*, 191–197.

[2] Akabanda, F., Hlortsi, E. H., & Owusu-Kwarteng, J. (2017). Food safety knowledge, attitudes and practices of institutional food-handlers in Ghana. *BMC Public Health, 17*, 40. https://doi.org/10.1186/s12889-016-3986-9

[3] Aluko, O. O., Ojeremi, T. T., Olaleke, D. A., & Ajidagba, E. B. (2014). Evaluation of food safety and sanitary practices among food vendors in Ile-Ife, Nigeria. *Food Control, 37*, 210–215. https://doi.org/10.1016/j.foodcont.2013.09.061

[4] Barro, N., Bello, A. R., Aly, S., Ouattara, C. A. T., Ilboudo, A. J., & Traoré, A. S. (2006). Hygienic status assessment of dishwashing waters, utensils, hands and pieces of money from street food processing sites in Ouagadougou (Burkina Faso). *African Journal of Biotechnology, 5*(11), 1107–1112.

[5] Bas, M., Ersun, A. Ş., & Kivanç, G. (2006). The evaluation of food hygiene knowledge, attitudes, and practices of food handlers in food businesses in Turkey. *Food Control, 17*(4), 317–322. https://doi.org/10.1016/j.foodcont.2004.11.006

[6] Center for disease control.(2014). Surveillance for Foodborne Disease Outbreaks United States, 2014: Annual Report.

[7] Chukuezi, C.O. (2010). Food Safety and Hyienic Practices of Street Food Vendors in Owerri, Nigeria. Studies in Sociology of Science, 1(1), 50-57. https://doi.org/10.3968/j.sss.1923018420100101.005

[8] Donkor, E. S., Kayang, B. B., Quaye, J., & Akyeh, M. L. (2009). Application of the WHO keys of safer food to improve food handling practices of food vendors in a poor resource community in Ghana. *International Journal of Environmental Research and Public Health, 6*(11), 2833–2842. https://doi.org/10.3390/ijerph6112833

[9] EI.Sherbecny, M.R, FahmiSaddik, M. Frank, L.B (1985). Microbiological profiles of foods served by street vendors in Egypt .9(4). https://do.org/101016/0168-1605(85)90026=1/

[10] FAO, (2012) Street Food Vending in West Africa Cities, Potentials and Challenges www.fao.org/africa%0A(12/06/2013).

[11] Food and Agricultural organization of the United Nations (2009). Good Hygiene Practice in the preparation and sale of Street food in Africa. Tools for Training.

[12] Food and Agriculture Organization. (2019). *The state of food security and nutrition in the world 2019: Safeguarding against economic slowdowns and downturns.* FAO. https://doi.org/10.4060/ca5162en

[13] Galgamuwa, L.S., Iddawela, D., &Dhaemaratne, S/D (2016). Knowledge and practices of food hygiene among food handlers in plantation sector, Sri Lanka. International Journal of Scientific Reports.https://doi.org/10.18203/issn.2454-2156.intjscirep20164307.

[14] Haleegoah, J., Ruivenkamp, G., Essegbey, G., &Frempong, G. (2015). Street-Vended Local Food Systems Actors Perceptions on Safety in Urban Ghana : The Case of Hausa Koko ,Waakye and GaKenkey. April, 134–145.

[15] Monney, I., Agyei, D., & Owusu, W. (2014). Hygienic practices among food vendors in educational institutions in Ghana: The case of Konongo. *Food and Public Health, 4*(6), 306–312. https://doi.org/10.5923/j.fph.20140406.04

[16] 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. https://doi.org/10.1016/j.foodcont.2011.01.016

[17] 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. https://doi.org/10.1016/j.foodcont.2011.01.016

[18] National Population Commission (NPC) (2022) Nigeria Demographic and Health Survey 2022.

[19] Negassa, B., Anbese, A. T., Worku, G., Areba, A. S., Seboka, B. T., Debela, B. G., Kanno, G. G., & Soboksa, N. E. (2023). Food hygiene practices and associated factors among street food vendors in urban areas of Gedeo Zone, Southern Ethiopia. *Environmental Health*

Insights, 17, 11786302231168531. https://doi.org/10.1177/11786302231168531

[20] Odonkor, S.T., Adom, T., Boatin.R.,Bansa. D., & Odonkor.C.J. (2011). Evaluation of Hygiene practices among street food vendors in Accra Metropolis Ghana.

[21] Okojie, P. W., & Isah, E. C. (2014). Sanitary conditions of food vending sites and food handling practices of street food vendors in Benin City, Nigeria: Implication for food hygiene and safety. *Journal of Environmental and Public Health*, 2014, 701316. https://doi.org/10.1155/2014/701316

[22] Omemu, A. M., & Aderoju, S. T. (2008). Food safety knowledge and practices of street food vendors in the city of Abeokuta, Nigeria. *Food Control, 19*(4), 396–402. https://doi.org/10.1016/j.foodcont.2007.04.021

[23] Sakiru, Akinbode. Adewale, D. (2011). Willingness to Pay for Street Food Safety in Ogun State, Nigeria. Journal of Agricultural & Food Information, April. https://doi.org/10.1080/10496505.2011.563226

[24] WHO. (2019). Accelerating efforts on food safety Report by the Director-General (Vol. 1, Issue November)

[25] WHO.(2002). Food Safety Programme - 2002 World Health Organization. Safer Food for Better Health.http://www.who.int/fsf

[26] WHO.(2002). Food Safety Programme - 2002 World Health Organization. Safer Food for Better Health.http://www.who.int/fsf

[27] World Health Organization. (2006). *Five keys to safer food manual*. WHO Press. https://www.who.int/publications/i/item/9789241594639

[28] World Health Organization. (2020). *Five keys to safer food manual*. WHO Press. https://www.who.int/publications/i/item/9789241594639