



Food Safety Cultures: A Study of Food Vendors in Abuja Municipal Area Council (AMAC), Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Food is considered safe when it is free from substances that might compromise individual or populations' health and well-being, and is realizable with appropriate food safety cultures. This study accessed 150 food vendors across four of twelve political wards of the Abuja Municipal Area Council, AMAC who consented to the exercise. Results indicated no significant relationship between location with perception and practices of vendors on food safety, which had mean scores of 0.593, and 0.139 respectively. With p value (< 0.05), there is clearly a significant difference between the options measuring food safety (yes = good, and not sure = fair), and option no (poor) having the highest observed count of 78, the null hypothesis was rejected. As a result, it was concluded that, the food safety culture of food vendors in Abuja will not deliver safe foods to consumers. High market prices of food supplies, complex/cumbersome processes involved with meeting government regulations on food safety with weighted means of 3.3133 and 2.8667 respectively, were identified as the prevalent constraints on food safety cultures among food vendors in Abuja. In assuring safety, while maintaining the benefits of food vending to both

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sellers and buyers, emphasis should be given in to promoting food safety rather than mere revenue generation among both vendors and local government officials who register these vendors.

Keywords: Perception; market; location; safety.

1. INTRODUCTION

Food safety has become a very important aspect of Health-care delivery and the government of Nigeria has made substantive efforts by enabling various government organs like the National Agency for Food and Drug Administration and Control (NAFDAC), Standard Organization of Nigeria (SON), and Federal Ministry of Health (FMOH) are to function so as to ensure Nigerians are safe [1]. The efforts of private, research and non-governmental bodies like the Nigerian Institute of Food Science and Technology (NIFST) & The United Nations Industrial Development Organization (UNIDO [2], also augment government efforts in this stride. Globally, it has become a significant and growing public health concern, owing to the high incidence of foodborne diseases [3], which results from either food related infections or intoxications. In addition to providing support for national economies, trade and tourism, food and nutrition security, and sustainable development [4,1,5], safe food is critical to public health [6].

WHO reports that only a few persons who become ill from food they have consumed sort for medical care, with little or no reports to public health authorities, or recorded in official disease statistics. In addition to several individual and systemic reasons that make it difficult to capture common food borne diseases in health data base, certain chronic diseases, like cancer, kidney failure, liver failure, resulting from contaminated food appear long after the food has been ingested [7].

The International Conference on Food Safety held in Addis Ababa in February 2019, and the International Forum on Food Safety and Trade held in Geneva in 2019, reiterated on the imperative of food safety in achieving global Sustainable Development Goals [5,8].

Previous studies have revealed that the greatest burden of food borne diseases falls within Africa, and yet the statistics are rather conservative, especially in Nigeria where self-medication is prevalent [9-12]. Though foodborne diseases affect all populations in varying degrees, the pregnant women, older adults, younger children,

and immuno-compromised are more susceptible [13].

Michael et al. [14] presents Griffiths definition of Food safety culture as a collection food safety practices used within an organization. Food safety can be achieved if a standard culture in food management is practiced. It is reflected in individual or Organizational values, beliefs and norms and actual practices in food handling, storage, processing and delivery [15].

Inadequate food processing and food-borne disease are important contributors to the huge burden of sickness and death [16], Though food safety issues are usually effects of unintentional causes, intentional roots, associated food fraud and/or poor food defense might also result in wide-scale harm to public health. To achieve health for all, cognizance must be given to freeing societies from avoidable burden of food-borne diseases.

Pepple stated that according to Professor Alfred Ihenkurye, more than 200,000 mortality rate are recorded yearly in Nigeria from food poisoning caused by food contamination during the time of processing, preservation and service [17]. CDC also stated that every year, at least 48 million persons get sick from a foodborne related illness, about 128,000 are hospitalized and 3,000 die [13]. For example, human infections due to indirect exposure through food have been implicated in WHO report of 472 laboratory confirmed cases of Lassa fever from 26 out of 36 Nigerian states and the Federal Capital Territory in 2020 [18].

Due to convenience & because of reasonable pricing, vended foods do serve an essential need of populations [19], who are blandished with many food options, marketed to maximize appeal. However, to establish that food is safe, and will not have adverse effects on health of the consumers, it is pertinent to draw on a scientific knowledge. An estimated value of 600 million – almost 1 in 10 persons in the world – become sick after consuming contaminated food and 420 000 die every year, leading to the loss of 33 million healthy life years (DALYs). US\$110 billion is lost every year in productivity and medical expenses as a result of unsafe food in low- and

middle-income countries. over US\$ 500 million in losses because of the damage caused by aflatoxins, fumonisins and trichothecenes [20], which are mycotoxins that commonly contaminate staple foods like peanuts and maize grown and consumed in Nigeria have been recorded [21].

With the increasing growth of the world's population, the intensification and industrialization of agriculture and animal production to meet increasing demand for food has created opportunities and yet, challenges for food safety [22]. Unstable climatic changes have also been predicted to affect food safety. These among other challenges put greater responsibility on food producers and handlers to ensure food safety. Foodborne diseases hamper socioeconomic development by overstressing health care systems, and harming national economies, tourism and trade [5]. Also, the origin of the corona virus, which stems from human consumption of, and likely cross contamination from vectors of the virus, further presents an opportunity to look into food safety within our society [23].

In Nigeria, people's ignorance of food safety among a myriad of other factors have undermined government efforts to ensure flow of safe foods [24]. Consumers are being exposed to problems of safety and quality of products purchased [25].

WHO have identified food service establishments, as one of the links in fostering foodborne diseases [5]. Pepple et al. [26] highlighted that food vending, serve as potential source of food borne diseases, especially with the emergence of informal food businesses. Chikuezi reported that poor food safety cultures among food vendors' raises concerns for potential outbreaks, owing to the fact that processed foods have been epidemiologically linked to diseases in the past [27]. Hamed and Mohammad also reiterated the significant role of food handlers in the transmission of foodborne diseases [28].

Deficiencies in scientific knowledge of food safety practices, poses some challenge in the preparation, handling and sale of safe processed foods. Notwithstanding, the outbreaks of Lassa fever in Nigeria, rats which constitute natural habitats for the causative agents are commonly observed frolicking around food institutions [27,28].

Although some institutionalized food vendors may have a documented food safety management system in place, a bulk of the vendors who provide service to majority of Nigerian populace are yet to embrace such formal Management system. And even for those who may have embraced a documented formal Management system, it may not yet be clear if there has been a smooth transition from the application of a classical hazard-based approach to the risk-based approach of food safety [4,29].

It is thus necessary to establish the current perception and practicing cultures of food vendors, as this will form a basis of understanding current lapses that can enhance informed decisions for appropriate interventions in the food value chain [30].

2. MATERIALS AND METHODS

2.1 Study Population

The study population in this study was made up of food vendors in typically selected LGA(s) within FCT, Abuja. The target population were comprised of food vendors on the roadside, restaurants, cafeterias and establishments from four of the twelve political wards in AMAC.

2.2 Study Area

In 1976, the Federal Capital Territory (Abuja) was created and was bordered to the west and north by Niger State and to the northeast by Kaduna State, with Nasarawa State in the east and southeast while Kogi State was to the southwest. It is currently the fastest growing city in Africa, with current estimated population of 3, 277, 740. It encompasses six area councils (Bwari, Abaji, Gwagwalada, Kwali, Area Municipal Council (AMAC) and Kuje.

AMAC is the largest area council with a population of over 1.5M. AMAC make up the bulk of the built-up areas in the Federal Capital City, making it the most urbanized and developed of the other five area councils of Abuja. This research will focus on obtaining findings from AMAC. AMAC is positioned between latitudes 8°36' N and 9°21' N of the Equator and longitudes 7°07' E and 7°33' E of the Greenwich Meridian. It covers about 1,500sqkm of the total land area (38.8%) of the Federal Capital Territory (FCT). AMAC is made up of 12 political wards namely; City Centre, Garki, Kabusa, Wuse, Jiwa,

Gui, Karshi, Orozo, Karu, Gwarinpa, Nyanya, and Gwagwa.

2.3 Study Design

Descriptive cross-sectional study was the type of design used. In achieving it, a structured questionnaire was used to obtain primary data from 150 consented respondents (having received adequate information on the aims of the research), who were issued one-one questionnaires by trained research assistants. Responses were interpreted quantitatively and data was analyzed with the latest version of SPSS.

2.4 Sampling Technique and Tool

A multistage sampling technique was used [31]. In the first stage, vendors were stratified by the existing 12 political wards in AMAC [32], as a concise list of individual food vendors or food vending outlets could not be obtained from AMAC.

In the second stage, four wards consisting Kabusa, Wuse, Gwarimpa and Nyanya were selected by means of simple random sampling.

In the third stage, to conveniently harness the 150 total sample size, the numbers 40, 35, 40, 35 were assigned to the wards, and the political units the four wards were identified. Within the fourteen political units of Kabusa, forty vendors were sampled from three Lugbe political units. Of the thirty political units in Wuse, thirty-five vendors were sampled from three political units consisting of Zone 3, 4, & 5. Of the twenty-four political wards in Gwarimpa, 40 vendors were sampled from Jabi/Utako. 35 vendors were sampled from Nyanya.

Questionnaire covering Demographic attributes, Perception on food safety, Food safety practices, and Food vendor constraints, which focused on key areas of food safety cultures was developed and used to gather data. Inputs were obtained from several scientific sources which are referenced in the literature review. Contents were also passed through the Codex Contact of NAFDAC to verify that relevant aspects of Food Safety Cultures were covered.

2.4.1 Inclusion criteria

A consented food vendor, who had contact with food during food preparation, &/or sale, who was working during the period of study.

2.4.2 Exclusion criteria

Food vendors who did not, and cannot consent to take part in the study.

2.4.3 Data quality control

A proper designing and pre-testing of the questionnaires was carried out to ensure that quality data was obtained.

Training were given to the research assistants (data collectors) that collected data on the objective, importance of the study, respondent's rights, confidentiality of information, techniques of interview, and about conducting the pre-test. The pretest was conducted using the neighboring wards as study location to make sure the validity and reliability of the survey tools and the necessary feedbacks were gotten by the data collectors. The principal investigator monitored the data collection process to ensure the completeness and reliability of the gathered information all through the data collection period.

3. RESULTS

3.1 Sample Profile

Table 1 presents the demographic characteristics of respondents, with results showing that in terms of location, Utako/Jabi and Lugbe more respondents with 28% and 27.3% respectively.

On gender characteristics, females took the lead with 75.3%. For the age group, the highest (32%) and lowest (0.7%) percentage of respondents for (25–29) and (60 +) years old, respectively. For Marital Status, the married respondents recorded the highest value of 62.7% to single (35.3%) and Divorced (2.0%). Regarding the educational level, secondary education had the highest with 62.7% while the Food hawker/open space cafeteria were more at 52.7%.

3.2 Perception of Food Vendors on Food Safety

Table 2 summarizes the perception of food vendors on food safety.

3.2.1 Knowledge of food safety and regulations

Majority of the food vendors (56.7%) have no knowledge of food safety and working system of Hazard Analysis & Critical Control Points

(HACCP) (86%). 50.7% of the vendors are not aware of the differences between food quality and safety while 16% of them do not know if such differences exist.

Table 1. Demographic data

Variable	Category	Frequency	Percentage (%)
Location	Utako/Jabi	42	28.0
	Lugbe	41	27.3
	Nyanya	32	21.3
	Wuse	35	23.3
Gender	Male	37	24.7
	Female	113	75.3
Age	18-19	5	3.3
	20-24	14	9.3
	25-29	48	32.0
	30-34	31	20.7
	35-39	24	16.0
	40-44	17	11.3
	45-49	4	2.7
	50-54	3	2.0
	55-60	3	2.0
	60 +	1	0.7
Marital status	Single	53	35.3
	Married	94	62.7
	Other	3	2.0
Education	Primary	21	14
	Secondary	73	62.7
	Tertiary	50	33.3
	None	6	4.0
Vendor type	Restaurant/fast food	71	47.3
	Food hawker/open space cafeteria	79	52.7

Table 2. Perception of food vendors on food safety in the Federal Capital Territory, Abuja Nigeria

Questions	Responses n = 150			
	No (%)	Not sure (%)	Yes (%)	
Do you know about food safety?	85 (56.7)	1 (0.7)	64 (42.7)	
Is there a difference between food quality and food safety?	76 (50.7)	24 (16.0)	50 (33.3)	
Food can get contaminated by microorganisms through;	hands, mouth and skin	32 (21.3)	31 (20.7)	87 (58.0)
	air/dust/water	36 (24.0)	21 (14.0)	93 (62.0)
	jewelry (rings, wristwatch, hand-bands)	32 (21.3)	17 (11.3)	101 (67.3)
	open wounds on hand	62 (41.3)	0	88 (58.7)
	Personal protective equipment (e.g. hair cover, nose mask, hand cloves) are necessary to prevent cross contamination	61 (40.7)	3 (2.0)	86 (57.3)
Do you know about food-borne diseases?	60 (40.0)	12 (8.0)	78 (52.0)	

Questions	Responses n = 150		
	No (%)	Not sure (%)	Yes (%)
	None	One mention	Two mentions
If yes, Mention any food-borne diseases	-	78 (52.0)	0
I know the meaning of HACCP*	No 129 (86.0)	Not sure 5 (3.3)	Yes 16 (10.7)
Are you aware if Nigerian government have regulations on food safety?	132 (88.0)	0	18 (12.0)
Complying with established food safety regulations can protect;	my customers	148 (98.7)	2 (1.3)
	my business	149 (99.3)	1 (0.7)
List any government regulatory institutions you know on food safety;	None	One mention	Two mentions
	73 (48.7)	68 (45.3)	9 (6.0)

*HACCP: Hazard Analysis & Critical Control Points

Table 3. Food Safety Practices of food vendors in the Federal Capital Territory, Abuja

Questions	Responses n = 150		
	No (%)	Not Sure (%)	Yes (%)
Which is the most important consideration when buying food stuff to prepare for sale, is it 'price' or 'freshness'?	Price 93 (62.0)	Safety 57 (38.0)	
I or staff are excused from handling/preparing food when we have:	frequent stool, catarrh or cough	101 (67.3)	1 (0.7) 48 (32.0)
	open wounds on hand	85 (56.7)	0 65 (43.3)
In addition to daily cleaning, I have an environmental sanitation plan in place?	79 (52.7)	9 (6.0)	62 (41.3)
I use SEPARATE KNIVES and cutting boards, each for raw meat, fruits and vegetables?	99 (66.0)	2 (1.3)	49 (32.7)
I wash hands with soap & water before handling food;	after touching money	78 (52.0)	15 (10.0) 57 (38.0)
	after using the toilet	39 (26.0)	19 (12.7) 92 (61.3)
	after sneezing into my palms and touching	36 (24.0)	35 (23.3) 79 (52.7)
I need more information, training, and guidance to ensure that my customers get safe foods	110 (73.3)	0	40 (26.7)

On regulation of food safety in Nigeria, 88% of the vendors are not aware of food safety regulation in Nigeria and the few that are aware

could only mention one of such institution while 98.7% of them don't know the benefit of food safety regulation.

3.2.2 Knowledge of disease-diet links

Although majority of the vendors have poor knowledge of food safety, yet most of them are aware that food can get contaminated by microorganisms through hands, mouth and skin (58%), air/dust/water (62%), jewelries (67%), and open wounds on hand (58.7%). 57.3% of the vendors are aware that personal protective equipment (e.g. hair cover, nose mask, hand clothes) can prevent cross contamination while 52% of them have knowledge of food borne diseases. Yet, 48.0% could not mention any food-borne disease, while 52.0% could mention one.

3.3 Food Safety Practices of Food Vendors in the Federal Capital Territory, Abuja

A high percentage (62%) of vendors consider price to safety when buying food stuff at the

market while 38% considered safety to price. Majority of the food vendors do not excuse themselves or their staff from handling/preparing food when they have frequent stool, catarrh or cough (67.3%) and open wounds on hand (56.7%). 52% of the vendors don't wash hands with soap and water before handling food after touching money but high percentage of them usually wash their hands with soap and water after using the toilet (61.3%) and after sneezing into palms and touching fomites (66.7%). On cross contamination, 66% of the vendors do not use separate knives and cutting boards, each for raw meat, fruits and vegetables when cooking. Most of the vendors (52.7%) do not have an environmental sanitation plan aside their daily cleaning exercises. 73.3% of the vendors are not even ready to get more information, training, and guidance to ensure that their customers get safe foods.

Table 4. Association between the location of participants and the perception on food safety in the Federal Capital Territory, Abuja

ANOVA		Sum of squares	Df	Mean square	F	Sig.
Perception	Between Groups	0.131	3	0.044	0.636	0.593
	Within Groups	10.007	146	.069		
	Total	10.138	149			

- $H_0 =$ There is a significant difference between location and perception of food safety by food vendors in Abuja
- $H_1 =$ There is no significant difference between location and perception of food safety by food vendors in Abuja
- Interpretation: No significant difference since p value (0.593) > 0.05
- No need for post-hoc test

Table 5. The Relationship between location and food safety practices of food vendors in Federal Capital Territory, Abuja

ANOVA		Sum of squares	Df	Mean Square	F	Sig.
Food safety practices	Between Groups	0.503	3	0.168	1.858	0.139
	Within Groups	13.179	146	0.090		
	Total	13.682	149			

- $H_0 =$ There is a significant difference between location and food safety practices of food vendors in Abuja
- $H_1 =$ There is no significant difference between location and food safety practices of food vendors in Abuja
- Interpretation: No significant difference since p value (0.139) > 0.05
- No need for post-hoc test

Table 6. Association between the location and food safety practices of food vendors in Abuja

	Observed N	Expected N	Residual
Poor	78	50.0	28.0
Fair	11	50.0	-39.0
Good	61	50.0	11.0
Total	150		

- $H_0 =$ The food safety practices of Food vendors in Abuja will deliver safe foods to the consumers
- $H_1 =$ The food safety practices of Food vendors in Abuja will **not** deliver safe foods to the consumers

Table 7. Analysis of Association between the location and Food Safety Practices of Food Vendors in Abuja

	Response
Chi-Square	48.520 ^a
Df	2
Asymp. Sig.	.000

3.3.1 Interpretation

Since p value (0.00) < 0.05, there is clearly a significant difference between the options measuring food safety (yes = good, no = poor and not sure = fair). With option no (poor) having the highest observed count of 78, the null hypothesis is rejected. Therefore, the food safety cultures of food vendors in Abuja will not deliver safe foods to consumers

3.4 Vendor Constraints to Enhancing Food Safety Cultures

Table 8. Showing constraints the Study observed in FCT, Abuja

Constraints	Frequency n = 150 (%)				Weighted mean	Overall rating
	Strongly disagree	Disagree	Agree	Strongly agree		
The process of meeting government regulations on food safety is complex or cumbersome	49 (32.7)	6 (4.0)	11 (7.3)	84 (56.0)	2.8667	Agree
High market prices of food supplies	19 (12.7)	11 (7.3)	24 (16.0)	96 (64.0)	3.3133	Strongly Agree
Inadequate access to clean portable water	92 (61.3)	18 (12.0)	5 (3.3)	35 (23.3)	1.8867	Disagree
Other mentioned constraints						
Finance	6 (9.0)					
Weather conditions	1 (1.0)					

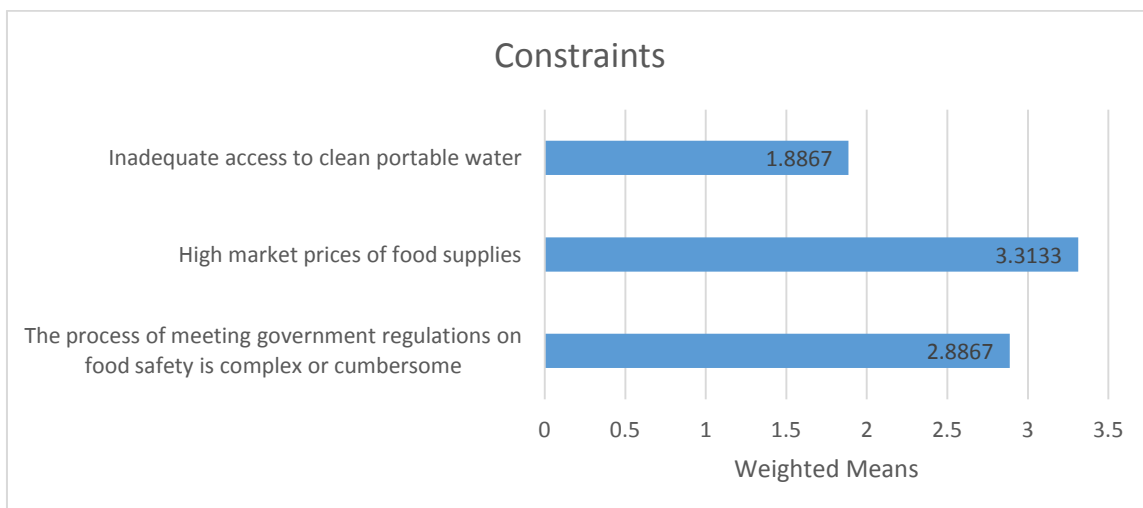


Fig. 1. Clustered Bar Chart of prevalent constraint to enhancing food safety cultures

Table 9. Showing a guide to decision on the Vendor Constraints observed in FCT, Abuja

Decision	Mean range
Strongly disagree	1 – 1.75
Disagree	1.76 – 2.50
Agree	2.51 – 3.25
Strongly agree	3.26 – 4.00

4. DISCUSSION

4.1 Vendor Cultures with Food Safety

Culture relates to values, attitudes, beliefs, orientations, and underlying assumptions prevalent among people. Considering that culture could go either way; either in a positive light where a system is enhanced, or negative path with no benefits and possible deleterious impacts on a system, it is possible to define metrics of what a good culture is, as highlighted in the questions raised in the questionnaire developed and used in this research. All discussions below would reveal the food vendor cultures with regards to food safety.

4.2 Sample Profile/ Demographic Characteristics

4.2.1 Location

For demographic characteristics of respondents, Table 1 presents results showing that Jabi and Lugbe had more respondents with 28% and 27.3% respectively, obviously because these places are frequented by people across Abuja for leisure and shopping in areas like the popular jabi lake.

4.2.2 Gender

For gender characteristics, females had the lead with 75.3%, which may be attributed to the fact that food vending business is predominantly practiced in this part of the world by women as they depend on it as an alternative means to complement family income in the midst of a harsh economy [33]. This corroborates figures of some previous studies [34,35] where majority of the vendors were women. In contrast a study done in South Africa [36], revealed majority of the food vendors to be men, because the role of gender in socioeconomic development of any country is often influenced by cultural orientation which differs from one geographical location to another.

4.2.3 Age

For the age group distribution, the highest (32%) and lowest (0.7%) percentage of respondents was (25–29) and (60 +) years old, respectively. Literature reviews suggests that food vendors are mostly young people that fall between the ages 25-40 [37].

4.2.4 Marital and educational status

Married respondents recorded a highest value of 62.7% to single (35.3%) and Divorced (2.0%) which might be due to the fact that married respondents have more responsibilities and bills to meet up with compared to others.

The highest educational level was that of the secondary education with 62.7% which almost similar to study carried out by Martins [38] where the highest educational level was the secondary education. This is in consonance with a study in Plateau and Owerri having 55.2%, and 52.8% respectively [39,27]. This could be due to the fact that most street vendors belong to the socioeconomically disadvantaged group and hence may not be willing to pursue higher education due to social deprivation orchestrated by poverty [40].

4.2.5 Type of establishment

The Food hawker/open space cafeteria took the lead with 52.7% and this may be attributed to the fact that this type of establishment vending is very easy to establish with low budget and most Nigerians often patronize them because of quantity and affordability with less or no concern for the health implications that may come with consuming them.

4.3 Perception of Food Vendors on Food Safety

4.3.1 Knowledge of food safety and regulations

There is a recent discovery that the dominant food system within which food-safety governance is designed to make food safe, is itself a structural and systemic source of unsafe food, poor health and a future of food insecurity for many [41]. A lack of coordination between the relevant regulatory bodies, likely as a result of inadequate power distribution to enforce food laws, inadequate supervision and proper monitoring by food safety officers was noted by

Okojie and Isah in 2014 [42]. The points raised by Oloo et al. [43] in 2018 all apply to Nigeria viz; Poor food safety regulation and enforcement infrastructure, Inadequate technical and regulatory, difficulty in assessment of conformity Inspections due to large numbers of food vendors, who are scattered across several locations. These may accord to why many food vendors (56.7%) have no knowledge of food safety and the working system of HACCP (86%). With as high as 88% of the vendors, also not being aware of food safety regulation in Nigeria. And of these, 48.7% still could not categorically mention any of the regulations. 98.7% of respondents did not know the benefit of food safety regulation.

About half (50.7%) of the vendors are not aware of the differences between food quality and safety while 16% of them do not know if such differences exist. This is similar to the report of a study in Kaduna where food vendors had inadequate knowledge of food safety [44], although other recent studies in Egypt and Indonesia respectively reported that most of the respondents had a good knowledge of food safety [45,46]. This gap in could also be responsible for why 62% of respondents considered 'Pricing' more important than 'Freshness' when buying raw materials or presenting food to customers. This finding is not an advantage to food safety, owing to the fact that raw materials usually form a critical control point in the production of any good (as augmented by the saying 'garbage-in; garbage-out').

Although majority of the vendors have poor knowledge of food safety, it is slightly encouraging that most of them are aware that food can get contaminated by microorganisms through hands, mouth and skin (58%), air/dust/water (62%), jewelries (67%), and open wounds on hand (58.7%). And also that some are aware (57.3%) that personal protective equipment (e.g. hair cover, nose mask, hand clothes) can prevent cross contamination. The prevalence of 48% of respondents that have no knowledge of food borne diseases creates an opportunity to develop appropriate interventions. In the phase of recurrent cholera outbreaks in Nigeria [47], it is astonishing to find that only 4 of the 74 respondents, who account for the 58% of those who agreed to knowing food-borne diseases listed cholera as a food-borne disease.

These findings corroborate FAO's publication that "a lack of knowledge among street food

vendors about the causes of food-borne disease is a major risk factor. Poor hygiene and unsanitary environmental conditions (such as proximity to sewers and garbage dumps) further exacerbate the public health risks associated with street foods. Improper use of additives (often unauthorized coloring agents), mycotoxins, heavy metals and other contaminants (such as pesticide residues) are additional hazards in street foods. Although many consumers attach importance to hygiene in selecting a street food vendor, consumers are often unaware of the health hazards associated with street vended foods" [48].

4.3.2 Food Safety Practices of food vendors

The proportion of respondents who (62%) consider price when buying food stuff/raw materials outweighs those that give more consideration to 38 freshness (38%).

It was discovered that most of the food vendors do not excuse themselves or their staff from handling/preparing food when they have frequent stool, catarrh or cough (67.3%) and open wounds on hand (56.7%). Similar to findings from a study in Ghana in 2020 [49] and in 2019 by Fosiul et al. [50] which reported that majority of food vendors served food with bare hands and did not wash their hands after handling money [50] we found that up to 52% of the vendors don't wash hands with soap and water before handling food after touching money. Yet, in consonance to the report of Chigozie et al. in 2020 [51], that most of the respondents wash their hands after using toilet, we found that high percentage of the food vendors usually wash their hands with soap and water after the use of toilet (61.3%) and after sneezing into palms and touching fomites (66.7%). Though this might be attributed to their elementary knowledge on personal hygiene at their earliest stage of education, the fact that vendors do not exhibit as much food safety measures after handling money and other fomites, which is a more common practice than visiting the toilet (except when having frequent stooling), asserts Iwu et al. [52] findings that vendors found it difficult to practice food safety when cooking or preparing food.

The proper use of wood in food establishments does not foster the transference of food-borne disease. Certain high-risk practices of failing to be observant about the potential risk of cross-contamination of foods as a consequence of

inefficiently cleaned cutting boards are a concern to food safety [51]. Also, because wood retains moisture, if non-portable water is used for rinsing, increased microbial activity may be noted on unsealed cutting boards [53]. Because cutting boards, most especially those made of wood, can become a source of contamination, rinsing alone even with hot water, was not sufficient to remove any likely disease-causing pathogens [54].

In line with report given by Margaret et al. [55] the 66% of vendors that do not use separate processing kitchen utensils, for ready-to-eat foods like fruits and vegetables, and non-ready-to-eat foods like raw meat, [56,57] is indicative that most food vendors do not understand the concept of cross contamination during preparation and handling of food products.

Finally, they reveal that 73.3% of the vendors are not even ready to get more information, training, and guidance to ensure that their customers get safe foods is a pointer of a huge lack of understanding of the necessary culture that is required to deliver safe food to the populace.

4.3.3 Constraints to enhancing food safety cultures

This study, in tune with findings of Adesina et al. [16], revealed high market prices of food supplies as the leading constraint. In dismay, this corroborates projections of the Organisation for Economic Co-operation and Development (OECD)-FAO Agricultural Outlook 2011–2020 increase in price of some world staple foods [58]. Considering the imbalance of scale on food import versus exports, with the fore on the upper hand, and the 22.95% rise in food inflation rate, there is a need to look into macroeconomic measures to cushion this trend [59]. And the complexity of meeting government regulations on food safety may be attributable to respondents' poor knowledge of government institutions and regulations.

5. LIMITATIONS OF THE STUDY

1. Attitude Problem: Data collectors, inclusive of the researcher were faced with poor attitude from the respondents. Researcher experienced revisits to get the respondents to consent, and have the questionnaire administered. This was owing to the fact that all to no avail, and in the face of the current economic challenges, the government of the day had engaged in

some surveys, with promises to bring interventions that would enhance business for the vendors.

2. Financial Constraints: Finance limited the researcher movement and area of coverage.

6. CONCLUSION AND RECOMMENDATIONS

In as much as culture is not an independent variable, it is easily influenced by a number of factors, for example, structures in place, ideologies, and environmental factors. "As regarding the relationship between culture and institutions, Daniel Etounga-Manguelle says, "Culture is the mother; institutions are the children," and institutional modifications, often impelled by politics, can influence culture" [60].

In this study, it was observed that most food vendors especially the food hawkers/open cafeteria vendors in Abuja, Nigeria had no knowledge of food safety and the few that had the knowledge were only concerned with making profit at the expense of the standard food hygiene and sanitary practices which has controlled their perception. It is a fact that perception can influence attitude and the benefits expected from carrying out a particular attitude can influence practice which has reflected in the result of this study. Also lack of coordination and enforcement of food laws between the relevant regulation bodies and Stakeholders may have resulted in poor nurturing of the right food safety cultures within vendors. Implementation of Food safety legislation seems to me more reactive as evidenced by the focus on laboratory examination and physical investigation of the end product, while proactive measures of food handling and practices gets minimal attention. When food vendors are trained and kept informed, and are able to perceive that poor food handling can cause food contamination, they will practice better food handling and better hygiene and this in return will improve food safety, with the intention of minimizing any event of food related epidemic disease outbreak in Abuja and the country at large.

In order to assure the safety of the food sold while maintaining the benefits of food vending, the following recommendations are suggested:

1. Authorities must be awakened to see to the implementation of policies aimed at

assisting, controlling and maintaining the food vending sector. A policy should be instituted & implemented in relation to an integrated consultation with vendors and consumers in order to meet the safety of ready-to-eat vended foods.

2. With a focus on promoting food safety rather than mere revenue generation, documentation and licensing of food vendors would enable authorities in using such bio datas to identify persons employed in such enterprises and the types of food sold. This most likely will provide a good opportunity to give food handlers advice and training in food safety. In ensuring appropriate conduct of food vendors, awareness generation, motivation and trainings is key.
3. Considering that a multi-sectoral approach is used to oversee food safety in Nigeria, the relevant Ministries, Departments and Agencies as outlined in the Food Safety Policy should live up to expectations. In a holistic approach, it is important to specify which government body is responsible for food vendors, as well as all other food handlers along the value chain.
4. Noting that the success of any food control programme depends solely on women, since the transfer, implementation and food related ideas takes place through them,(90)authorities should work towards educating and supporting food vendors in advancing their food safety knowledge in terms of trainings for safer food practices.
5. It is necessary to create awareness, and easily accessible reporting systems to enable Nigerians in reporting all disease related symptoms from food consumption.
6. Taking cognizance of appropriate behavioural change models is very necessary if a community is to have the full benefits of street-vended foods with minimal risk of food borne disease. Government intervention is required to ensure that the standard of safety for such foods is the best attainable in the context of the prevailing local situation. Therefore, it is recommended that authorities key into risk assessment, by conducting annual National Baseline Survey of Food safety along relevant food value chains, and ensure adequate food risk communication in Nigeria.

CONSENT AND ETHICAL APPROVAL

FCTA provided the ethical approval and clearance needed for the study. Verbal consent was gotten from owners of establishments, with a written consent obtained from study subjects. Interview was carried out with the full consent of the respondents. Each respondent was given the assurance that the information they are to provide will be kept confidential and used for the purpose of this study alone.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Chukwu PCOO. FAO. [Online]; 2014. [cited 2020]. Available:<http://extwprlegs1.fao.org/docs/pdf/nig151436.pdf>
2. UNIDO [Online].; 2017. Available:<https://www.unido.org/news/first-food-safety-and-investment-forum-held-nigeria>
3. Izanne SH, Jan FRL and Maria MT. The personal and general hygiene practices of food handlers in the delicatessen sections of retail outlets in South. *Journal of Environmental Health*. 2007;70(4):33-38.
4. Bintsis T. Foodborne pathogens. *AIMS Microbiology*. 2017 J;3(3).
5. World Health Organisation. Food Safety. [Online].; April 2020. Available:<https://www.who.int/news-room/fact-sheets/detail/food-safety>
6. Arie HH, Stanley B, Aarieke EIJ, Rob DJ, Marcel HZ, Benno HK. Future challenges to microbial food safety. *International Journal of Food Microbiology*. 2010;139.
7. Miyagishima K. FAO. [Online].; 2015. [cited 2020]. Available:https://apps.who.int/iris/bitstream/handle/10665/199350/9789241565165_eng.pdf.
8. Steven Jaffee, Spencer Henson, Laurian Unnevehr, Delia Grace, Emilie Cassou. *The Safe Food Imperative*. WorldBank Group; 2019.
9. Arie HH, Martyn DK, Paul RT, Herman JG, Tine H, Robin JL, Nicolas Praet, David C. Bellinger, Nilanthi R. de Silva, Neyla Gargouri, Niko Speybroeck, Amy Cawthorne, Colin Mathers, Claudia Stein, Frederick J. Angulo, Brecht Devleesscha.

- World Health Organization Global Estimates and Regional Comparisons of the Burden of Foodborne Disease in 2010. *PLoS Med.* 2015 December; 12(12).
10. Modupe B. Ayanwale, Ifeoma P. Okafor, Oluwakemi O. Self-medication among rural residents in Lagos, Nigeria. *Journal of Medicine in the Tropics.* 2017;(19):65-71.
 11. Aworh OC. NiFST.org. [Online].; 2020. [cited 2020 December]. Available:<https://nifst.org/wp-content/uploads/2020/06/Keynote-Address-Prof.O.C.-Aworh.pdf>
 12. Odeyemi OA. Public health implications of microbial food safety and foodborne diseases in developing countries. Open Access article distributed under the terms of the Creative Commons Attribution 4.0 International License (<http://>. 2016).
 13. Centers for Disease Control and Prevention, National Center for Emerging and Zoonotic Infectious Diseases (NCEZID), Division of Foodborne, Waterborne, and Environmental Diseases (DFWED). CDC. [Online].; 2020. [cited 2020 November]. Available:<https://www.cdc.gov/foodsafety/foodborne-germs.html>.
 14. Michael S Wright, Paul Leach, Gill Palmer. Food safety culture diagnostic toolkit for inspectors; 2012.
 15. FSSC. SSC-22000-Guidance-Document-Food-Safety-Culture-_Version-5.1.pdf. November 2020.
 16. Adesina K. Thomas, Philips ON. Assessment of food safety practices among cassava processors in selected rural communities of Oyo State, Nigeria. *African Journal of food, agriculture, nutrition and development.* African Journal of Food, Agriculture, Nutrition and Development. 2015 September; 15(4).
 17. Pepple N. Environment and food poisoning: Food safety knowledge and practice among food vendors in Garki, Abuja – Nigeria. *Journal of Health Education Research & Development.* 2017; 5(2).
 18. World Health Organisation. [Online]; 2020. Available:<https://www.who.int/csr/don/14-february-2019-lassa-fever-nigeria/en/>.
 19. Francis Owoicho Aluh, Deborah Oyine Aluh. Knowledge, attitudes and practices of food hygiene among mobile food Knowledge, attitudes and practices of food hygiene among mobile food. *International Journal of Community Medicine and Public Health.* 2017 September;4(11).
 20. Matny O. Mycotoxin: Global Risk and Silent Killer in Our Food. Researchgate; 2020 February.
 21. Nigeria CCP. Re: Survey of Mycotoxin Regulation in African Member States. 15th May 2019. Partnership for Aflatoxin Control in Africa.
 22. Steve Jennings, Julian Cottee, Tom Curtis, Simon Miller. Food in an Urbanized World. International Sustainability Unit (ISU); 2015.
 23. Lawrence Haddad, Jess Fanzo, Steve Godfrey, Corinna Hawkes, Saul Morris, Lynnette Neufeld. Global Alliance for Improved Nutrition. [Online].; 2020 [cited 2021 January]. Available:<https://www.gainhealth.org/media/news/covid-19-crisis-and-food-systems-addressing-threats-creating-opportunities>.
 24. Omojokun J. Regulation and Enforcement of Legislation on Food Safety in Nigeria; 2013. Available:<https://www.intechopen.com/books/mycotoxin-and-food-safety-in-developing-countries/regulation-and-enforcement-of-legislation-on-food-safety-in-nigeria>.
 25. Ekanem EE. Institutional framework for consumers protection in Nigeria. *International Journal of Advanced Legal Studies and Governance.* 2011 April;2(1).
 26. Elvis J. Dun-Dery, Henry O. Addo. Food hygiene awareness, processing and practice among street food vendors in Ghana. *Food and Public Health.* 2016;6(3).
 27. Chukuezi CO. Food Safety and Hygienic Practices of Street Food Vendors in Owerri, Nigeria. *Studies in Sociology of Science.* 2010;1(1).
 28. Ahmed FH, Nesreen AM. food-safety-knowledge-attitude-and-self-reported-practices-among-food-handlers-in-sohag-governorate-egypt. WHO; Eastern Mediterranean Health Journal. 2020; 26(14).
 29. Magdalena Niewczas, Tadeusz Sikora, Anna Maria Prusak. FOOD RISK ANALYSIS. In International Quality Conference; 2019.
 30. Imtiaz Jawed, Faraz R Tareen, Komal Cauhan and Mohammed Nayeem. Food safety and COVID-19: Limitations of HACCP and the way forward. *The Pharma Innovation Journal.* 2020 April; 9(5).

31. Olakunle AO, Bankole OO. Contemporary methods in social research Ile-Ife: Kuntel Publishers; 2010.
32. Prof. Attahiru M. Jega O. INEC FCT Directory of Polling Units; 2015.
33. Nurudeen, AA, Lawal AO, Ajayi, SA. A survey of hygiene and sanitary practices of street food vendors in the Central State of Northern Nigeria. *Journal of Public Health and Epidemiology*. 2014 May;6(5).
34. Odonkor ST, Adom T, Boatun R, Bansa D, Odonkor CJ. Evaluation of hygiene practices among street food vendors in Accra metropolis, Ghana. *Elixir Food Science*. 41. 2011;41(5807-5811).
35. Patience Mensah, Dorothy YM, Kwaku OD, & Anthony Ablordey. Street foods in Accra, Ghana: How safe are they? *Bulletin of WHO*. 2000;546-54.
36. Duse G, da Silva MP, Zietsman I. Coping with hygiene in South Africa, a water scarce country, ". *International Journal of Environmental Health Research*. 2003;13(1).
37. Jillian Hill, Zandile Mchiza, Jean Fourie, Thandi Puoane, Nelia Steyn. Consumption patterns of street food consumers in Cape Town. *Journal of Family Ecology and Consumer Sciences, Special Edition Food and nutrition challenges in Southern Africa*. 2016;1(4-8).
38. JHM. Socio-economic and hygiene features of street food vending in Gauteng. *South African Journal of Clinical Nutrition*. 2006;19(1).
39. Tolulope OA, Zuwaira IH, Danjuma AB, Zaman Misari. Knowledge and practice of food safety and hygiene among food vendors in primary schools in Jos, Plateau State, North Central Nigeria. *Journal of Medical Research*. 2015 May;4(2).
40. Okojie PW, Isah EC. 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;14(5):2-6.
41. McMahan M. What food is to be kept safe and for whom? Food-Safety Governance in an Unsafe Food System. *MPDI Laws*; 2013 October 2.
42. Isah EC, Okojie PW. Sanitary conditions of food vending sites and food handling practices of street food vendors in Benin City, Nigeria: Implication for Food Hygiene and Safety. *Hindawi: Journal of Environmental and Public Health*; 2014 September.
43. Benard Oloo, Lanoi Daisy, Ruth Oniang'o. Food safety legislation in some developing countries; 2018 July. Available:<https://www.intechopen.com/chapters/61873>.
44. Ahmad AU, Mohammed NS, Kabiru Sabitu, Zubairu Iliyasu, Muawiya BS, Khadija LH. Personal and food hygiene practices among street-food vendors in Sabon-Gari local government area of Kaduna State, Nigeria. *Archives of Medicine & Surgery, Kaduna State University*. 2018; 3(2).
45. Lestantyo D, Husodo AH, Iravati, S, Shaluhayah Z. Safe food handling knowledge, attitude and practice of food handlers in Hospital Kitchen. *International Journal of Public Health Science*. 2017;6.
46. Nada AA, Anushree Priyadarshini, Amit KJ. Evaluating food safety knowledge and practices among foodservice staff in Al Madinah Hospitals, Saudi Arabia. *Safety Molecular Diversity Preservation International*. 2019;5(9).
47. Ihekweazu DC. Cholera in Nigeria: Urgent call to strengthen Water, Sanitation and Hygiene (WaSH); 2021. Available:<https://reliefweb.int/report/nigeria/cholera-nigeria-urgent-call-strengthen-water-sanitation-and-hygiene-wash>.
48. FAO FQaSS. Ensuring quality and safety of street foods. *Food for the Cities - Multidisciplinary Area*; 2012.
49. Raymond AT, Emmanuel AB, Hasehni Vampere, Emmanuel AG, Adjei GA. Knowledge on food safety and food-handling practices of street food vendors in Ejisu-Juaben Municipality of Ghana. *Hindawi: Advances in Public Health*. 2020;(Article ID 4579573).
50. Fosiul Nizame, Mahbub-UI Alam, Al Masud, Akm Shoab, Aftab Opel, Khairul Islam, Stephen P. Luby, Leanne Unicomb. Hygiene in restaurants and among street food vendors in Bangladesh. *The American Journal of Tropical Medicine and Hygiene*. 2019 July;101(3).
51. Chigozie OI, Okechukwu CI, Prosper OUA, Chinomnso CN. Assessment of the food hygiene practices of food handlers in the Federal Capital Territory of Nigeria. *Tropical Journal of Medical Research*. 2020;17(1).

52. Anthony CI, Kenechi AU, Chukwuma BD, Kevin CD, Henry NC, Irene AM, Uche RO, Ugochukwu CM, Emmanuel Ndukwu, Ikechi Ohale. Knowledge, attitude and practices of food hygiene among food vendors in Owerri, Imo State, Nigeria. Occupational Diseases and Environmental Medicine. 2017;5(11-25).
53. Iolence Aviat, Christian Gerhards, José-juan Rodriguez-Jerez, Valérie Michel, Isabelle Le Bayon, Rached Ismail, Michel Federighi. Microbial safety of wood in contact with food: A review. Wiley Online Library: Comprehensive Reviews in Food Science and Food Safety. 2016; 15(3).
54. Cambridge City Council. [Online]. [cited 2021 March]. Available: <https://www.cambridge.gov.uk/food-hygiene-considerations>
55. Sylvester N. Onyeneho, Craig W. Hedberg. An assessment of food safety needs of restaurants in Owerri, Imo State, Nigeria. International Journal of Environmental Research and Public Health. 2013 August;10.
56. Margaret G, Judith K and Paul O. Knowledge in food hygiene and hygienic practices differ- in food handlers at a hospital in Nairobi, Kenya. AJFST. 2013; 4(1).
57. Dietetics AoNa. 4 Simple Steps to Keep Food Safe; 2021. Available: <https://www.eatright.org/homefoodsafety/four-steps/separate/4-simple-steps-keep-food-safe>.
58. Government HK, Safety CfF. Food safety is in your hand Critical control points are your friends (7 food safety tips); 2017. Available: https://www.cfs.gov.hk/english/programme/programme_haccp/programme_haccp_tips06.html
59. FAO. The State of Food Insecurity in the World. 2011.
60. Nigeria-Country Commercial Guide. US Department of Commerce; 2021. Available: <https://www.trade.gov/country-commercial-guides/nigeria-agriculture-sector>

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