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Food Handling and Waste Management Practices among Food Vendors in Ijebu North Local Government, Ogun State, Southwest Nigeria

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Abstract

Food vendors with poor personal hygiene and a lack of waste management awareness may be possible infection sources. This study reports food handling and waste management practices among food vendors using a descriptive cross-sectional study with an observational administered questionnaire. A total of 228 food vendors were interviewed about their food handling and waste management practices. Data gathered was analyzed using descriptive statistical technique and percentages. The majority of the respondents were above age 41 (48.9%) while 30.4 and 20.7% were aged 26-40 and 18-25, respectively. Respondents from the different sampling locations disposed of their waste at different times daily, twice a week and weekly. While most vendors maintained good practices concerning waste disposal, many were not certified to handle food. The attitude, practice and knowledge of the food handlers were excellent and well above average. However, regular training and enlightenment would be required to enhance good hygiene practices.

Keywords: Food vendors, hygiene, waste management, practices

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1. Introduction

Waste is any discarded and unwanted material that arises from the activities of animals and humans in the environment (Douglas, 2004; Ferronato & Torretta, 2019). Waste is often produced by people at large since time immemorial and an increasing one that is of major concern to every nation of the world and has exhibited a constant threat problem. Waste is of three types namely liquid, solid and gas (which are commonly seen as an air pollutant). The most widely used waste management and final disposal methods, which are often common in low-income countries, are open burning and open dumping. (Ferronato & Torretta, 2019). Solid waste generation, control, and disposal are among the most challenging environmental and public health concerns in Nigeria today. While the problem of solid waste disposal has existed since the beginning of time and is inextricably linked to waste generation, the fact is that it has become so out of reach in many cities that even the government is overwhelmed (Jimoh, 2005; Momodu, Dimuna & Dimuna, 2011; Kumar, Smith, Fowler, Velis, Kumar, Arya, Rena, Kumar, & Cheeseman, 2017).

Solid wastes are non-liquid and non-gaseous products of human activities that are considered useless. It may appear in the form of garbage, refuse, and sludge (Babayemi & Dauda, 2009). Of all various classes of wastes generated in Nigeria, solid wastes appear to pose the greatest challenge beyond the reach of various waste management agencies (Ogbonna, Amangabara, & Ekere, 2007; Nwogwugwu, & Ishola, 2019). One of the most significant setbacks in the efforts to control solid waste in Nigeria includes weak sanitation laws enforcement by the appropriate government officials as well as the unwholesome waste disposal habits of residents (Babayemi & Dauda, 2009). Due to the multiple processes involved in the usage of food, waste results in a loss of resources and significant environmental impacts, particularly when avoidable (Tonini, Albizzati, & Astrup, 2018). According to Cristóbal, Castellani, Manfredi, & Sala, 2018 and the Food and Agriculture Organization (FAO), worldwide up to one-third of all food is

lost or wasted due to storage and cooling facilities in difficult climatic conditions, infrastructure, technical limitations in harvesting techniques, packaging and marketing systems. Good sanitation is important for ensuring better health. Living in an environment with improved sanitation facilities offer the opportunity to save the lives of more than 1.5 million of the populace a year who would otherwise have suffered diarrhea or other foodborne diseases across the world (Enoch & Issaka, 2018).

Food is referred to as a diverse group of edible materials that provide the body's vital nutrients for survival and development. Food is also a crucial instrument for health promotion and disease prevention. Contaminated ready-to-eat and poorly prepared street food may be the cause of outbreaks of foodborne disease (Iwu, Uwakwe, Duru, Diwe, Chineke, & Merenu, 2017). Food safety concerns are critical to world health, the Food and Agricultural Organization (FAO) defined street food as ready-to-eat foods and beverages prepared and sold by hawkers and vendors, especially in public places and on the streets (FAO/WHO, 2015). Food contamination is attributed to the global deaths of an estimated two million people annually, including many children. New threats to food safety have also been reported to be constantly emerging. These foodborne illnesses are common, costly, yet preventable public health challenges (Shrivastava, Shrivastava, & Ramasamy, 2016). Many diseases can be transmitted through ingested food. Foodborne diseases are caused by various agents, including bacteria, viruses, parasites, chemicals and toxins, and cause various clinical presentations (Akonor & Akonor, 2013; Mridha, 2011).

A food handler is someone who works in the food business or is professionally involved in it, such as an inspector, who in his routine work comes into direct contact with food during production, processing, packaging or distribution (Zain & Naing, 2002). As a result, food handlers with poor personal hygiene and lack of knowledge about important issues in foodborne disease prevention, who work in food establishments may be possible infection sources of many intestinal helminths of protozoa and enterogenic pathogens. According to the World Health Organization (WHO), foodborne diseases affect up to 30% of the population in developed countries each year, while up to 2 million people die each year in developing countries. Furthermore, up to 70% of cases of diarrhea diseases in developing countries are linked to the ingestion of contaminated food, which can be traced back to poor handling of food through contamination. Contamination of food may occur at any stage of production, processing, distribution, or preparation (Green & Selman, 2005). Food handlers and other people responsible for food preparation have a critical role in the incidence and spread of foodborne illnesses as their hands and other body parts may harbour micro-organisms and their actions likewise could compromise the chain of safety from "farm-to-fork".

Food handlers have been implicated in previous studies, which have shown that improper food preparation practices in a restaurant kitchen, as well as contaminated equipment and food, are a significant source of most of these cases (Beumer & Kusumaningrum, 2003; Medeiros, Hillers, Kendall,&Mason, 2001; Redmond & Griffith, 2006; da Silva Farias, Akutsu, Botelho, & Zandonadi, 2019). Other factors linked to foodborne illnesses include inadequate personal hygiene, improper food storage (temperature and time), and food from unknown sources (Lynch, Painter, Woodruff, & Braden, 2006; McFarland, Checinska Sielaff, Rasco, & Smith, 2019). Hence, this study aims at investigating food handling and waste management practices among food vendors in the Ijebu-North local government.

2. Methodology

Study Area

The study was conducted in three towns: Ijebu-Igbo, Ago-Iwoye, and Oru. All the above-mentioned towns are located in the Ijebu-North Local Government Area of Ogun State. It is located within the coordinates 6^0 57^1 N and40^1E. It has an area of 967 km^2 with a population of 284, 336 (2006 census). The towns are located in the tropical rain forest belt with hot and humid climatic conditions. The indigenes of these towns are mainly Ijebus (Yoruba) with a small number of non-indigenous people.

Survey method, data collection and analysis

The study area was zoned into various districts comprising Ago-Iwoye, Oru and Ijebu-Igbo based on the density of food vendors and handlers. Food vendors/handlers selling directly consumed food were targeted, and informed verbal consent was obtained from the food handlers before the interview. Each zone's proportional sample size was determined, and food vendors/ handlers were chosen at random from each zone. A well-structured questionnaire was chosen as the data collection instrument to acquire information such as age, sex, educational attainment. A total of 208 respondents were interviewed which comprises 40 males and 188 females. Data were collected from July to September 2019. Data collected from food vendors in these towns were analyzed statistically using SPSS 20.0 version for analysis using the descriptive statistical technique for mean, frequency and percentages. Chi-square statistical test was used to determine the relationship between waste management and food safety practices of food vendors.

3. Results

Table 1 indicates that most food handlers and vendors were over the age of 41 (48.9%), while 30.4 and 20.7 per cent were between the ages of 26-40 and 18-25, respectively. Food vendors in Oru had the highest number that is within the age range of 41 and above 27 (57.4%). One hundred and eighty-eight (82.9%) respondents were female, while forty (17.1%) were male with Ijebu-Igbo having the majority of female food vendors 87 (92.6 %) while Ago-Iwoye had the highest number of male vendors with 27 (31%). One hundred and thirty-four (56%) of the respondents attained primary education; twenty-one (13%) of the respondents attained secondary education. With Ago-Iwoye food vendors having an appreciable number of primary and secondary education, 69% and 18.4% respectively. Only 22.2% of vendors acquired skills through training while 77.8% of food vendors acquired skill through self-practice and other forms such as been thought by parent and Observation from others. It was found that a large proportion of food handlers/vendors was not certified in food training (75.2%).

Figure 1 shows that 33 (16%) of the vending sites were wooden sites, 36 (17%) were canopy, 96 (44.7%) were containers, 6 (2.9) were Polythene structures, 56 (21%) made use of wheelbarrow/truck and 1 (0.7%) was zinc sheets, with Ago-Iwoye having the highest respondents using containers 37 (44.8%) while Oru had the least respondent using zinc sheet 1(0.7%). Food Preparation and Handling practices by respondents as shown in Table 2 revealed that one hundred and three respondents (42.3%) prepared their food at home while 125 respondents (57.7%) prepared their food at the stall. Only 34.2% of the vendors interviewed did not use an apron. Knowledge of food hygiene and sanitary practices, as shown in Table 3 also revealed that One hundred and forty-five (63.3%) of the respondent agreed to wash off food before cooking, about Eighty-two (32.3%) believes in warming of foods before serving when the foods are cold. The majority of food vendors were also observed not to prepare foods on the same surface multiple times without cleaning it. Only one respondent agreed that food can be prepared more than twice on the same surface. However, it has been observed that vendors (34.17%) had poor knowledge practice on how they handled raw materials for food without washing their hands. All the respondents agreed that the surface for the preparation of food should always be in good hygienic conditions. All respondents (100%) said leftover foods are consumed by households. All the respondents (100%) agreed with the practice that utensils should be washed with warm water and soap while one hundred and twenty-one of the respondents (54%) agreed that the water used must be replaced once while one hundred and seven (46%) believe that water can be used twice before replacement. All the vending sites appeared clean.

Most vendors/handlers had good knowledge of waste management and sanitation practices. The results in Table 4 show that 41.5% of food vendors in Ijebu-Igbo disposed of their waste daily, 48.9% of the vendors disposed of their waste twice weekly while 9.6% disposed of their waste weekly. In Oru, 38.3% disposed of their waste daily, 51.1% of the vendors disposed of their waste twice weekly while 10.6% disposed of their waste weekly; 22.9% of vendors in Ago-Iwoye disposed of their waste daily, 44.8% of the vendors disposed of their waste twice weekly and 32.2% disposed of their waste weekly. It was observed that food vendors/handlers maintained good waste management practices by disposing of their waste daily (31.6%) and some twice weekly (50.4%) while only 18% dispose of their waste weekly. The waste of 57.6% of the vendors was held in a waste bin, while the others discarded it in the bush

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(42.4 per cent). Accessibility and availability to water supply; the results indicate that there is no supply of municipal water, eighty-eight (38.3%) of the respondents make use of well water, while 140(61.7%) make of water from the borehole as shown in Fig.2.

Table 1: Social Demographic of the Respondents

	Frequency			Percentage		
	Oru	Ago	I-Igbo	Oru	Ago	I-Igbo
Age of the respondents						
18 – 25	7	16	21	14.9	24.5	22.3
26 - 40	13	30	30	27.7	31.9	31.1
41 – above	27	41	43	57.4	43.6	45.7
Sex of the respondents						
Male	6	27	7	12.8	31.0	7.4
Female	41	60	87	87.2	69.0	92.6
Total	47	87	94	100	100	100
Educational background of the respondents						
None	25	11	37	53.2	12.6	39.4
Primary	19	60	55	40.4	69.0	58.5
Secondary	3	16	2	6.4	18.4	2.1
Total	47	87	94	100	100	100
Form of training received by the respondents						
Self-taught	4	7	2	8.5	8.0	2.1
Taught by Parents	24	41	37	51.1	47.1	39.4
Observation of other	13	20	25	27.7	23.0	26.6
Formal Training	6	19	30	12.8	21.8	31.9
Total	47	87	94	100	100	100

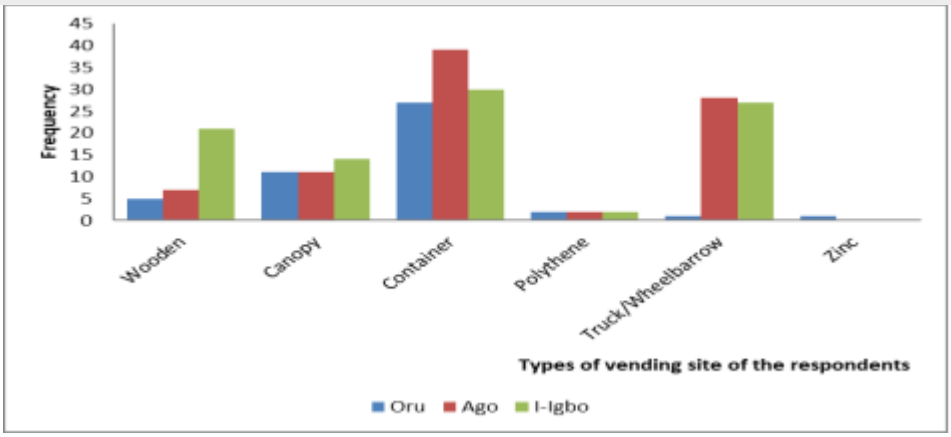

Figure 1: Types of the vending site of the respondents

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Table 2: Food Preparation and Handling Practices by Respondents

Preparation of food									
	Frequency			Percentage					
	Oru	Ago	I-Igbo	Oru	Ago	I-Igbo			
Wash food before cooking	38	50	57	8.5	8.0	2.1			
Food heating before serving	8	37	37	51.1	47.1	39.4			
Prepared on the same surfaces more than twice	1	-		27.7	23.0	26.6			
Place of Preparation of food									
At home	13	40	50	27.7	46	53.2	27.7	46	53.2
At the stall	34	47	44	72.3	54	46.8	100.0	100	100
Materials used in serving food									
Metal plates	13	17	22	27.7	19.5	23.4	27.7	19.5	23.4
Plastics plate	6	8	11	12.8	9.2	11.7	40.4	28.7	35.1
Enamel plates	8	26	41	17.0	29.9	43.6	57.4	58.6	78.7
Plastic bags	20	36	20	42.6	41.4	21.3	100.0	100	100
Food storage									
Openly in the stalls	12	36	13	25.5	41.4	13.8	25.5	41.4	13.8
Wheelbarrows	35	51	81	74.5	58.6	86.2	100.0	100	100

Table 3: Knowledge of Food Hygiene and Sanitary Practices

Hygienic condition of the preparation surface						
	Frequency			Percentage		
	Oru	Ago	I-Igbo	Oru	Ago	I-Igbo
Clean	47	87	94	100	100	100
Number of times is water used before replacement						
Once	27	54	40	57.45	62.07	42.55
Twice	20	33	54	42.55	37.93	57.45
Personal Hygiene of the vendors						
Once	27	54	40	10.2	11.1	8.2
Twice	20	33	54	7.6	6.8	11
Total	47	87	94	17.8	17.8	19.2
Use of Apron	26	67	60	86.7	55.4	55.4
Handling of food with hands	21	20	34	13.3	44.6	44.6
Cleaning of Utensils						
With the warm soapy water	47	87	94	100	100	100
Leftovers Consumed	47	87	94	100	100	100
Hygienic condition of preparation surface						
Clean	47	87	94	100	100	100

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Table 4: Waste Management and Sanitation Practice by Food Vendors

	Where is the waste disposed					
	Frequency			Percentage		
	Oru	Ago	I-Igbo	Oru	Ago	I-Igbo
Bush	16	31	56	34	35.6	59.6
Waste bin	31	56	38	66	64.4	40.4
How frequent is the waste disposed						
Daily	18	19	29	38.3	21.8	41.5
Twice weekly	25	39	45	53.2	44.8	47.9
Weekly	04	29	10	8.5	33.3	10.6

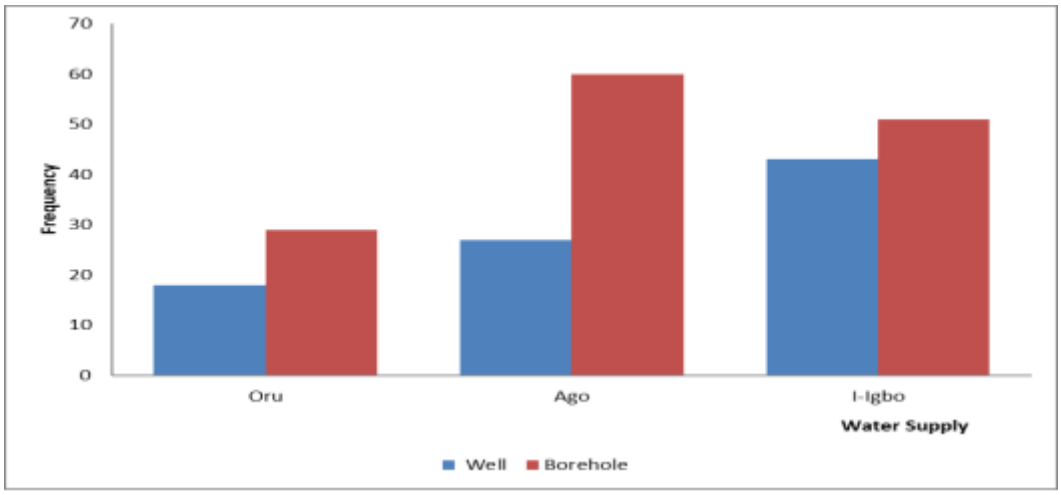

Figure 2: Source of water supply

4. Discussion

Most vendors were age were aged 41 years and above (48.9%) with the least number of vendors aged between 18and 25 years, that constituted 20.7% of the respondents' Similar findings were reported by Akonor & Akonor (2013) on the food safety knowledge by food handlers in Accra with the highest food handlers and vendors were in the old age groups, although other studies reported different findings (Kubde, Pattankar, & Kokinar, 2016); (Monney, Agyei, Ewoenam, Priscilla, & Nyaw, 2014), that the largest of the food handlers were in the young age groups. The majority of the food vendors in this study were females (82.9%) while males made up 17.1%, this shows that the food vending business is predominantly practised by women. Nurudeen, Lawal, Opotu, & Ajayi,

(2014) in Nigeria found that the majority of food vendors were females (80.9%), while Comfort (2010) in Ghana found that women (66.67%) made up the majority of food vendors in another survey, as did Odonkor, Adom, Boatin, Bansa, & Odonkor. Similar findings were discovered in Ghana in 2011. Educationally, these results are in line with studies from other developing countries on food vending. According to the findings, more than half of the food vendors (56%) had only primary school education, while those with secondary school education constituted the least respondents (13%). The pattern of these educational levels attained by food vendors is collaborated by the findings of Edima, Tem Nnam, Awono Enama, Biloa, & Ndjouenkeu,(2014) in Cameroun on the street food sector, but is in contrast with the findings of Apanga et al., (2014) in Northern Ghana. A low level of education among food handlers translates to a high risk of food safety.

The findings on food serving and hygiene practices among food vendors revealed that food was served with different kinds of plates (78.7%) and nylon materials (21.3%), the reason for this is that most of the vendors believe that proper presentation of food plays an important role in food safety and hygiene practices. Cleaning of surface tables and utensils, 76% of the food vendors make use of soapy water for the utensils and surface table. The same was found by Henry, Edward, Ogbonna & Emmanuel (2017) in Calabar and its environs. All vendors involved in this study practise hand washing. This finding was in agreement with Onyeneho & Hedberg (2013) in Imo State, Nigeria, that a minority (70%) of vendors wash their hands at some point or the other. A low level of education among food handlers translates to a high risk of food safety. This indicates that food vendors should be held accountable for any foodborne outbreaks caused by a lack of good hygiene practices such as hand washing, cross-contamination of raw and cooked foods, and monitoring of cooking temperature, all of which are vital steps for preventing foodborne illness. This result is similar to that of Nigusse & Kumie(2012), who discovered that while about 60% of respondents covered their food to keep flies and rodents out, only about half of them had adequate sanitary conditions. This showed that the level of environmental hygiene and personal of some food vendors appeared fairly good. It can be seen in the overall attitude of food handlers toward food handling, which is positive.

The majority of food handlers believed that transmission of foodborne diseases occurs through contaminated utensils and water. Similar findings were also reported in other studies (Takalkar & Kumavat, 2011; Azanaw, Gebrehiwot, & Dagne, 2019; Dagne, Raju, Andualem, Hagos, & Addis, 2019). The majority of food handlers believed that transmission of foodborne illnesses can be prevented by regular cleaning of utensils and maintaining good personal hygiene, which corresponds with the report of Dagne, Raju, Andualem, Hagos, & Addis, (2019) that food handlers knew preventive measures. Also, it was noted that the majority of vendors engaged in hand washing before cooking. This finding is similar to a study conducted in Saudi Arabia, which found that more than half of the vendors washed their hands (Enunwaonye, 2018). This could be attributed to the global handwashing campaign taking its toll. It was noted that the majority of the respondents embraced washing their hands with soap, This demonstrates that the vast majority of respondents embrace proper handwashing technique. This shows further that the need for more handwashing with soap cannot be overemphasized to reduce food contamination with pathogens (Monney, Agyei, Ewoenam, Priscilla, & Nyaw 2014).

The observation on the sanitary conditions of the food vending sites and how the wastes are being disposed of, 38% disposed of their waste daily, 43% disposed of twice-weekly while only 17% disposed of their wastes once a week. This is supported by the findings of another study in Benin (Chukuezi, 2010), and Owerri (Okojie & Isah, 2014) in Nigeria, and Accra, Ghana (Mensah, Yeboah-Manu, Owusu-Darko, & Ablordey, 2002), where the majority of the food premises was observed to be tidy, with the use of waste bin and the presence of onsite water source for sanitary purposes.

The limitations of this work are that there was no microbiological analysis regarding the enumeration of bacteria and other enteric pathogens.

5. Conclusion

This study aimed to find out how well food handlers knew about food safety and how they handled waste. It was found from this study that vendors prepared foods under relatively good sanitary conditions and that vendors had good food handling practices. The following recommendations are made based on the results of this study: food vendors should continue to maintain personal hygiene and acceptable environmental conditions when processing, packaging, or serving food items to consumers; personal protective kits such as a nose/face mask, apron, and headgear/chef cap should be encouraged during the food preparation and serving process. Regular sanitization of all surfaces and plates and utensils with a good quantity of clean water should be adopted. There should be regular licensing and sensitization of food vendors by agencies and relevant bodies saddled with the responsibility of food safety. Food agencies through relevant authority should ensure food vendors are inspected. This can be done by taking samples of the foods to Food Laboratory for analysis. The government should provide potable water so that food vendors can conveniently practice good hygiene. Additionally, health organizations, civil society groups, media, students, and youth can all play a role in raising food safety and sanitation awareness.

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