

## Environment and Food Poisoning: Food Safety Knowledge and Practice among Food Vendors in Garki, Abuja – Nigeria

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### Abstract

The survey reached fifty food vendors in Garki, Abuja Nigeria to assess their knowledge of food safety, contamination, poisoning and control measures. A simple questionnaire was developed and administered one on one to the target population and data collected on their knowledge food borne disease pathogens, personal hygiene, and food handling practices, safety and risk perception as well as temperature control. 80% reported that they wash and clean their equipment; 52% reported that they exempt a sick staff from work until recovered and certified healthy; 89% reported that they wash their hands regularly with clean water. 42% reported that they use hand sanitizer frequently. 100% (all respondents) said that they washed their hands after handling raw food like fish and meat 53% lacked knowledge of optimum refrigeration temperature while 26% could not adjust refrigerator temperature. 40% had knowledge of Hepatitis A as a food borne pathogen, 20%, had knowledge of Salmonella, and 21%, E. coli, and 12% Listeria and 7% had knowledge of Vibrio as pathogens. Water supply is gotten from local water vendors from private boreholes. Comparison of the knowledge base between the educated and non-educated vendors revealed a great disparity on the level of knowledge between the two. The major source of food supply was from the Open markets while water supplies come from private bore holes. The research also showed a direct relationship between educational level and knowledge of food pathogens as well as hygiene and safety knowledge. Lack of knowledge on safety and hygiene practices among food vendors (owners and staff) indicates the increased risks of food poisoning associated with the food vendors and restaurants.

**Keywords:** Safety; Contamination; Poisoning; Pathogens; Disease; Risk; Hygiene

### Introduction

Food safety has been a growing concern in Nigeria today. The location of some restaurants and food processing industries contributes the transmission of food poisons. According to Professor Alfred Ihenkuronye, more than 200,000 persons die every year in Nigeria of food poison caused by food contamination during processing, preservation and service. Food contaminants are mostly substances from our environments. According to Nigerian health experts, inadequate water supply may affect food safety. Drinking water may also be polluted by human activities therefore, to protect human health is to ensure hygiene, sanitation and adequate drinking are in place. The joint monitoring Program (JMP) for water and Sanitation of the WHO/ UNICEF [1], noted that only 58 percent of Nigerians have access to portable drinking water.

Human activities lead to generation of wastes which constitutes a breeding ground for disease vectors and other microorganism that can contaminate food resulting to food poisoning. Pathogens gain access to (contaminate) food through improper handling, during preparation and storage. Food poisoning comes from eating food that have been contaminated with microorganisms like bacteria and viruses; Poisonous metals like cadmium or lead and chemicals. Contaminated food does not always taste bad but mostly smells and tastes very normal. Some food cause poisoning more frequent than others so they need to be properly cooked and/or refrigerated. Examples are dairy foods, sea foods, chicken etc. Universal food safety practices are to be applied to prevent all food poisoning handling practices.

Zainab Akanji, in her study on food safety noted that, 99% of working class Nigerians in urban settings eat outside their homes (mostly from food vendors) and therefore are vulnerable to poisoning if foods are not handled in hygienic conditions. These foods may pose

significant public health problems due to poor knowledge of basic food safety measures [2] and inadequate infrastructures. In Abuja, the Federal capital Territory of Nigeria, only the big food companies can afford the exorbitant rent and requirement for setting up a food restaurant with the minimum quality standard. Therefore, food vendors operate in various ways like pushing their food-laden carts, from one location to another; operating under tree shades to which tends to attract more customers than others because they provide a sort of affordable, convenient and often varieties of nutritious food for their customers. Importantly also, this serve as a source of income and an opportunity for self-employment with low capital investment for the vendors [3].

A major barrier to food safety in Nigeria is lack of proper waste disposal and toilet facilities for the customers. Most of the eating stalls in Abuja are marked by unsanitary conditions, like poor drainage systems, overcrowding and poor waste disposal which leads to poor hygiene (personal and environmental) [4]. Of a great concern also is the food ingredients and the source foods. Raw materials and ingredients are usually purchased from the open markets, where the items are displayed openly on tables, ground during rain or shine, in muddy places and around filthy gutters. Buyers are mostly in the habit of touching the food stuffs for with unwashed fingers either to feel the texture or to

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ascertain the fineness of the powder in case of grounded stuff. Flies are most often found around the meat and fish areas perching all over the items with absolutely no source of protection. This also present high potential for contamination [5].

### What is food poisoning?

Food poisoning (also known as foodborne illness or foodborne disease) is any illness that results from eating contaminated food. Food contamination may be defined as the presence of harmful substance (microorganism or chemical) that can cause illness in food. Food poisoning is an issue of public concern. Over the years, there have been several cases of food borne disease outbreaks and these in turn has kept the public and researchers alert that harmful microbes may be present in food that may cause diseases.

### Food poisoning in Nigeria

Although the National Agency for Food and Drugs Administration and Control (NAFDAC) is working hard to monitor the quality of food and drugs sold in Nigeria markets; there is yet no system to survey foodborne diseases in Nigeria. Several cases of food poisoning which led to mortality and morbidity have been reported. According to the World Health Organization (WHO), there are two million reported cases of food poisoning with estimated deaths of two hundred thousand people from food poisoning and twenty thousand deaths from exposure to food pesticides annually – children inclusive. The food borne pathogens (*E. coli* and *Salmonella*) were mostly found to be responsible to these deaths. Harmful bacteria, viruses, parasites or chemical substances has also been linked to more than 200 diseases, ranging from diarrhoea to cancers [6]. Meanwhile, Zainab Akanji, in her study on food safety noted that, 99% of working class Nigerians eat outside their homes and therefore are vulnerable to poisoning if foods are not handled in hygienic conditions.. In April 7, 2015, there was a report of food poisoning caused by toxic metals in Zamfara state which resulted to the death of numerous infants and children. There was another outbreak of food poisoning in Ibadan, caused by *Salmonella typhimurium*, in a sandwich filling that claimed about 20 lives. According to the report, sandwiches were kept at room temperature until consumption following day [5]. Another food poisoning case among three families in Kano State was also reported after yam flour consumption and investigation revealed the use of certain preservatives which had a lethal effect on the consumers [7]. A similar case was also reported among five families in Illorin, Nigeria [6]. There was also a report of 60 cases and 3 deaths due to food borne disease with a symptomatic gastro intestinal disorders among people who ate in a funeral service [8]. The deaths were linked to food contamination during processing, preservation and service [9]. The improper use of agro chemicals and pesticides to control pests on agricultural products and grains were said to be responsible for the rising cases of food poisoning in Nigeria.

### Health sector response to food poisoning in Nigeria

The association of food vendors in Nigeria, through various schemes, educates both vendors and consumers on the importance of quality and safe food practices. We create food safety awareness to the public. As such, we promote a clean environment for food preparation, ensuring healthy food handling and processes. The National Agency for Food and Drug Administration and Control, NAFDAC is also concentrating effort to enlighten farmers on the dangers of applying banned agro-chemicals to boost or preserve farm produce. NAFDAC is also intensifying effort in educating food vendors on hygiene and safety practices. Public Nurses under the umbrella of Professional

Association of Public Health Nursing Officers of Nigeria (PAPHNON) has concluded plans to sensitise food vendors at the Garki market of the Federal Capital Territory (FCT) on the importance of hygiene practices before selling food to the public.

### Research Methods

#### Subjects

Restaurant/eateries managers in 3 categories of restaurants in Garki were engaged in a face to face interviews using a structured questionnaire to assess their knowledge on food safety and possible causes of food poisoning. The questions were in four categories: Personal Hygiene, food handling/ storage, risk perception and knowledge foodborne disease pathogens. Their sources food and water supply were determined as well. The restaurants were also grouped in to three and their managers were surveyed: Group 1- Major hotels' restaurants; Group 2-regular/fast food type; and Group 3- food hawkers and open space cafeterias.

#### The survey location

This survey only concentrated in Garki area 3 and Area 10 only. Face-to-face interviews with managers and restaurant heads in the 2 areas were conducted. Data obtained were on Personal Hygiene, food handling/ storage, risk perception and knowledge foodborne disease pathogens [10]. Most of 15 questions were multiple choice questions and the questionnaire was divided into 5 sections: Demographics, Personal Hygiene, food handling/ storage, risk perception and knowledge foodborne disease pathogens. All participants' consents were collected by signing the consent form.

Sixty questionnaires and consent forms were given out, of which 50 (the actual target) consented (83%). In Group 1 (restaurants in major hotels), the managers were 82% Males and 18% Females. Minimum educational level was secondary education and all were certified caterers who had completed course in Food Hygiene. On the average, the managers have at least 8 years working experience in catering and hotel management. In group 2 (regular/fast food type), 62% of the managers were female, 38% were males, all educated with catering and Food Hygiene training experience. Average years of experience were 15 years. Group 3 (food hawkers, gardens and open space cafeterias) were 18% males and 82% females. 45% had at least secondary education. 40% had just basic education and 15% had no education at all. Only 15% in this category had attended catering school and food hygiene course. The rest did not. Participants in this category had an average of 8 years' experience in the business. Restaurants in Group one have an average of 5 staff and said they serve an average of 3000 people, weekly both in indoor and outdoor services, Group two, have average of 7 staff and serves about 8000 people weekly while group three with an average of 4 staff seem to have the largest crowd serving about 12000 people weekly.

### Results and Analysis

#### Risk perception

81% of the respondents agreed that people could easily contract food-borne illnesses if the cooking utensils and equipment are not cleaned regularly; 42% said the illness could be contracted from the restaurant if the attendants do not wash hands after using toilets or handling dirty objects as well as before serving food; 60% said eating raw food or fruits and meat that are not properly cooked. 21% said through eating food that is contaminated by chemicals or petroleum products like kerosene and petrol. Only 52% believed that if a sick staff is allowed to cook food, he/she could lead transmit food-borne illness.

## Food handling practices

84% percent of respondents reported that they wash their hands every time with water and soap before preparing foods, 10% said they wash most of the time and 6% said they wash some of the time. Hand washing habit by group of restaurant was 100% in Group 1; 92% in group 2 and 60% in group 3. Regarding the handling of vegetables, various methods were provided by the respondents about how they wash their vegetables before cooking or preparing vegetable salads; such as: Flooding under running water (60%), and soaking in vinegar and salt water (40%).

## Refrigerator and temperature control

The recommended temperature for refrigerator is:  $-18^{\circ}\text{C}/-0.4^{\circ}\text{F}$  (freezer);  $0^{\circ}\text{C}/32^{\circ}\text{F}$  (meats);  $5^{\circ}\text{C}/41^{\circ}\text{F}$  (refrigerator),  $10^{\circ}\text{C}/50^{\circ}\text{F}$  (vegetables). Given that most of the food items and vegetables must be stored in a cold temperature, it was necessary to assess the managers' knowledge of temperature control. The standard temperature recommended by the National Agency for Food and Drugs Administration and Control (NAFDAC) and the United States Food and Drug Administration is  $41^{\circ}\text{F}$  or  $5^{\circ}\text{C}$  maximum for internal refrigerator temperature. All restaurants in Group 1 and 2 (100%) had at least one refrigerator, gas cooker, micro wave oven, a kerosene or charcoal stove. Some of the restaurants in group 3 (55%) had at least one refrigerator, one of either gas cooker, kerosene or charcoal stove. Only 68% of the restaurant managers knew about the optimal refrigerator temperature while 32% did not know anything about refrigeration temperature. Respondents have various ways of handling left over foods. 72% said left over foods were preserved in the refrigerator and 28% said they were consumed by staff and not served to customers. About how the food is warmed, the respondents said it could be with micro wave, gas cooker, kerosene and charcoal stove depending on the available one at the moment.

## Knowledge of foodborne pathogens

The following food borne pathogens were listed by the respondents: Vibrio Cholera (20%); Salmonella (30%), E. coli (25%), Hepatitis A (28%). If a large quantity of food was suspected to be contaminated 35% of the respondents said they could recover it by heating in a higher temperature for some minutes; 15% said onions and palm oil could be added to make it safe again for eating while 25% said such food should be discarded as it is no longer safe for eating.

## Personal hygiene and sanitary facilities/equipment

All the respondents agreed that all staff maintain personal hygiene (100%). All restaurants in group 1 and 2 had toilet facilities. Only 12% of the restaurants in group 3 had open latrine system only for liquid wastes, located a few distances from the cooking and eating point. None in group 3 had a convenient toilet.

## Pests

The respondents said that the major pests they usually encounter in their business premises, especially the store houses were: Rats (58%) Cockroaches (37%) and flies (53%).

## Water supply

All (100%) of restaurants in group 1 and 2 have boreholes located within their facilities. Only 25% of the facilities in group 3 had boreholes and the remaining 75% depend on local water vendors (whose source of water is from private boreholes) for cooking and sometime use water from well for washing dishes and sometimes their vegetables.

## Food items supply

55% of the respondents said they buy their food ingredients from the open markets on a daily basis, 28% used regular suppliers, 17% used company registered distributors.

## Discussion

In this study, the providers' knowledge base for prevention of food-poisoning at eateries in Garki, Abuja was evaluated. The result of the evaluation indicates that most eatery operators do not have a good knowledge of food-borne pathogens and the practices that affects food safety, or those that facilitates the outbreak of food borne diseases. The knowledge deficiency was greater among street vendors and open canteens operators. This survey also provides an overview of food safety knowledge, Attitude and practices in Nigeria. The result also reveals the gap in knowledge base and the need for educational programs for the food vendors. Although some respondents knew the importance of hygiene and the circumstances that could lead to food poisoning and their preventive strategies, almost half of the respondents didn't find anything wrong with a sick person serving food. It was also discovered that although all the restaurant staff agreed that they practice hand washing, this was only after handling meat or touching what they deem as dirty objects and the proper way of washing hands was not known or followed. 85% of the staff who practiced hand washing only washed hands with water and no soap or detergent was used. But the consequences of not washing hands properly cannot not be under estimated in such a business. One thing also was discovered; most of the restaurants made use of a wooden cutting board for their vegetables and meat cuttings. Sharing this board could easily lead to cross infections. Most of them said they rinse the board with water after cutting a different object but the concern here is that rinsing with water alone could not get rid of pathogens that could hide in the little holes in the board. So, proper sanitation of these tools after each use was necessary to get rid of pathogens. Proper handwashing, hygiene and sanitation may be difficult to adhere to by restaurants in group 3 because these restaurants seldom have a borehole, handwashing or toilet facilities. It is perceived to be very difficult for restaurants in group 3 to achieve sanitation standards.

## Education and food safety knowledge

The result of this survey indicates a variation of food safety and hygiene knowledge and practices between the educated and non-educated restaurant staff. Only the educated ones could identify some food pathogens while the non-educated ones named the pests (cockroaches, rats) as pathogens. Beside the formal education, those who attended catering schools had more knowledge on hygiene and safety issues than those that did not attend. Again, these ones were also able to indicate the foods that is prone to poisoning.

## Implications to public health

This survey brought to light some issues related to food safety in Abuja. A good number of food vendors lack knowledge about food safety. Most of them lack both formal education and job related training that is needed to ensure safety. Some operate in unhygienic environment without appropriate facilities needed for safety. The study has also provided a guiding light for NAFDAC and other regulatory bodies to tailor their trainings.

## Conclusion

Inadequate knowledge of food safety among restaurants staff in Garki is a call to action. An appropriate program to enhance the

knowledge base of food vendors on hygiene and safety issues in order to eliminate outbreak of food borne illness is necessary. Individuals (food vendors, restaurant owners), should show the commitment to this course while government and other regulatory bodies should work together to develop a training package in order to avert the potential danger of outbreaks of food borne illness.

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