

# Innovations

## Holistic Approaches to Understanding and Mitigating Food Poisoning in Nsukka Zone: A Sociological-Statistical Synthesis

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**Abstract:** *This research concentrates on unraveling the complexities of food poisoning in Nsukka urban. Integrating qualitative sociological analyses with robust statistical methodologies, the study illuminates the societal dynamics and patterns (factors) influencing the prevalence of food poisoning (food borne illnesses). The synergy between sociological insights and statistical findings forms a comprehensive foundation for developing preventive measures. This interdisciplinary approach contributes to a clear understanding of the issue, fostering cross-disciplinary dialogue and informing holistic solutions in the realm of food safety. The study reveals that food poisoning is wholly caused by poor handling of cooking materials and this can be prevented through training of staff on food hygiene.*

**Keywords:** *Food poisoning, holistic approach, understanding, mitigating, Sociological-Statistical synthesis, Nsukka zone.*

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### 1. Introduction

Food borne disease (also referred to as food borne illness or food poisoning) is any illness that results from the consumption of contaminated food, pathogenic bacteria, viruses, parasites or chemical substances that contaminate food. According to WHO (2019), Food borne diseases are a global public health issue that has major impacts on human health, livelihoods, and health care systems. With constant changes in the global food trade dynamics, food consumption behaviors, the environment, the production processes, emergence and re-emergence of food borne pathogens and chemical contaminants continues to enter the food chain. Food borne diseases continues to be a growing problem and have aroused the concern and anxiety of the society about food safety. Most of these food-borne illnesses are caused by sociological factors such as individual lifestyle, mishandling behaviors and improper preparation/storage of food by food handlers. In order to ensure food safety and

prevent food poisoning, all food businesses including food service organizations should comply with the existing food regulations as well as prepare their own food safety plan to prevent food poisoning.

The increasing number of food poisoning outbreaks and food-related scares has led to calls for better hygiene and quality practices. Food poisoning outbreaks of salmonella, listeria, and *Escherichia coli* have made the public more skeptical of the food they consume. Recently, the debate surrounding The European Commission has recognized the importance of controlling food-poisoning outbreaks owing to the increasing number of meals consumed outside the home, in parallel with the ever-expanding range of pre-prepared meals (Ahmed & Sameh, 2015).

This changing consumer lifestyle/behaviors emphasizes the need for better and effective ways of controlling food hygiene. There is strong statistical evidence that the incidence of food poisoning caused by caterers is greater than in any other food sector, accounting for 70% of all bacterial food poisoning outbreaks. Furthermore, seventy per cent of these food poisoning outbreaks are due to the inadequate time and temperature control of food, while the remaining 30% are the result of cross-contamination (Wilson et al., 2019).

The hands of food service employees can be vectors in the spread of food-borne diseases because of poor personal hygiene or cross-contamination. For example, an employee might contaminate his hands when using the toilet, or bacteria might be spread from raw meat to salad greens by food handler's hands. It has been pointed out that data on risk factors for food-borne diseases imply that most outbreaks result from improper food handling practices (Ehiri & Morris, 2012). Mary Mallon popularly known as "Typhoid Mary" the first known case of a healthy carrier in the United States, was proven responsible for the contamination of at least one hundred and twenty-two people, including five dead. A study in the USA suggested that improper food handler practices contributed to approximately 97% of food-borne illnesses in food-service establishments and homes (Howes et al., 2019).

Food poisoning follows the ingestion of microorganisms that may have been present in already contaminated food, which may have resulted from inadequate food preservation techniques or unsafe handling practices or which may have arisen from cross-contamination from surfaces, equipment, or, less likely, from persons who carry enterotoxigenic staphylococci in their nails or on their skin (Barrie, 2012; Jay et al., 2014). Similarly, infected food handlers are also a common source of food-borne viruses such as the Hepatitis A virus and the diarrhea-causing, small round-structured viruses which are excreted in large numbers by infected individuals. WHO, (2015) reported that many cases of food borne virus infection have been associated with catering. Poor sanitary practices in food storage, handling, and preparation can create an environment in which bacteria such as *campylobacter*,

salmonella, and other infectious agents are more easily transmitted (Fielding et al., 2014; Gent et al., 2012).

From the researcher's observation and experience, many food handlers in catering establishments in Nsukka urban are found not keeping adequate hygiene practices not only in their preparation but also in the exhibition of their products for sale. This condition has led to increasing number of food poisoning outbreaks in the region. Food poisoning has caused so many illnesses, such as typhoid and even deaths among students, adults, youths and children in Nsukka urban.

Food handlers may transmit pathogens passively from a contaminated source, for example, from raw poultry to a food such as cold cooked meat that is to be eaten without further heating. They may also, have themselves to be sources of organisms either during the course of gastrointestinal illness or during and after convalescence, when they no longer have symptoms. During the acute stages of gastroenteritis, large numbers of organisms are excreted and by the nature of the disease are likely to be widely dispersed; clearly, food handlers who are symptomatically ill may present a real hazard and should be excluded from work. Good hygiene, both personal and in food handling practices, is the basis for preventing the transmission of pathogens from food handling personnel to consumer (Bryan, 2014; Evans et al., 2017). Lynch et al., (2009) stated that the Food and Drug Administration (FDA), with support from enforcement agencies and the food industry and catering establishment has endorsed food service worker training since 1976; however, since that time, the retail food service industry, has intensified efforts to improve retail food safety through training of restaurant managers and employees.

### **1.1. Research gaps and motivation**

The empirical gaps that motivated this study is centered on limited collaborative expertise research on food poisoning from the sociological and statistical angle. Despite the extensive research on food poisoning, in various areas, there is a notable scarcity of studies targeting the societal dynamics and statistical patterns influencing the prevalence of foodborne illness among catering establishments in Nsukka urban. In addition, identifying the factors contributing to food poisoning could potentially lead to long term solutions to health issues and alleviate future societal health burdens. While, other research output may overlook sociological and environmental determinants influencing food poisoning among catering establishments, there is a need for comprehensive intervention addressing these multifaceted influences.

Hence, this study was designed to unravel the factors causing food poisoning in catering establishments, and to examine the strategies for preventing food poisoning in catering establishments in Nsukka urban.

## **2. Method**

### **2.1. Design**

This study adopted a descriptive survey research design. A descriptive survey research design is one in which a group of people or items are studied by collecting and analyzing data from only a few people considered to be representatives of the entire group. The design is considered appropriate in carrying out this study because it facilitated the collection of data systematically from a sample of the population, (Nworgu, 2015).

### **2.2. Study Location**

The study was carried out in Nsukka urban. Nsukka has a land mass of 5,545 km<sup>2</sup> and a population of 309,633 people as at 2006 census. Nsukka shares a common border with Edem, Opi, Ede-Oballa, and Obimo. The inhabitants are mainly traders, Igbo speaking and farmers with mixture of Hausa settlers. The inhabitants also include civil servants and a good number of small scale businesses located in many areas of the zone. It is this unique nature that makes catering business very lucrative. Hence, the need for carrying out the present study in this area to ensure good hygiene practices by catering establishments.

### **2.3. Scope of the Study**

The geographical scope of this study covered all catering establishments in Nsukka urban. The study will examine the hygiene practices of catering establishments with particular interest on food hygiene practices. This content scope will also focus on the approaches to prevent against food poisoning in catering establishments in Nsukka urban.

### **2.4. Participants and procedure**

The population for this study comprises of 650 staff in the 21 registered catering establishments in Nsukka urban. Available records indicate that there are 650 staff operating in the 21 catering establishments. (Source: Office of the secretary, Nsukka Food Vendors Meeting 2020/2021 respectively). The sample size for this study was 130 food handlers. This figure comprises of 130 staff from 7 randomly selected catering establishments. A simple random sampling technique was used to select.

### **2.5. Instrument for Data Collection**

The study made use of primary source of data through questionnaire designed on a likert scale. The questionnaire is a four-point rating scale of strongly agreed (SA), agreed (A), disagreed (D), and strongly disagreed (SD). The questionnaire is designed in such a way that every question in the questionnaire is related to the

objectives of the study. The questionnaire consists of three sections. The first section bothers on the name and gender of the respondents. The second section bothers on the factors that cause food poisoning in catering establishment, while the third section bothers on the strategies for preventing food poisoning in catering establishments.

#### **2.6. Validation of the Instrument**

A draft of questionnaire was presented to three experts in the Department of Home Economics and Hospitality Management Education in University of Nigeria, Nsukka for content and face validation. The final correction was used by the researcher to modify and produce final copies of the questionnaire for data collection.

#### **2.7. Method of Data Collection**

The direct delivery and retrieval method was used to administer and collect data. The researcher employed the services of two trained research assistants. The research assistants were instructed on how to administer and retrieve the questionnaire from the respondents so as to minimize loss of questionnaire and ensure safe handling and return of the instrument.

#### **2.8. Method of Data Analysis**

A mean score rating method was used to analyze the data based on the 2.5 benchmark. The standard deviation of the responses were also considered to ascertain the significance of the mean score.

### **3. Data Analysis and Interpretation**

After administration of the questionnaire to the respondents, data were generated. The generated data were screened and cleaned, and there was no case of missing values. Afterwards, the statistical package for social sciences (SPSS) software version 16 was used to perform the statistical analysis. To tackle the first objective of this study, mean score analysis was done to ascertain the prevalent factors influencing food poisoning in catering establishments in Nsukka urban. The result shows that all the items contained in table 1 below have a strong influence in causing food poisoning in catering establishments in Nsukka urban.

Similarly, the mean scores in table 2 shows that all the itemized strategies for preventing food poisoning in catering establishment are effective.

**Table 1: Mean score ratings and standard deviation of factors causing food poisoning in catering establishment.**

S/N	Item Statement	Mean	S.D	Decision
1	Wrong usage of ingredients	3.22	0.79	A
2	Negligence of food safety rules on the part of cooks	3.50	0.65	A
3	Poor hygiene on the part of cooks	3.62	0.63	A
4	Improper preservation of cooked food	3.59	0.58	A
5	Unpasteurized milk, cheese, or other dairy products	3.35	0.77	A
6	Improper hot holding of foods	2.87	0.88	A
7	Inadequate temperature control of food	2.92	0.86	A
8	Inadequate time control of food	2.69	0.84	A
9	Cross contamination of raw foods	3.48	0.73	A
10	Infected food handlers	3.51	0.71	A
	<b>GRAND MEAN</b>	<b>3.28</b>		<b>A</b>

**n= 130, S.D = Standard Deviation, A = Accept, R= Reject**

**Table 2: Mean ratings and standard deviation of the strategies for preventing food poisoning in catering establishment.**

S/N	Item Statement	Mean	S.D	Decision
1	Reduce the use of canned foods	3.12	0.70	A
2	Do not use outdated foods, packaged with a broken seal, or cans that are bulging or have a dent	3.62	0.52	A
3	Avoid cross contamination of raw foods	3.52	0.64	A
4	Wash your hands thoroughly with soap and hot water before and after preparing food, as well as after handling each different kind of food.	3.62	0.58	A

5	Hot foods should be maintained above 140degrees F, and cold foods should be stored below 40degrees F	3.26	0.62	A
6	Use a food thermometer and be sure to cook meat thoroughly and at adequately high temperatures	3.42	0.66	A
7	Refrigerate leftovers properly	3.52	0.60	A
8	Avoid foods that have been kept at room temperature for more than two hours	2.98	0.86	A
9	Infected or sick food handlers should be suspended from work	3.47	0.66	A
10	Training the staff on food hygiene	3.75	0.50	A
	<b>Grand Mean</b>	<b>3.43</b>		<b>A</b>

**n= 130, S.D = Standard Deviation, A = Accept, R= Reject**

#### 4. Results

The results in the table 1 show the responses of the factors causing food poisoning in catering establishments in Nsukka urban. All the items from 1-10 have mean scores greater than the bench mark of 2.50 which implies acceptance. This result tells that all the following items are the possible causes of food poisoning in catering establishments; wrong usage of ingredients, negligence of food safety rules on the part of cooks, poor hygiene on the part of cooks, improper preservation of cooked food, unpasteurized milk, cheese, or other dairy products, improper hot holding of foods, Inadequate temperature control of food, inadequate time control of food, cross contamination of raw foods and infected food handlers. The grand mean of 3.28 shows that the respondents agreed in average to all items in table 1. The table also shows the standard deviations of each response. The standard deviations for each response is less than 1 showing that there is no much variation in responses from the respondents.

Similarly, the results in the table 2 show the responses of the strategies for preventing food poisoning in catering establishments in Nsukka urban. All the items in table 2 also have mean scores greater than the bench mark of 2.50 which implies acceptance. This result shows that all the following are the possible strategies for preventing of food poisoning in catering establishments; Reduce the use of canned foods, do not use outdated foods, packaged with a broken seal, or cans that are bulging or have a dent, avoiding cross contamination of raw foods, Washing your hands thoroughly with soap and hot water before and after preparing food, as well as after handling each different kind of food, Hot foods should be maintained above



140 degrees, and cold foods should be stored below 40 degrees, Use a food thermometer and be sure to cook meat thoroughly and at adequately high temperatures, refrigerate leftovers properly, avoid foods that have been kept at room temperature for more than two hours, Infected or sick food handlers should be suspended from work, and training the staff on food hygiene. The grand mean of 3.43 shows that the respondents agreed in average to all items in table 2. The table also shows the standard deviations of each response. The standard deviations for each response are less than 1 showing that there is no much variation in responses from the respondents.

## **5. Discussion**

The findings in the analysis revealed that all the items were accepted as being the causes of food poisoning in catering establishments, which are referred to be as negligence of food safety rules on the part of cooks, poor hygiene on the part of cooks, cross contamination of raw foods, infected food handlers among others. These findings are in line with many studies who identified improper cooking, temperature abuse during food storage, cross contamination between cooked and uncooked foods, poor sanitation and hygiene, and using unsafe water and raw materials as the handling factors associated with food-borne disease outbreak and directly linked to food handlers (Mahmood et al., 2017; Ababio&Lovatt, 2015). Similarly, Abdulla&Siow (2014), reported that insufficient knowledge and negligence during food preparation is a common cause of food borne disease outbreaks.

The results as presented in table 2 revealed that the respondents agreed to all the items as ways of preventing food poisoning in catering establishments. The findings were in conformity with the findings of Bryan and Evans (2017), who reported that good hygiene, both personal and in food handling practices, is the basis for preventing the transmission of pathogens from food handling personnel to consumer.

The study further revealed that all the items listed in table 2 were all accepted by the food handlers as the consequences of food poisoning in catering establishments. The results were expected. These findings are in consonance with the findings of WHO (2015), who reported that many cases of food borne virus infection have been associated with catering. Similarly, poor sanitary practices in food storage, handling, and preparation can create an environment in which bacteria such as camphylobacter, salmonella, and other infectious agents are more easily transmitted (Fielding et al., 2014; Gent et al., 2012).



### **5.1. Limitations**

This study could not make use of all catering establishments in Nsukka urban, rather the study made use of only registered catering establishments. Also, the scope could not cover different families which experience food poisoning in their various homes. Because of the vast nature of the population space, the study is limited in terms of respondents' coverage. Further studies should try as much as possible to expand the coverage so as to get more robust findings.

### **5.2. Future direction**

Based on the results and findings of this study, Managers of catering establishments and other food businesses should frequently supervise the hygienic condition under which food handlers working for them prepare food. They should also, constantly reward adherence to food hygiene principles. The local and national authorities should set up a committee, which will frequently inspect the food hygiene practices of food handlers and vendors across the country. A bill should be passed to the effect that only food handlers who have received adequate food hygiene training and have been certified should be allowed to work as food handlers or food vendors. Trainings should be organized periodically to sensitize the food handlers and the general public on the strategies for preventing food poisoning. Finally, this study will be an addition to the body of literature on causes of food poisoning and its preventive measures.

### **5.3. Conclusions**

The study showed reasons for the causes of food poisoning in catering establishments such as wrong usage of ingredients, negligence of food safety rules on the part of cooks, poor hygiene on the part of cooks, improper preservation of cooked food, unpasteurized milk, cheese, or other dairy products etc. The consequences of food poisoning in catering establishments and also some strategies for preventing food poisoning in catering establishment were identified.

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