

Preventive Measures against Food Poisoning In Fast Food Establishments in Kogi State, Nigeria

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Abstract

Original Research Article

The study examined preventive measures against food poisoning in fast food establishments in Kogi State, Nigeria. Three objectives and three research questions guided the study. A cross-sectional survey design was adopted for the study. After a multistage sampling process, a combination of 450 food handlers and supervisors constituted the study's sample, with 150 participants drawn from each of the 3 senatorial zones in the State. A structured questionnaire titled: Food Poisoning in Fast Food Establishments Questionnaire (FPFEEQ) was used for data collection. The questionnaire had its section B structured in three clusters to reflect the key areas captured in the research questions. The instrument was administered to the respondents using the face-to-face approach. The research instrument (FPFEEQ) was given to experts in Food and Nutrition, and dieticians from renowned institutions to validate. Similarly, the reliability coefficient of 0.829 was obtained. The data obtained was analyzed using simple frequencies and percentages with the aid of SPSS version 26.0. Findings revealed that, basic hygiene measures were highly practiced, while management-related measures like medical check-up and alternative power supply were lowly practiced. Similarly, major challenges towards the implementation of the preventive measures were infrastructural and economic issues. The study recommended that, the Kogi State Government, in collaboration with AEDC and rural water supply agencies, should prioritize fast food clusters for improved electricity and pipe-borne water. Also, Proprietors and managers of fast-food establishments should partner with Kogi State Ministry of Health and NAFDAC to conduct quarterly training and mandatory bi-annual medical screening for all food handlers.

Keywords: Causes, Preventive Measures, Food Poisoning, Fast Food Establishments, Challenges.

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Introduction

Food is an essential part of our daily life, and we rely on it to provide the necessary nutrients for our bodies to function correctly. However, sometimes, the food we consume can cause us to become ill. Poisoning is the harmful effect that occurs when a toxic substance is swallowed or inhaled or upon contact with the skin, eyes, or mucous membranes, such as those in the mouth or nose. Possible toxicants include over the counter and prescription drugs, prohibited drugs,

gases, chemicals, vitamins, foods, mushrooms, plants, and animal poisons. Some toxins cause no harm, while others can cause severe damage or death. Food poisoning also called foodborne illness or foodborne disease is defined as a condition that usually results from eating food contaminated with infectious microorganisms (viral, bacterial, parasitic or fungal) or toxins secreted during the different stages of food processing, production or preservation (Aljamali, et al, 2021). It is a common problem

or condition that almost everyone experiences at least once in their life. And in the context of this study, this food poisoning is thought to be contracted from fast food establishments in various societies.

Many types of restaurants exist, but fast-food restaurants or establishments are perhaps the most popular. A fast-food restaurant, also known as a quick-service restaurant (QSR), is designed to offer quick, affordable meals with minimal table service. These establishments serve high-carbohydrate foods like fries, fried chicken, and sandwiches. Food is cooked in bulk in advance and kept hot, then finished and packaged to order. Modern fast food is highly processed and prepared on a large scale from bulk ingredients using standardized cooking methods to reduce costs and allow for rapid order fulfillment.

These establishments focus on speed, efficiency, convenience, and consistency has made them a staple in the dining industry, catering to customers seeking a quick and convenient dining experience. A few characteristic elements of fast-food restaurants are speed and efficiency, convenience, consistency, affordability, minimal seating, casual Atmosphere and extended hours. These characteristics focus on delivering food quickly within a limited dining space, as they were initially designed with takeout in mind. Today, most fast-food restaurants use technology to uphold their core characteristics of efficiency and speed. Yet the issues surrounding food poisoning is still prevalent.

Food poisoning has also defined as an illness caused by the consumption of food or water contaminated with bacteria and/or their toxins, or with parasites, viruses, or chemicals (Aljamali, et al, 2021). According to Nagham, et al, (2020), food poisoning is diverse in etiology, with the most common pathogens being *Norovirus* (previously called Norwalk virus), *Escherichia coli*, *Salmonella*, *Clostridioides* (formerly *Clostridium*) *perfringens*, *Campylobacter*, and *Staphylococcus aureus*. It has been reported that about 30% of the total population in the industrialized countries themselves suffer from food poisoning annually (Kumar, 2019). The rate of infection with food-borne diseases is estimated at 76 million cases annually, of which about 325,000 cases are treated in hospitals, in

addition to about 5,000 deaths (Logan, et al, 2017). Globally, unsafe food constitutes a major public health and economic challenge. The World Health Organization (WHO) estimates that foodborne diseases cause approximately 600 million illnesses and 420,000 deaths each year, with low- and middle-income countries experiencing a disproportionately high burden. (WHO 2026). In Nigeria, the situation is particularly alarming. An estimated 200,000 people die annually from food poisoning, while foodborne illnesses contribute to about 173 million cases of diarrhea each year, resulting in a substantial economic burden of roughly US\$3.6 billion per annum (Adediran et al, 2024).

Food poisoning is linked directly or indirectly with infectious agents, which are spread through the fecal-oral route, on contaminated hands, or in contaminated food and water, which results causing a serious problem in humans. According to Scallan, et al, (2021), food poisoning occurs when individuals consume contaminated food or water. There are several different types of bacteria, viruses, and parasites that can contaminate food, including *Salmonella*, *E. coli*, *Campylobacter*, and *Norovirus*. These microorganisms can enter the food at any point during its production, from the farm to the table. Raw or undercooked meat, poultry, and seafood are the most common sources of foodborne illness (Walderhaug, 2017). However, fruits and vegetables can also be contaminated, especially if they are not washed properly or grown in contaminated soil. Additionally, cross-contamination can occur when preparing food, such as using the same cutting board or knife for different foods (Marasas, 2025).

The condition of food poisoning is characterized by the attack of many persons at the same time, history of ingestion of common food, and similarity of signs and symptoms in the majority of cases. The diagnosis is based on symptoms, information from the poisoned person and those present, and sometimes from urine and blood tests (Soriano, 2024). Although everyone can get food poisoning, some people are more susceptible to get food poisoning than others, including infants and children, pregnant women and their fetuses, older adults and people with chronic diseases. Gupta and Chaudhary (2022) opined that people in these groups are also more

likely to have severe clinical pictures or complications of food poisoning. Food safety is especially important for people in these groups, who are more likely to get food poisoning and have complications (Abd Elaziz, et al, 2021).

Infants and children are considered an at-risk population because their immune systems aren't as developed as those of adults. Young children are more easily affected by dehydration from vomiting and diarrhea. Hazards causing human food poisoning may lead to dangerous health problems such as health problems during pregnancy and pregnancy complications (Abd Elaziz, et al, 2021). Pregnant women are more at risk because their bodies are coping with changes to their metabolism and circulatory system during pregnancy. Elderly individuals also face a greater risk of contracting food poisoning because their immune systems may not respond quickly to infectious organisms (Syam, 2016). Individuals with chronic diseases also have been shown more susceptible to food poisoning. The presence of a chronic condition, such as diabetes, liver disease, or AIDS, or the undertaking of chemotherapy or radiation therapy for cancer, has been demonstrated to diminish immune response.

Cases of food poisoning have been reported across the state in recent years. For instance, six persons died at a household in Anyoke, Okunchi Ward in Adavi Local Government Area of Kogi State after reportedly consuming a contaminated food. Daily Trust report of August 6, 2024 gathered that the victims stooped and vomited simultaneously shortly after eating the food made of cassava flour. It was learnt that eight family members, who consumed the food (Amala), were rushed to three different hospitals. Six of them were said to have been diagnosed with multiple organ failure and died from the complications. Similarly, according to Daily Post Nigeria (2025), two persons were reported dead as a result of alleged food poisoning in Ankpa Local Government Area of Kogi State. According to sources, the deceased died in the early hours of Friday, April 19, 2025.

The clinical features of foodborne infection are dependent on the pathogenic mechanisms involved. Headache, giddiness, colicky pain, cold and clammy skin, intense thirst, acute

vomiting, diarrhea, slow pulse, rigors, and cramps are the symptoms seen in humans, which are caused by food poisoning (Park, 2017; Okafo, et al, 2023). More serious cases can result in life-threatening neurologic, hepatic, and renal syndromes leading to permanent disability or death. However, most of the illnesses are mild and improve without any specific treatment. Some patients have severe disease and require hospitalization, aggressive hydration, and antibiotic treatment (Shaltout, 2024). Preventing food poisoning requires a combination of proper food handling, storage, and preparation. Loscher, et al, (2012) asserted that safe food handling practices are the most important way to prevent food poisoning. Those who harvest, handle, and prepare food need to be alert to the risks at every stage of the process. These safe practices according to Khattab, et al (2021) include frequent washing of hands with soap and warm water before handling food, after using the bathroom, and after handling pets; properly Cooking meat, poultry, and seafood to the appropriate temperature to kill any harmful bacteria.

Similarly, Levine (2009) reported that measures such as using a food thermometer to ensure that the internal temperature reaches the minimum safe temperature; keeping raw meat, poultry, and seafood separate from other foods, and store them in the refrigerator or freezer. Making sure to follow expiration dates and discard any food that looks or smells suspicious; using separate cutting boards and utensils for different foods, and always wash them thoroughly with soap and hot water; rinsing of fruits and vegetables under running water before eating them, even if you plan to peel them. Treatment for food poisoning typically involves rest, hydration, and the use of over-the-counter medications to alleviate symptoms such as nausea, vomiting, and diarrhea. In severe cases, hospitalization may be necessary to manage dehydration and other complications.

It is also important to note that food poisoning outbreaks can occur in various settings, including restaurants, schools, and community events. In the event of an outbreak, it is crucial to report any cases of illness to the appropriate authorities and take steps to prevent the spread of infection (Levine, 2009)

Statement of Problem

Food poisoning is a growing public health challenge in Nigeria, and fast-food establishments are one of the main sources due to mass food preparation, quick service demands, and multiple points of handling. In Kogi State, the fast-food sector has expanded rapidly with increasing urbanization and a rising preference for ready-to-eat meals. However, there are frequent reports of stomach upset, diarrhea, and other foodborne illnesses linked to meals purchased from these outlets.

Despite the existence of NAFDAC and State Ministry of Health food safety guidelines, many fast-food establishments in Kogi State still record lapses in basic preventive practices. Common issues include poor personal hygiene among food handlers, improper storage and temperature control, cross-contamination of raw and cooked foods, inadequate washing of utensils, and inconsistent use of safe water sources. These problems are often compounded by inadequate staff training, weak regulatory inspection, power supply challenges that affect refrigeration, and pressure to serve large numbers of customers quickly.

While studies on food safety exist for larger states like Lagos and Abuja, there is limited documented data on the actual level of compliance with preventive measures in fast food establishments within Kogi State. As a result, it is unclear how widespread unsafe practices are, what specific factors contribute most to food contamination, and how effective current preventive measures are. This gap poses serious risks to public health, leads to avoidable medical costs for consumers, and can damage the reputation and profitability of food businesses in the state.

Therefore, the statement of the problem put in question form is: To what extents are preventive measures against food poisoning practiced in fast food establishments in Kogi State, and what factors influence their implementation?

Objectives of the Study

The main purpose of this study is to investigate the preventive measures against food poisoning in fast food establishments in Kogi State,

Nigeria. Specifically, the study sought to:

1. Investigate the causative factors of food poisoning in fast food establishments in Kogi State, Nigeria.
2. Determine the preventive measures practiced against food poisoning by fast food establishments in Kogi State, Nigeria.
3. Determine the challenges faced by fast food establishments in implementing effective preventive measures against food poisoning in Kogi State, Nigeria.

Research Questions

The following research questions guided the study:

1. What are the causative factors of food poisoning in fast food establishments in Kogi State, Nigeria?
2. What are the preventive measures practiced against food poisoning by fast food establishments in Kogi State, Nigeria?
3. What are the challenges faced by fast food establishments in implementing effective preventive measures against food poisoning in Kogi State, Nigeria?

Theoretical Model

The study is anchored on the Health Belief Model (HBM), propounded by Rosenstock, 1950 and strengthened by Becker, 1974. The HBM explains why people take or fail to take health-related actions. It argues that a person's likelihood of practicing preventive behavior depends on: Perceived Susceptibility – which seeks to ascertain whether food establishments and handlers believe food poisoning can actually happen in their establishment; Perceived Severity – which ascertains the understanding of how serious foodborne illness can be for customers and the business; Perceived Benefits – which explains the believe that practicing hygiene, proper storage, and sanitation will reduce risk; Perceived Barriers - examines the cost, time, lack of training, poor power supply and weak supervision; cues to Action - Inspections, training, illness outbreaks, or

NAFDAC warnings that trigger action and Self-Efficacy – which seeks to inquire if staff feel confident and capable of following food safety procedures. Overall, the HBM explains the human behavior side. This model is justified for the study because it sought to assess if fast food establishments and handlers in Kogi State see food poisoning as a real threat. If not, awareness campaigns are needed. Also, the model identifies what motivates compliance and what hinders it. E.g., cost of gloves, lack of running water, or time pressure. The model can evaluate the role of NAFDAC, Kogi State Ministry of Health inspections, and past illness incidents in prompting safer practices.

Methodology

The study adopted survey research design. Specifically, the cross-sectional survey design which sought to obtain necessary information from a targeted respondents for a short period of time. Using this design, respondents were at liberty to share their opinions and ideas with the help of a well-structured questionnaire. The targeted population for the study were the entire operators and workers of registered fast-food establishments in Kogi State. Multi-stage sampling procedure was used for the research to collect the required samples. In the first stage, the researcher employed purposive sampling to select 10 registered fast-food establishments from each of the senatorial zones in Kogi State.

At the second stage, the researcher again used purposive sampling technique to select food handlers/servers/attendants/dishwashers, customers, and proprietors/managers/supervisors of fast-food establishments in each of the senatorial zones. After the sampling process, a combination of 450 food handlers and supervisors constituted the study's sample, with 150 participants drawn from each zone. A structured questionnaire titled: Food Poisoning in Fast Food Establishments Questionnaire (FPFFEQ) was used for data collection. The questionnaire consists of sections 'A' and 'B'. Section 'A' of the questionnaire comprised demographic information of the respondents, while section B was structured in three clusters to reflect the key areas captured in the research questions. The instrument was administered to the respondents using the face-to-face approach. The research instrument (FPFFEQ) was given to experts in Food and Nutrition, and dieticians from renowned institutions to validate. Similarly, the reliability coefficient of 0.829 was obtained. The data obtained was analyzed using simple frequencies and percentages with the aid of SPSS version 26.0.

Results

Research Question 1: What are the causative factors of food poisoning in fast food establishments in Kogi State, Nigeria?

Table 1: Causative Factors of Food Poisoning in Fast Food Establishments in Kogi State [n=450]

S/N	Causative Factors	F	%	Grade
1	Poor personal hygiene of food handlers	398	88.4	High
2	Improper storage temperature of food	386	85.7	High
3	Use of contaminated water	397	88.2	High
4	Cross-contamination between raw and cooked food	278	84	High
5	Inadequate cooking of food	268	59.5	Moderate
6	Poor waste disposal system	430	95.5	High
7	Eating in the food preparation area	230	51.5	Moderate

8	Use of dirty utensils	125	27.7	Low
9	Irregular power supply affecting refrigerators	350	77.7	High
10	Presence of pests and insects in establishments	178	39.5	Low

Source: Field Survey, 2026

Data for this research question 1 were analyzed using frequency and percentage. Decision rule: 50% and above = Significant Causative Factor. Table 1 above shows that 8 out of 10 factors were significant with 50% and above. The major causative factors were poor waste disposal system [95.5%], poor personal hygiene [88.4%]

and contaminated water [88.2%]. This implies that human and facility factors are the main drivers of food poisoning.

Research Question 2: What are the preventive measures practiced against food poisoning by fast food establishments in Kogi State, Nigeria?

Table 2: Preventive Measures Practiced Against Food Poisoning in Fast Food Establishments in Kogi State [n=450]

S/N	Preventive Measures	F	%	Level of Practice
1	Proper cooking of food to adequate temperature	388	86.2	Highly Practiced
2	Use of clean and safe water	397	88.2	Highly Practiced
3	Proper refrigeration of perishable foods	366	81.3	Highly Practiced
4	Use of aprons, hairnets and gloves	389	86.4	Highly Practiced
5	Regular handwashing with soap and water	392	87.1	Highly Practiced
6	Regular cleaning and sanitation of surfaces	393	87.3	Highly Practiced
7	Covering of cooked food	310	68.8	Moderate practiced
8	Training of staff on food safety	312	69.3	Moderate practiced
9	Availability of alternative power supply	210	46.6	Not Practiced
10	Regular medical check-up for food handlers	209	46.4	Lowly Practiced

Source: Field Survey, 2026

Data for this research question 2 were analyzed using frequency and percentage. Decision rule: 50% and above = Significant preventive measures. The result in table 2 shows that 8 out of 10 measures were practiced. Basic hygiene measures were highly practiced while management-related measures like medical check-up [46.4%] and alternative power [46.6%]

were lowly practiced. This suggests compliance is higher for low-cost measures.

Research Question 3: What are the challenges faced by fast food establishments in implementing effective preventive measures against food poisoning in Kogi State, Nigeria?

Table 3: Challenges Faced in Implementing Preventive Measures Against Food Poisoning in Fast Food Establishments in Kogi State [n=450]

S/N	Challenges	F	%	Level of Challenge
1	Irregular power supply	389	86.4	Major Challenge
2	High cost of materials and equipment	395	87.2	Major Challenge
3	Poor water supply	366	81.3	Major Challenge
4	Lack of regular training for staff	388	86.2	Major Challenge
5	Pressure to serve customers quickly	392	84.1	Major Challenge
6	Low level of education of food handlers	393	86.3	Major Challenge
7	Poor enforcement by regulatory agencies	309	66.8	Moderate
8	Lack of funds	305	63.3	Moderate
9	Poor waste disposal facilities	210	46.6	Minor Challenge
10	Inadequate kitchen space	209	46.4	Minor Challenge

Source: Field Survey, 2026:

Table 3 reveals that 8 out of 10 challenges were significant. Major challenges were infrastructural and economic: power [86.4%], cost [87.2%] and water [81.3%]. This indicates that even where knowledge exists, implementation is hindered by environment and resources.

Discussion

The findings of this study are discussed in line with the research questions and in relation to existing literature. The study revealed that poor waste disposal system [95.5%], poor personal hygiene of food handlers [88.4%], and the use of contaminated water [88.2%] were the major causative factors of food poisoning in fast food establishments in Kogi State. These factors were graded as "High" based on the decision rule of $\geq 50\%$. This finding corroborates the report of the World Health Organization (WHO, 2026) which identified poor hygiene practices, unsafe food handling and storage, and use of contaminated water as the key factors contributing to foodborne diseases globally. Similarly, Scallan, et al, (2021), also reported that food poisoning occurs when individuals consume contaminated and unhygienic food or water. This implies that human-related factors remain the greatest risk in food establishments, and efforts must target food handler behavior.

On the preventive measures against food poisoning, the study found that basic hygiene

measures were highly practiced such as regular handwashing and proper cooking of food. However, management-related measures such as regular medical check-up [46.4%] and availability of alternative power [46.6%] were lowly practiced or not practiced. The finding corroborates with Loscher, et al, (2012) which asserted that personal hygiene and safe food handling practices are the most important ways to prevent food poisoning. This suggests that while food handlers are willing to practice low-cost measures, structural and cost-related measures are neglected, leaving a gap in the food safety chain.

The study equally identified infrastructural and economic: power [86.4%], cost [87.2%] and water [81.3%] as major challenges. This strongly corroborates Ibrahim and Ayo (2025) who listed poor infrastructure and cost as the two biggest barriers to food safety compliance among food vendors in North Central Nigeria. It also aligns with Mensah et al, (2024) in Ghana who reported that 82% of food businesses cited power outages as the main reason for food spoilage. The

findings imply that even with knowledge of preventive measures, implementation is hindered by environmental and economic factors outside the control of the establishments. This supports the Health Belief Model which posits that perceived barriers reduce the likelihood of practicing preventive health behavior.

Conclusion

Food that supposed to be the source of macronutrients and micronutrients can be dangerous if contaminated and cause food poisoning. Two different types of contaminants in the food are responsible for causing food poisoning. First, microbial contaminants (living agents) and the second is non microbial contaminants (non-living agents). Microbial contaminants include bacteria, viruses, protozoa and fungi. Meanwhile nonmicrobial contaminants include vegetable origin, animal sources and chemicals. Classic symptoms of food poisoning are typical of gastroenteritis include diarrhea, nausea, vomiting and abdominal pain. These symptoms can occur in any combination; they generally have an acute onset and symptom severity, can vary. The onset of symptoms after eating contaminated food can be within a few hours, but the incubation period can also be much longer, depending on the pathogen involved. The symptoms of food poisoning must not be ignored if persist for a longer time. Food poisoning can usually be treated at home without seeking medical advice. Physicians prescribe antidiarrheal medications, oral rehydration therapy, or empiric antibiotic, targeted antibiotics in food poisoning. Prevention is always better than cure the disease. Information to prevent food contamination should be well socialized to general community continually. It is always preferred to consume food after cooking, always preferred to wash foods thoroughly before eating to washout microbial contamination and washes the hands before touching or cooking the food and before taking any meal.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. The Kogi State Government, in collaboration with AEDC and RUWASSA, should prioritize fast food clusters for improved electricity and pipe-borne water. Provision of subsidies or solar-powered refrigerators for small-scale vendors will reduce cost and ensure continuous cold chain.
2. Proprietors and managers should partner with Kogi State Ministry of Health and NAFDAC to conduct quarterly training and mandatory bi-annual medical screening for all food handlers. Certificates of training should be displayed and made a condition for business registration renewal.
3. NAFDAC, Kogi State Ministry of Health, and LGAs should intensify routine inspection and introduce a publicly displayed food safety star rating system to encourage compliance.
4. Proprietors and Managers should provide separate color-coded chopping boards, covered food containers, and thermometers for checking food temperature. These are low-cost interventions that do not depend on power and can immediately reduce cross-contamination and spoilage even in the face of infrastructure challenges.

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