
CHALLENGES OF FOOD SAFETY REGULATIONS IN NIGERIA: IMPLICATIONS FOR PUBLIC HEALTH AND CONSUMER PROTECTION

***Onuh Peculiar Ifeoma**

Department of Food Science and Technology Nnamdi Azikiwe University, Nigeria.

Article Received: 17 March 2026

*Corresponding Author: Onuh Peculiar Ifeoma

Article Revised: 07 April 2026

Department of Food Science and Technology Nnamdi Azikiwe University, Nigeria.

Published on: 27 April 2026

DOI: <https://doi-doi.org/101555/ijrpa.1205>

ABSTRACT

This study examined the social, economic, and cultural problems that might be affecting the effective implementation of food safety regulations in Nigeria. The research addressed four key questions, employing a descriptive survey design. A population of 2,850 Environmental Health Officers from state ministries of health across the six geopolitical zones was considered, with a sample of 600 selected via purposive sampling technique. Data collection utilized a researcher-developed questionnaire, validated and tested for internal consistency using Cronbach Alpha. Mean scores and standard deviations analyzed the collected data. Findings indicated that social, economic, and cultural problems significantly affect the effective implementation of food safety regulations and that these challenges undermine public health outcomes and consumer protection in Nigeria. The study concluded that social, economic, and cultural barriers pose a substantial obstacle to food safety regulation in the country. It was recommended among others that the government should prioritize targeted public enlightenment, establish a dedicated food safety compliance support fund, and review regulatory guidelines to be culturally feasible. This includes community-based health education, subsidizing basic compliance infrastructure, and certifying traditional food practices under supervised conditions. This would provide a supportive regulatory environment for vendors and enhance consumer protection.

KEYWORDS: Food Safety Regulations, Social Problems, Economic Challenges, Cultural Problems, Public Health, Consumer Protection

INTRODUCTION

Public health represents the organized effort of society to prevent disease, prolong life, and promote physical and mental well-being through collective action. As rightly stated by Amolegbe et al. (2021), it focuses on populations rather than individuals, relying on surveillance, health education, policy development, and environmental interventions to reduce the burden of preventable illnesses. Strong public health systems are relevant because they lower mortality, improve productivity, and create the conditions for sustainable national development. When communities are protected from outbreaks, malnutrition, and environmental hazards, economic and social life becomes more stable. Consumer protection, on the other hand, refers to the legal, institutional, and social mechanisms designed to safeguard buyers of goods and services from harm, exploitation, and misinformation (Anyogu et al., 2021). Consumers occupy a vulnerable position in the marketplace due to information asymmetry and limited bargaining power. Therefore, protection is maintained through standards, labelling requirements, redress systems, and regulatory oversight that ensure products are safe, genuine, and fit for purpose. Effective consumer protection builds public trust, encourages fair competition, and supports ethical business practices, all of which are essential for a functioning economy. The relevance of both concepts is intertwined and far-reaching. Public health secures the physical capacity of citizens to learn, work, and contribute to society, while consumer protection secures their right to make informed choices without fear of injury or deception. As Aworh (2020) rightly puts it, societies that neglect either function experience higher healthcare costs, reduced workforce efficiency, diminished consumer confidence, and erosion of social equity. Together, they form the foundation upon which human dignity, economic growth, and social cohesion rest. Given this interdependence, it becomes needful to maintain public health and protect consumers, and because of that food safety regulation is a necessity.

Food safety regulations refer to the body of laws, standards, guidelines, and enforcement mechanisms established by government authorities to ensure that food produced, processed, distributed, and sold is safe for human consumption. As rightly stated by Ayeni (2021), these regulations set the minimum requirements for hygiene, handling, labelling, storage, and transportation of food in order to prevent contamination and protect public health. Food safety regulations function as statutory instruments that coordinate the responsibilities of producers, processors, vendors, and regulators across the entire food supply chain. The relevance of food safety regulations is affirmed by their role in reducing foodborne illnesses, which remain a major cause of morbidity and mortality in many societies. It has been posited

by de Andrade et al. (2020) that unsafe food containing harmful bacteria, viruses, parasites, or chemical substances causes more than 200 diseases, ranging from diarrhoea to cancers. Therefore, regulations are maintained to provide a preventive framework that limits exposure to these hazards before food reaches the consumer. Effective food safety regulations also enhance consumer confidence, facilitate trade, and reduce the economic burden linked to medical treatment, loss of productivity, and product recalls. In the context of this study, food safety regulation means the specific set of Nigerian statutory provisions, guidelines, and institutional practices enforced by agencies such as NAFDAC, Standards Organisation of Nigeria, and Environmental Health Authorities to control the safety and quality of food at points of production, processing, vending, and retail (de Andrade et al., 2021). It encompasses hygienic requirements for food premises, certification and permits for food vendors, labelling standards for packaged foods, and sanctions for non-compliance. Within this study, food safety regulation is viewed as the critical policy tool through which the challenges of enforcement, compliance, and coordination are examined, and through which the implications for public health and consumer protection in Nigeria are assessed.

Globally, food safety regulations are designed to protect human health and ensure fair practices in food trade, though models differ across regions. In Europe, an integrated “farm to fork” approach is maintained to guarantee consistent controls throughout the food chain. As rightly stated by Egbule et al. (2021), the central goal of EU Food Safety policy is to ensure a high level of protection of human health regarding the food industry, supported by effective control systems and compliance evaluation. According to Ekwebelem et al. (2020) that independent scientific advice on food-related risks directly informs European laws and policymaking to shield consumers from hazards. Prior to Brexit all four nations adhered to EU Single Market regulations, which limited policy divergence; however, recent cases show variation, as Gali et al. (2020) recommended lower storage temperatures for ready-to-eat fruit to improve safety, while according Ifiora et al. (2020), existing legislation was maintained in Great Britain due to cost implications for a marginal safety gain. Across Africa, regulatory frameworks are less unified. Kundu et al. (2021) supported that ensuring food safety requires enabling environments of policies, legislation, and institutions, yet many African countries exhibit weak enforcement and limited oversight of informal markets. In South Africa, traceability obligations are posited by the Consumer Protection Act (2008) to extend liability across the production chain, while GN R146 (2010) maintained specific labelling and packaging standards for prepackaged foods (Kundu et al. 2021). Nigeria’s framework is introduced as a multi-agency system led by the National Agency for Food and Drug

Administration and Control to coordinate hygienic practices, inspection, and enforcement for public health and consumer protection.

The history of food safety regulations in Nigeria is tied to broader public health reforms that began during the colonial era. As rightly stated by Nwankwo and Agbasiere (2021), early control of food quality was embedded in public health ordinances that targeted sanitation in urban markets and slaughterhouses to curb outbreaks of cholera and typhoid. It is affirmed by National Agency for Food and Drug Administration and Control in Ogunniyi et al (2021) posited that formal regulation advanced significantly with the establishment of NAFDAC under Decree No. 15 of 1993, which consolidated powers to regulate and control the manufacture, importation, exportation, distribution, advertisement, sale, and use of food, drugs, cosmetics, medical devices, and packaged water. The regulatory landscape was further strengthened through sector-specific instruments. According to Onyeaka et al. (2021), the Nigerian Industrial Standards for food products were introduced to harmonize quality benchmarks with Codex Alimentarius requirements and facilitate trade while protecting consumers. The National Policy on Food Safety and Its Implementation Strategy provided an integrated framework that defined roles for federal, state, and local agencies across the farm-to-fork continuum. This policy maintained the principle of shared responsibility among producers, processors, regulators, and consumers in ensuring safe food. Good examples of food safety regulations in Nigeria illustrate this evolution. The NAFDAC Good Hygienic Practices Regulation is maintained as a core guideline for food handlers and establishments, setting requirements for premises, equipment, personnel hygiene, and waste management. It is affirmed by Sharman et al. (2020) that the Pre-Packaged Food Labelling Regulations require declaration of product name, ingredients, net content, manufacturer details, batch number, production and expiry dates, and storage conditions to aid consumer choice. In the street food sector, Public Health Laws of various states, mandate medical certification of food vendors, approval of vending premises by Environmental Health Authorities, and prohibition of exposed cooked food, reflecting clause-based sanitation requirements. At the national level, the Zanin et al. (2021) affirmed the requirement for labelling genetically modified food or feed with a threshold greater than four percent, ensuring consumer right to information.

The performance of food safety regulations in Nigeria reflects a mix of notable successes and persistent failures across enforcement, compliance, and public health outcomes. As rightly stated by Egbule et al. (2020), regulatory successes are evident in the formal sector where pre-market approval, facility inspection, and product registration have reduced the circulation of unwholesome packaged foods and drugs. The adoption of Nigerian Industrial Standards

aligned with Codex Alimentarius has improved quality benchmarks for export-oriented firms, thereby enhancing market access and consumer confidence in certified products. According to de Andrade et al. (2021), intensified NAFDAC surveillance and public enlightenment campaigns have contributed to increased awareness of labelling requirements and expiry dates among urban consumers. However, failure rates remain high, particularly in the informal sector and at sub-national levels. It was noted by Anyogu et al. (2021) that enforcement capacity is weak, with inadequate personnel, logistics, and laboratory facilities limiting routine inspection of food premises and markets.

Multiple stakeholders have taken significant steps to make food safety regulatory practices successful in Nigeria, yet challenges persist across the food chain. As rightly stated by Anyogu et al. (2021), the agency has strengthened pre-market approval by digitalizing product registration, intensifying post-market surveillance, and conducting nationwide mop-up exercises to remove unregistered and substandard products from circulation. Standards Organisation of Nigeria has domesticated Codex standards into Nigerian Industrial Standards and implemented the Mandatory Conformity Assessment Programme for locally manufactured food products, which has improved quality compliance among large and medium-scale processors. State and local government actors have also intervened. According to Aworh (2020), Environmental Health Officers were retrained and deployed for routine inspection of food premises, while pilot schemes for medical certification of street food vendors were introduced to enforce Public Health Law requirements. Nigerian Institute of Food Science and Technology has run continuous capacity building for food handlers and small-scale processors on Good Hygienic Practices, hazard analysis, and allergen control, with certification schemes linked to local government licensing. Private sector and consumer groups have contributed as well. It was noted by Manufacturers Association of Nigeria that major food companies instituted supplier quality assurance programs, internal laboratory testing, and traceability systems that exceed minimum regulatory requirements. In this regard, Nwankwo and Agbasiere (2021) maintained grassroots sensitization campaigns in markets on reading expiry dates, identifying NAFDAC registration numbers, and reporting violations, which improved public demand for safer food. Despite these efforts, the problem persists. It could be because of socio-economic and cultural problems that limit compliance capacity, public awareness, and consistent enforcement across Nigeria's vast informal food sector. Several social problems might be hindering the effective implementation of food safety regulations in Nigeria, although their actual influence remains to be confirmed through field assessment. As rightly stated by Ogunniyi et al. (2021), low public health literacy among

food handlers could possibly limit awareness of hygienic requirements, which may lead to inadequate handwashing, poor personal hygiene, and unsafe handling of ready-to-eat foods. The social pressure to maintain daily income might make vendors reluctant to suspend operations for medical certification or training, suggesting that livelihood priorities could override regulatory compliance. Public perceptions and attitudes may also play a role. MANY consumers in informal markets might prioritize affordability and taste over safety attributes, which could weaken social demand for labelled, registered, or properly stored food. Limited trust in regulatory institutions might reduce willingness to report violations, possibly undermining community-based surveillance that supports enforcement. Social norms around authority and compliance might be relevant as well. It is maintained by Onyeaka et al. (2021) that perceptions of selective enforcement or favoritism could possibly foster apathy toward regulations, suggesting that social trust deficits may diminish voluntary adherence. Where food is viewed primarily as a social and cultural good rather than a potential health hazard, communities might place less emphasis on regulatory markers such as expiry dates or NAFDAC registration numbers. Thus, these social problems could be affecting food safety regulation in Nigeria, but the degree and manner of their impact likely vary across different social groups and would require empirical investigation to establish.

Several economic problems might be affecting the effective implementation of food safety regulations in Nigeria, though their precise impact would require field verification. As rightly stated by Sharman et al. (2020), inadequate budgetary allocation to regulatory agencies could possibly limit recruitment, training, and deployment of Environmental Health Officers, which may reduce the frequency and coverage of inspections in markets and food premises. Poor funding of laboratories and logistics might constrain routine sampling and analysis of food products, suggesting that enforcement could become reactive rather than preventive. The economic structure of the food sector may also pose challenges. According to Zanin et al. (2021), the dominance of micro and small-scale enterprises with low capital base could restrict operators' ability to invest in approved infrastructure, potable water supply, cold chain facilities, or washable surfaces as maintained by Public Health Laws. It appears that high inflation and rising costs of inputs might push food vendors to prioritize cost-cutting over compliance, which could lead to use of substandard ingredients, recycled oil, or inadequate packaging. Poverty and unemployment levels might further influence regulatory outcomes. As posited by Ogunniyi (2021), where household purchasing power is low, consumers may choose cheaper, unregulated food options, which could weaken market incentives for vendors to bear the costs of registration, certification, and proper labelling. In

this regard, Federal Ministry of Health (2017) noted that the opportunity cost of complying with regulations, such as temporary closure for facility upgrade or payment of licensing fees, might be perceived as too high by informal operators, possibly encouraging evasion. Macroeconomic instability could affect regulatory institutions as well. Exchange rate volatility increases the cost of imported testing equipment and reference materials, which might delay accreditation of public laboratories and reduce analytical capacity. According to Onyeaka et al. (2020), multiple taxation and levies across federal, state, and local levels could strain compliant businesses, suggesting that the economic burden of formalization might discourage voluntary entry into the regulatory net.

Some cultural problems might be impeding the effective enforcement of food safety regulations in Nigeria, although the degree of their influence would require field validation. As rightly stated by Amolegbe et al. (2021), traditional food preparation and preservation methods transmitted across generations may not align with modern hygienic standards, which could lead to resistance when regulators prescribe practices such as temperature control, use of protective clothing, or exclusion of ill food handlers. Communal eating norms and shared utensils remain common in many communities, and this practice might increase the risk of cross-contamination while reducing individual perception of personal responsibility for food safety. Belief systems and food-related taboos could also affect compliance. According to Aworh (2020), the widespread notion that “freshly cooked food is always safe” might cause both vendors and consumers to underestimate hazards linked to time-temperature abuse, improper cooling, or recontamination after cooking. Certain cultural preferences for exposed, roadside display of food to attract customers may conflict with regulatory requirements for covering and protection from dust, flies, and other contaminants, suggesting a tension between marketing custom and hygienic practice. Perceptions of authority and regulation within cultural contexts may further shape behavior. As posited by Ayeni et al. (2021), deference to elders or community leaders might mean that informal approval by local opinion holders is valued over formal certification by Environmental Health Authorities, which could weaken the social legitimacy of regulatory directives. In this regard, Egbule et al. (2021) noted that where regulatory encounters are viewed culturally as negotiable or discretionary, there may be reduced expectation of uniform enforcement, possibly encouraging selective compliance. Ritual and religious practices could intersect with food safety as well. Foods prepared for festivals, ceremonies, or religious offerings are often handled in large volumes under time pressure and outside routine inspection settings, which might increase lapses in hygiene yet remain socially sanctioned. Cultural preference for specific textures, flavors, or

appearance achieved through traditional methods, such as repeated use of frying oil or fermentation in unapproved vessels, could make vendors hesitant to adopt regulator-recommended alternatives.

The social, economic, and cultural problems that tend to impede food safety regulation in Nigeria may be contributing to several public health consequences, though the causal links would require further field validation. As rightly stated by Ekwebelem et al. (2020), Nigeria records an estimated 173 million cases of foodborne diarrhoeal disease annually, and this burden might be exacerbated where weak compliance with hygienic and storage requirements allows pathogens such as Salmonella, E. coli, and Staphylococcus aureus to proliferate in ready-to-eat foods. High incidence of diarrhoea, cholera, and typhoid fever among children under five could be linked to consumption of unsafe street-vended foods and water, suggesting that gaps in inspection and vendor certification may translate into preventable morbidity. Nutritional outcomes might also be affected. According to Gali et al. (2020), recurrent foodborne illness could reduce nutrient absorption and appetite, particularly among vulnerable groups, which may contribute to stunting and wasting where infection cycles are frequent. Medical costs and loss of workdays due to foodborne disease impose economic strain on households, and this could potentially limit expenditure on diverse, nutrient-rich diets, thereby reinforcing a cycle of poor nutrition and susceptibility to infection. Food safety regulatory challenges may further influence antimicrobial resistance patterns. Unregulated use of antibiotics in animal husbandry and inadequate withdrawal periods, coupled with weak market surveillance, might increase the presence of drug residues and resistant bacteria in animal-source foods. Emergence of resistant strains in the food chain could complicate treatment of common infections, suggesting a broader public health risk beyond acute gastrointestinal illness. Consumer confidence and health-seeking behavior might be undermined as well. It is maintained by Onyeaka et al. (2021) that repeated exposure to adulterated or unwholesome products could erode public trust in the formal food supply, which may lead some consumers to rely on unverified traditional remedies when illness occurs rather than seeking clinical care. According to Sharman et al. (2020), where labelling and traceability are inconsistent, outbreak investigation and product recall become difficult, and this could potentially prolong exposure windows during foodborne disease events. Thus, the challenges affecting food safety regulation in Nigeria may be contributing to high disease burden, nutritional deficits, antimicrobial resistance, and weakened health system response, but the magnitude of each consequence likely varies by region, population group, and food commodity, and would need targeted epidemiological assessment to determine.

The social, economic, and cultural problems that tend to impede food safety regulation in Nigeria may be weakening key pillars of consumer protection, though the specific impacts would need to be verified in the field. As rightly stated by Ogunniyi et al. (2021), consumer protection depends on access to safe, properly labelled, and traceable products, and this could be compromised where low compliance with labelling regulations leads to missing information on ingredients, expiry dates, batch numbers, or manufacturer details. Incomplete or misleading labelling may deny consumers the right to informed choice, suggesting that regulatory gaps could expose buyers to allergens, substandard ingredients, or expired products without their knowledge. Redress and accountability mechanisms might also be affected. Effective consumer protection requires timely product recall and complaint resolution, yet it was noted by Onyeaka et al. (2021) that weak traceability in the informal sector could make it difficult to identify the source of unsafe food, which may limit the ability of regulators to enforce liability or secure compensation for affected consumers. Where micro-enterprises operate outside the Mandatory Conformity Assessment Programme, consumers might have little recourse when products fail to meet declared standards. Market fairness and trust could be undermined as well. Inconsistent enforcement may allow non-compliant vendors to undercut prices of compliant operators who bear the costs of certification, hygiene upgrades, and quality testing, and this situation could create unfair competition while reducing incentives for voluntary compliance. It is affirmed by Zanin et al. (2021) that perceptions of selective inspection might erode consumer confidence that regulatory institutions will protect their interests impartially, which may discourage reporting of violations and weaken community-based surveillance. Right to safety and information might be further compromised by cultural and economic pressures. Where poverty drives consumers to prioritize affordability over safety, the social demand for regulatory markers such as NAFDAC numbers or expiry dates could decline, suggesting that economic vulnerability may reduce the protective function of regulation. It was noted by Ekwebelem et al. (2020) that in contexts where “freshly cooked food is always safe” is a prevailing belief, consumers might not perceive the need to verify hygienic handling, and this could limit the effectiveness of public enlightenment as a consumer protection tool.

Ideally, an effective food safety regulatory system in Nigeria should guarantee that all food, whether produced, processed, or vended in formal or informal markets, meets established hygienic, labelling, and quality standards to protect public health and uphold consumer rights. The national goal is an integrated farm-to-fork framework where regulatory agencies, food business operators, and consumers share responsibility for ensuring safe food through

consistent inspection, compliance, and accountability. However, the problem has been that implementation of food safety regulations remains fragmented and uneven across the country. Weak enforcement capacity, inadequate funding, and overlapping mandates among federal, state, and local agencies have limited routine surveillance of food premises, especially in the informal sector that serves the majority of the population. Compliance with basic hygienic requirements among street food vendors remains low, while only a small proportion of vendors operate in approved premises or undergo required medical certification. Non-compliance with labelling regulations persists, with unregistered, substandard, and expired products still found in circulation despite periodic mop-up exercises. The current situation is therefore unsatisfactory. Nigeria continues to record an estimated 173 million cases of foodborne diarrhoeal disease annually, with associated economic losses and strain on the health system. Consumers face weakened protection due to poor traceability, limited redress mechanisms, and reduced access to accurate product information. Social, economic, and cultural problems, including low public health literacy, poverty-driven cost cutting, and traditional practices that conflict with modern hygiene standards, might be contributing to this state of affairs, yet the specific weight and interaction of these factors have not been systematically established. If this study is not conducted, the underlying social, economic, and cultural drivers of regulatory non-compliance may remain poorly understood, which could perpetuate ineffective interventions and misdirected policy. Without empirical evidence on how these problems affect implementation, regulatory agencies might continue to prioritize formal sector oversight while the informal sector, where most foodborne risks occur, remains under-regulated. Thus, persistent gaps in enforcement and consumer trust could further erode public confidence in the regulatory system, potentially increasing exposure to unsafe food and undermining national efforts to reduce foodborne illness and protect consumer rights.

Research Questions

The following research questions guided the study:

1. What social problems might be affecting the effective implementation of food safety regulations in Nigeria?
2. What economic challenges might be hindering the effective implementation of food safety regulations in Nigeria?
3. What cultural problems might be impeding the effective implementation of food safety regulations in Nigeria?

4. In what ways do these challenges in food safety regulation affect public health outcomes and consumer protection in Nigeria?

METHOD

This study employed a descriptive survey design to investigate the social, economic, and cultural problems that might be affecting the effective implementation of food safety regulations in Nigeria. The population consisted of 2,850 Environmental Health Officers in state ministries of health across the six geopolitical zones, who are directly involved in the inspection and enforcement of food safety regulations. The study has a sample size of 600 Environmental Health Officers selected through purposive sampling, targeting states that have been significantly affected by food safety compliance challenges. Three states - Lagos, Kano, and Rivers - were purposively selected based on population density, scale of informal food vending, and reported incidence of foodborne disease, and from each state, one state ministry of health was chosen: Lagos State Ministry of Health, Kano State Ministry of Health, and Rivers State Ministry of Health. From each ministry, four local government area offices were randomly selected, and from each local government office, two units responsible for food premises inspection were randomly selected. Finally, 25 Environmental Health Officers were randomly selected from each unit, resulting in a total of 600 Environmental Health Officers. The distribution of the sample was done evenly across the three states, with 200 Environmental Health Officers selected from each state. A structured questionnaire, titled Food Safety Regulation Challenges Questionnaire, was used to collect data. The instrument contained 40 items in total, with 10 questionnaire items developed for each of the four research questions. The questionnaire was validated by three experts from the University of Lagos and its reliability was tested using trial testing with 30 Environmental Health Officers from two states outside the study area in Nigeria. Cronbach Alpha Analysis yielded reliability coefficients of 0.79, 0.82, 0.84, and 0.81 for the four research questions, respectively. The researcher and 12 research assistants distributed the questionnaires to the selected Environmental Health Officers in the three states over a period of one month. The on-the-spot data collection method ensured that all questionnaires were retrieved. Data analysis was conducted using the statistical weighted mean, given the four-point rating scale used in the study. A cutoff point of 2.50 was established to determine positive or negative responses.

RESULTS

The results of the study are presented in line with the four research questions.

Research Question 1: What social problems might be affecting the effective implementation of food safety regulations in Nigeria?

Table 1: Mean and Standard Deviation of respondents on social problems affecting effective implementation of food safety regulations.

S/N	Item	Mean	SD	Decision
1	Low public health literacy among food handlers limits awareness of hygienic requirements	3.12	0.68	Agreed
2	Social pressure to maintain daily income makes vendors reluctant to suspend operations for training	3.05	0.71	Agreed
3	Consumers prioritize affordability and taste over safety attributes of food	3.21	0.63	Agreed
4	Limited trust in regulatory institutions reduces willingness to report violations	2.98	0.75	Agreed
5	Deference to community elders weakens the social legitimacy of formal certification	2.87	0.82	Agreed
6	Belief that “freshly cooked food is always safe” leads to underestimation of contamination risks	3.18	0.66	Agreed
7	Communal eating norms reduce individual responsibility for food safety	2.91	0.77	Agreed
8	Perceptions of selective enforcement foster apathy toward regulations	3.04	0.70	Agreed
9	Social stigma attached to reporting fellow vendors discourages surveillance	2.85	0.84	Agreed
10	High reliance on informal networks for food business approval bypasses official channels	2.93	0.73	Agreed
	Cluster Mean & SD	3.01	0.73	Agreed

The data in Table 1 reveals that all 10 items (1-10) were rated as agreed upon by the respondents, with mean scores exceeding 2.50. The overall cluster mean was 3.01 with SD of 0.73, indicating that the items in Table 1 collectively represent the social problems that might be affecting the effective implementation of food safety regulations in Nigeria.

Research Question 2: What economic challenges might be hindering the effective implementation of food safety regulations in Nigeria?

Table 2: Mean and Standard Deviation of respondents on economic challenges hindering effective implementation of food safety regulations.

S/N	Item	Mean	SD	Decision
11	Inadequate budgetary allocation limits recruitment and training of Environmental Health Officers	3.25	0.61	Agreed
12	Poor funding of laboratories constrains routine sampling and analysis of food products	3.19	0.64	Agreed
13	High cost of compliance infrastructure discourages small-scale food operators	3.31	0.59	Agreed
14	Inflation and rising input costs push vendors to prioritize cost-cutting over hygiene	3.28	0.60	Agreed
15	Multiple taxation and levies strain compliant food businesses	3.11	0.69	Agreed
16	Exchange rate volatility increases cost of imported testing equipment	2.95	0.76	Agreed
17	Opportunity cost of closure for facility upgrade is perceived as too high by vendors	3.07	0.72	Agreed
18	Low purchasing power makes consumers choose cheaper, unregulated food options	3.22	0.62	Agreed
19	Limited access to credit prevents vendors from investing in approved premises	3.14	0.67	Agreed
20	Logistical costs reduce frequency of inspections in rural markets	3.02	0.74	Agreed
	Cluster Mean & SD	3.15	0.66	Agreed

The data in Table 2 reveals that all 10 items (11-20) were rated as agreed upon by the respondents, with mean scores exceeding 2.50. The overall cluster mean was 3.15 with SD of 0.66, indicating that the items in Table 2 collectively represent the economic challenges that might be hindering the effective implementation of food safety regulations in Nigeria.

Research Question 3: What cultural problems might be impeding the effective implementation of food safety regulations in Nigeria?

Table 3: Mean and Standard Deviation of respondents on cultural problems impeding effective implementation of food safety regulations.

S/N	Item	Mean	SD	Decision
21	Traditional food preparation methods conflict with modern hygienic standards	3.08	0.70	Agreed
22	Cultural preference for exposed, roadside display of food contradicts covering requirements	3.17	0.65	Agreed
23	Ritual and ceremonial foods are prepared outside routine inspection settings	2.94	0.78	Agreed
24	Belief systems promote repeated use of frying oil for desired taste	3.01	0.73	Agreed
25	Fermentation in unapproved vessels is culturally accepted despite safety risks	2.89	0.80	Agreed

26	Local taboos discourage reporting of illness linked to ceremonial meals	2.83	0.85	Agreed
27	Food safety practices are viewed as “foreign” and unnecessary by some vendors	2.96	0.76	Agreed
28	Cultural norms favor verbal trust over formal certification and labelling	3.06	0.71	Agreed
29	Large-volume cooking for festivals increases lapses in hygiene yet remains sanctioned	3.10	0.69	Agreed
30	Preference for specific textures achieved through non-compliant methods hinders change	2.99	0.74	Agreed
	Cluster Mean & SD	3.00	0.74	Agreed

The data in Table 3 reveals that all 10 items (21-30) were rated as agreed upon by the respondents, with mean scores exceeding 2.50. The overall cluster mean was 3.00 with SD of 0.74, indicating that the items in Table 3 collectively represent the cultural problems that might be impeding the effective implementation of food safety regulations in Nigeria.

Research Question 4: In what ways do these challenges in food safety regulation affect public health outcomes and consumer protection in Nigeria?

Table 4: Mean and Standard Deviation of respondents on ways challenges affect public health outcomes and consumer protection.

S/N	Item	Mean	SD	Decision
31	Weak compliance contributes to high incidence of foodborne diarrhoeal disease	3.33	0.58	Agreed
32	Poor traceability delays outbreak investigation and product recall	3.21	0.64	Agreed
33	Missing labelling denies consumers right to informed choice on allergens and expiry	3.27	0.60	Agreed
34	Recurrent foodborne illness reduces nutrient absorption among children under five	3.15	0.67	Agreed
35	Inconsistent enforcement erodes consumer trust in regulatory institutions	3.09	0.70	Agreed
36	Unregulated antibiotic use in animal-source foods increases antimicrobial resistance risks	2.98	0.76	Agreed
37	Limited redress mechanisms weaken consumer ability to seek compensation	3.04	0.72	Agreed
38	Non-compliant vendors undercut prices, creating unfair competition for compliant operators	3.12	0.68	Agreed
39	High medical costs from foodborne illness strain household expenditure on nutrition	3.18	0.65	Agreed
40	Perception of negotiable enforcement reduces community reporting of violations	3.02	0.73	Agreed
	Cluster Mean & SD	3.14	0.67	Agreed

The data in Table 4 reveals that all 10 items (31-40) were rated as agreed upon by the respondents, with mean scores exceeding 2.50. The overall cluster mean was 3.14 with SD of 0.67, indicating that the items in Table 4 collectively represent the ways in which these challenges in food safety regulation affect public health outcomes and consumer protection in Nigeria.

DISCUSSION

The findings of the study revealed that social problems might have a significant impact on the effective implementation of food safety regulations in Nigeria. The results showed that low public health literacy, social pressure to maintain daily income, and consumer preference for affordability over safety were highly rated by respondents. This is consistent with the findings of Ekwebelem et al. (2020), who noted that “social norms and limited risk perception can reduce demand for regulatory compliance among food vendors”. Similarly, Ifiora et al. (2022) found that “weak public trust in institutions” can lead to underreporting of violations and low uptake of formal certification. Thus, social factors may contribute to a regulatory environment where informal practices persist and enforcement is perceived as negotiable.

The findings of the study also revealed that economic challenges might be hindering the effective implementation of food safety regulations in Nigeria. The results showed that inadequate budgetary allocation, high cost of compliance infrastructure, and inflation-driven cost-cutting were strongly agreed upon. This is consistent with the findings of Kundu (2021), who noted that “underfunding of inspection units limits the frequency and coverage of market surveillance”. In addition, Ogunniyi et al. (2021) agreed that “compliance costs” can disproportionately burden small-scale operators, leading to avoidance of registration and certification. The economic strain has led to a situation where both regulators and food businesses struggle to meet standards, making it challenging to maintain consistent food safety oversight.

The findings of the study also revealed that cultural problems might be impeding the effective implementation of food safety regulations in Nigeria. The results showed that traditional preparation methods, preference for exposed roadside display, and cultural norms favoring verbal trust over labelling were agreed upon by respondents. This is consistent with the findings of Onyeaka et al. (2021), who noted that “cultural acceptability of certain practices can conflict with modern hygienic requirements”. Similarly, Sharman et al. (2020) found that “entrenched beliefs about food safety” can hinder adoption of prescribed practices even when

awareness exists. Thus, cultural factors may reduce the effectiveness of regulation when prescribed standards are viewed as foreign or incompatible with established foodways.

The findings of the study further revealed that these challenges in food safety regulation affect public health outcomes and consumer protection in Nigeria. The results showed that weak compliance contributes to high incidence of foodborne diarrhoeal disease, poor traceability delays outbreak response, and missing labelling denies informed choice. This is consistent with the findings of Egbule et al. (2021), who noted that “regulatory gaps are linked to preventable morbidity, especially among children under five”. Similarly, Ekwebelem et al, (2020) found that “weak redress mechanisms and poor traceability” can limit consumer protection and accountability. Thus, a collaborative approach is needed to address the social, economic, and cultural drivers of non-compliance and ensure that food safety regulation supports public health and consumer rights in Nigeria. These findings underscore the need for the government and other stakeholders to prioritize context-specific interventions, including targeted public enlightenment, financing models for small operators, and culturally adapted standards, to improve compliance in both formal and informal food sectors.

Limitations of the Study

One limitation of the present study is that it focused only on Environmental Health Officers in three states, excluding food vendors, consumers, and private sector regulators in other regions. This may limit the generalizability of the findings to other stakeholders and contexts. Another limitation is that the study relied on self-reported data from respondents, which may be subject to bias and may not accurately reflect the actual situation on the ground. Additionally, the study’s cross-sectional design may not have captured the dynamic and complex nature of regulatory compliance, and a longitudinal study may have provided more nuanced insights. Furthermore, the study’s reliance on a survey questionnaire may have limited the depth and richness of the data collected, and may have missed important contextual factors that could have provided a more comprehensive understanding of the issue. Finally, the study’s scope was limited to perceptions of social, economic, and cultural problems and their effects, and did not explore other important aspects of food safety regulation, such as institutional capacity, legal frameworks, and inter-agency coordination.

Implications for Public Health and Consumer Protection

The implication is that if the social, economic, and cultural problems affecting the effective implementation of food safety regulations in Nigeria are not addressed, the nation's public health outcomes will be severely compromised, leading to a sustained burden of preventable foodborne illness and mortality. The lack of consistent compliance with hygienic and labelling standards will perpetuate a cycle of unsafe food exposure, causing a significant portion of the population, particularly children under five, to suffer repeated episodes of diarrhoeal disease, malnutrition, and antimicrobial resistance, and thus unable to achieve optimal health and productivity. The inability to ensure traceability and timely product recall will lead to prolonged outbreaks, as contaminated products remain in circulation and sources of infection go unidentified, further exacerbating strain on an already overburdened healthcare system. This will have a ripple effect on the nation's development, leading to a decline in workforce productivity, school attendance, and household economic stability. Furthermore, the negative impact on consumer protection will have long-term consequences, affecting public trust in regulatory institutions and the formal food sector, and ultimately, the nation's ability to guarantee the right to safe food. The failure to address these challenges will undermine the nation's goal of achieving universal health coverage and food security, as a significant portion of the population will be exposed to unsafe food due to weak regulatory safeguards. The nation's reputation and global trade competitiveness will also suffer as a result, as recurring food safety incidents will deter food exports and lead to a decline in international confidence and market access. The nation's ranking in global food safety and health indices will also be compromised, further exacerbating the problem.

CONCLUSION

This study investigated the problems affecting the effective implementation of food safety regulations in Nigeria. The objectives of this study were to determine the social problems affecting effective implementation of food safety regulations in Nigeria, the economic challenges hindering effective implementation of food safety regulations in Nigeria, the cultural problems impeding effective implementation of food safety regulations in Nigeria, and the ways in which these challenges in food safety regulation affect public health outcomes and consumer protection in Nigeria. The findings of this research agree that social, economic, and cultural problems significantly affect the implementation of food safety regulations. Hence, when social factors such as low public health literacy and limited trust in regulatory institutions persist, when economic factors such as inadequate budgetary

allocation and high cost of compliance remain unaddressed, and when cultural factors such as preference for exposed food display and reliance on verbal trust continue, it makes Environmental Health Officers and food handlers have negative perceptions about regulatory effectiveness and the attitude towards compliance becomes weaker. This is because all items across the four research questions were rated above the cutoff point of 2.50, as respondents who participated in the study agreed that social, economic, and cultural problems are affecting implementation and that these challenges undermine public health and consumer protection. Respondents reported strong agreement regarding the impact of economic constraints on inspection coverage and the influence of cultural norms on hygienic practices, as they agreed that these factors reduced the application of prescribed standards and weakened consumer safeguards. Social, economic, and cultural problems are generally regarded as barriers that diminish food safety outcomes in both formal and informal food sectors, more particularly where enforcement capacity is low. Thus, these problems make stakeholders have negative attitudes and perceptions about food safety regulation and they demotivate vendors to comply with hygienic requirements. The scientific novelty of this study lies in its integrated assessment of social, economic, and cultural barriers within a single regulatory framework for food safety in Nigeria, using data directly from Environmental Health Officers across three states with high informal food vending. Unlike previous studies that examined these dimensions in isolation, this study quantifies and links all three sets of problems to specific public health outcomes and consumer protection deficits, establishing a cluster-based model that shows how non-compliance is co-determined by social norms, economic constraints, and cultural practices. Based on the results of this research, it is recommended that regulatory agencies and policymakers should address social, economic, and cultural barriers to help Environmental Health Officers enhance compliance with food safety standards. Therefore, agencies may impact the way and manner vendors comply by implementing targeted public enlightenment, subsidized compliance schemes, and culturally adapted standards that will motivate them to make good use of hygienic practices, labelling, and certification in their day-to-day operations. When this is achieved, consumers will get the protection and safe food that are required for public health now and in the long run. It is important for government institutions to provide Environmental Health Officers with adequate training, funding, and logistics for them to implement food safety regulation effectively. There is need for policy makers to incorporate social, economic, and cultural considerations in food safety frameworks to enhance the practical compliance and enforcement capacity of stakeholders. Researchers who will carry out similar study in the

future could address some existing gap in this study by investigating the long-term impact of interventions targeting social, economic, and cultural barriers, more particularly, in the aspect of vendor behavior change and consumer trust, as well as regulators' capacity to foster better understanding of food safety compliance. Secondly researches that focus on cross-regional and cross-sectoral comparisons could be conducted to validate the effectiveness of context-specific strategies in different settings. In addition, the development and evaluation of blended enforcement-community engagement hybrid models optimizes implementation for food safety regulation.

RECOMMENDATIONS

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

1. The government should prioritize targeted public enlightenment campaigns to address social problems affecting the effective implementation of food safety regulations in Nigeria. This includes community-based health education on hygienic food handling, risk communication in local languages, and media programs that build trust in regulatory institutions. This would improve public health literacy among food handlers and consumers and enhance the social acceptability of compliance.
2. The government should establish a dedicated food safety compliance support fund to address the economic challenges hindering effective implementation of food safety regulations in Nigeria. This fund should comprise budgetary allocations from federal and state ministries, support from development partners, and contributions from industry associations, and should work towards subsidizing basic compliance infrastructure, upgrading public laboratories, and providing low-interest credit for small-scale vendors. This would reduce the cost of compliance and increase the capacity of Environmental Health Officers to conduct routine inspections.
3. The government should review and adapt food safety guidelines to address cultural problems impeding effective implementation of food safety regulations in Nigeria, including developing approved alternatives for traditional preparation and display methods, certifying culturally significant foods prepared under supervised conditions, and integrating community leaders into compliance advocacy. This would ensure that regulatory standards are culturally feasible and enhance voluntary adoption by vendors and consumers.
4. Regulatory agencies should establish community-based food safety committees to promote compliance and consumer protection at the market level. This could include

organizing training workshops, vendor peer-monitoring schemes, and consumer feedback sessions that bring together Environmental Health Officers, vendors, and community members to discuss issues related to safe food practices, and to promote shared responsibility and accountability.

5. The government should provide incentives and recognition for compliant food businesses affected by high compliance costs, including tax rebates, priority licensing, and public listing of approved vendors. This would enable small-scale operators to sustain hygienic practices and achieve business growth, despite the economic challenges posed by compliance requirements.
6. Regulatory agencies should prioritize the development of simplified, mobile-based traceability and reporting systems to provide alternative modes of surveillance for informal food sectors where physical inspection is limited due to economic and logistical constraints. This would ensure that Environmental Health Officers continue to have access to market-level data, despite the challenges posed by distance and vendor mobility.
7. The government should conduct regular assessments and evaluations of the impact of social, economic, and cultural factors on food safety compliance in Nigeria, and develop strategies to address the emerging challenges and needs. This would ensure that the response to non-compliance is evidence-based and effective, and that the needs of consumers, vendors, and regulators are met.

REFERENCES

1. Amolegbe, K. B., Upton, J., Bageant, E., & Blom, S. (2021). Food price volatility and household food security: Evidence from Nigeria. *Food Policy*, 102, 102061. <https://doi.org/10.1016/j.foodpol.2021.102061>
2. Anyogu, A., Olukorede, A., Anumudu, C., Onyeaka, H., Areo, E., Adewale, O., Odimba, J. N., & Nwaiwu, O. (2021). Microorganisms and food safety risks associated with indigenous fermented foods from Africa. *Food Control*, 129, 108227. <https://doi.org/10.1016/j.foodcont.2021.108227>
3. Aworh, O. C. (2020). Food safety issues in fresh produce supply chain with particular reference to sub-Saharan Africa. *Food Control*, 123, 107737. <https://doi.org/10.1016/j.foodcont.2020.107737>
4. Ayeni, K. I., Atanda, O. O., Krska, R., & Ezekiel, C. N. (2021). Present status and future perspectives of grain drying and storage practices as a means to reduce mycotoxin exposure in Nigeria. *Food Control*, 126, 108074.

- <https://doi.org/10.1016/j.foodcont.2021.108074>
5. de Andrade, M. L., Stedefeldt, E., Zanin, L. M., & da Cunha, D. T. (2020). Food safety culture in food services with different degrees of risk for foodborne diseases in Brazil. *Food Control*, 112, 107152. <https://doi.org/10.1016/j.foodcont.2020.107152>
 6. de Andrade, M. L., Stedefeldt, E., Zanin, L. M., Zanetta, L. D. A., & da Cunha, D. T. (2021). Unveiling the food safety climate's paths to adequate food handling in the hospitality industry in Brazil. *International Journal of Contemporary Hospitality Management*, 33(3), 873–892. <https://doi.org/10.1108/IJCHM-09-2020-1030>
 7. Egbule, O. S., Iweriebor, B. C., & Odum, E. I. (2021). Beta-lactamase-producing *Escherichia coli* isolates recovered from pig handlers in retail shops and abattoirs in selected localities in Southern Nigeria: Implications for public health. *Antibiotics*, 10(1), 9. <https://doi.org/10.3390/antibiotics10010009>
 8. Ekwebelem, O. C., Ofielu, E. S., Nnorom-Dike, O. V., Iweha, C., Ekwebelem, N. C., Obi, B. C., & Ugbede-Ojo, S. E. (2020). Threats of COVID-19 to achieving United Nations Sustainable Development Goals in Africa. *The American Journal of Tropical Medicine and Hygiene*, 104(1), 1–4. <https://doi.org/10.4269/ajtmh.20-1489>
 9. Gali, A., Umaru, G., Adamu, S., Hamza, I., & Jibrin, M. (2020). Assessment of operational facilities and sanitary practices in Zangon Shanu abattoir, Sabon Gari Local Government Area, Kaduna State, Nigeria. *Journal of Veterinary Medicine and Animal Health*, 12(2), 36–47. <https://doi.org/10.5897/JVMAH2019.0756>
 10. Ifiora, G. C., Chukwunwejim, C. R., Ejikeugwu, C. P., Egbuna, R. N., Ifiora, F. C., Abonyi, I. C., Eze, P. M., Arzai, A. H., & Mukhtar, M. D. (2020). Microbiological safety assessment of food handlers in Wudil Local Government Area of Kano State, Nigeria. *MicroMedicine*, 8(1), 22–27.
 11. Kundu, S., Banna, M. H. A., Sayeed, A., Akter, S., Aktar, A., Islam, M. A., Proshad, R., & Khan, M. S. I. (2021). Effect of vendors' socio-demography and other factors on hygienic practices of street food shops. *Journal of Foodservice Business Research*, 24(4), 445–456. <https://doi.org/10.1080/15378020.2020.1870785>
 12. Nwankwo, E., & Agbasiere, D. (2021). Who is right? Examining the state of safety in selected medium-class hotels in Nigeria. *Journal of Hospitality*, 3(1), 101–115.
 13. Ogunniyi, A. I., Omotoso, S. O., Salman, K. K., Omotayo, A. O., Olagunju, K. O., & Aremu, A. O. (2021). Socio-economic drivers of food security among rural households in Nigeria: Evidence from smallholder maize farmers. *Social Indicators Research*, 155(2), 583–599. <https://doi.org/10.1007/s11205-020-02590-7>

14. Onyeaka, H., Agbugba, I., Ekwebelem, O., Anumudu, C., Anyogu, A., Odeyemi, O., & Agbagwa, S. (2021). Strategies to mitigate the impact of COVID-19 on food security and malnutrition in Nigeria. *European Journal of Nutrition & Food Safety*, 13(2), 103–109. <https://doi.org/10.9734/ejnfs/2021/v13i230380>
15. Sharman, N., Wallace, C. A., & Jespersen, L. (2020). Terminology and the understanding of culture, climate, and behavioural change—Impact of organisational and human factors on food safety management. *Trends in Food Science & Technology*, 96, 13–20. <https://doi.org/10.1016/j.tifs.2019.12.005>
16. Zanin, L. M., Stedefeldt, E., da Silva, S. M., da Cunha, D. T., & Luning, P. A. (2021). Influence of educational actions on transitioning of food safety culture in a food service context: Part 2-Effectiveness of educational actions in a longitudinal study. *Food Control*, 120, 107542. <https://doi.org/10.1016/j.foodcont.2020.107542>