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Consumer Perceptions and Behaviours Toward Food Safety in Nigeria: A Systematic Review

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ABSTRACT

Background

Food safety significantly influences the global burden of disease, particularly in rapidly urbanising regions. In low- and middle-income countries such as Nigeria, there is limited understanding of how consumer concerns about food safety shape eating habits and dietary choices. This review aimed to synthesise evidence on food safety perceptions and how it influences consumer behaviour in Nigeria. The study examined existing research on Nigerian consumers' perceptions, attitudes, and behaviours regarding food safety, providing insights into knowledge gaps and areas requiring future investigation.

Methods

A systematic review was conducted following PRISMA guidelines. The PECO model guided the development of a comprehensive search strategy, initially applied to PubMed and adapted for other databases. Keywords relevant to food safety, consumer behaviour, and Nigeria were used. Reference lists of relevant studies were also screened. Inclusion criteria focused on peer-reviewed research that addressed consumer perceptions or behaviours related to food safety.

Results

Twenty-four studies met the inclusion criteria. Research was concentrated in urban areas, particularly the southwestern region, with prepared and ready-to-eat foods being the most studied. Most studies relied on single-method data collection, primarily structured surveys. Findings indicated that although participants generally had good knowledge of food safety, self-reported practices were often inadequate and in most cases absent or underreported. Methodological limitations, including lack of validated instruments and overreliance on self-reporting, were identified across several studies.

Conclusion

Future research should prioritise fresh produce and traditional markets, incorporate observational and qualitative approaches, and explore the cultural, social, and contextual factors influencing food safety behaviours. Understanding consumers' motivations, perceptions, and values in specific cultural contexts will be critical to developing effective interventions to improve food safety practices in Nigeria.

Keywords: Nigeria; Food Safety; Consumers; Foodborne Disease; Perceptions; Practices

INTRODUCTION

Food safety remains one of the most pressing public health concerns globally, particularly in low- and middle-income countries (LMICs) (Liguori et al., 2022). Every year, an estimated 600 million people fall ill due to contaminated food, leading to approximately 420,000 premature deaths (Pires & Devleesschauwer, 2021; WHO, 2022). The burden is disproportionately higher in LMICs, which account for nearly two-thirds of all foodborne disease mortality (Wu et al., 2021). In Africa, the economic toll of foodborne illness is roughly 27 times greater than that in North America and Europe, a reflection of fragile healthcare systems that lack the capacity for effective detection and treatment (Nordhagen, 2022). Globally, these infections cost economies around $20 billion USD annually (Hoffmann & Scallan, 2017).

Nigeria, like many LMICs, faces a significant food safety crisis. The country records an estimated 173 million cases of diarrhoea annually due to widespread foodborne diseases (Nordhagen, 2022). It has one of the world's highest fatality rates from foodborne illnesses, with approximately 2,300 under-five children dying each day (Grace et al., 2018). Food poisoning alone causes about 200,000 deaths annually, costing the government roughly USD 3.6 billion in treatment expenses (Zhu et al., 2021). Despite these alarming figures, consumer awareness and attitudes towards food safety remain poor. Many consumers in LMICs pay little attention to food expiry dates or the hygiene of preparation facilities (Onyeka et al., 2021), and studies have shown that consumer actions often contribute to, and exacerbate, public health problems (Stuempfig & Seroy, 2021). Unsafe consumer behaviour increases medical costs and disease transmission, straining healthcare systems and personnel (Nowshad et al., 2021). Understanding the variables—such as attitudes, motives, and perceptions—that influence consumer decisions is therefore essential for promoting safer food practices (Aworh, 2021).

A stark disconnect exists between the perspectives of food producers and consumers. Consumers tend to prioritise taste, design, and nutritional value (Gizaw, 2019; Okoruwa & Onuigbo-Chatta, 2021), while manufacturers focus more on packaging and marketability (Wood et al., 2021). In Nigeria, many low-income consumers prioritise affordability over quality or

hygiene, often purchasing from street vendors simply to satisfy hunger rather than considering nutritional value or safety (Onyeaka et al., 2021; Kundu et al., 2021). As a result, unsafe food handling practices are widespread. Many vendors operate in unsanitary conditions with limited access to clean water, proper storage, or adequate waste disposal facilities (Nordhagen, 2022; Grace et al., 2018). Power outages further complicate food preservation, and a poor maintenance culture exacerbates existing infrastructural deficiencies (Parikh et al., 2022).

The lack of adherence to food safety measures among Nigerian food businesses is linked to regulatory shortcomings, poor consumer awareness, cultural norms, and economic pressures (Nordhagen, 2022). Regulatory agencies tend to focus on large manufacturers, neglecting the informal sector where most food consumed by the population is produced. Without clear and enforceable standards, food safety practices often rely on personal or traditional norms (Grace et al., 2018; Valente et al., 2019). In multicultural contexts, workers' adherence to traditional food handling customs can vary widely, affecting hygiene standards (Onyeaka et al., 2021). Some unlicensed vendors attempt to maintain better safety practices but are constrained by financial limitations or informal work arrangements (Umar et al., 2018).

Existing research on food safety in Nigeria has largely focused on ready-to-eat meals and food vendors, with relatively little emphasis on consumer perceptions (Kundu et al., 2021; Ndu et al., 2021; Okpala et al., 2021). Although consumer attitudes and behaviours are recognised as major determinants of food safety in high-income countries (Grace et al., 2018; Umar et al., 2019; Kwol et al., 2020; Ndu et al., 2021), this area remains underexplored in Nigeria. Economic circumstances, cultural beliefs, and religious values strongly shape how Nigerians perceive and respond to food safety risks (Madaki & Miroslava, 2021; Iwar, 2017; Odetokun et al., 2021). The government's efforts to address food safety through media campaigns have had limited success, as public engagement has not significantly altered consumer behaviour (Iwar, 2017; Ezirigwe, 2018; Okoruwa & Onuigbo-Chatta, 2021).

Reducing the burden of foodborne disease remains a major priority across LMICs, but limited resources and weak governance often impede the implementation of effective food safety standards (Grace et al., 2018; Onyeaka et al., 2021; Nordhagen, 2022). Even where regulatory systems exist, their impact on informal markets—where most consumers purchase food—is minimal (Boadu et al., 2020; Okoruwa & Onuigbo-Chatta, 2021). Contamination frequently occurs before food reaches consumers, and domestic food preparation practices often fail to mitigate risks (Valente et al., 2019; Boadu et al., 2020). Understanding how to promote safe practices in these informal settings is therefore critical (Umar et al., 2018; Onyeaka et al., 2021; Nordhagen, 2022).

This review synthesises existing research on Nigerian consumers' attitudes and behaviours towards food safety, highlighting the interplay of socioeconomic, cultural, and regulatory factors. Nigeria presents a compelling case study due to its high prevalence of foodborne diseases and inconsistent enforcement of safety regulations (Grace et al., 2018; Jaffee et al., 2018; Okoruwa & Onuigbo-Chatta, 2021). Despite having numerous food safety laws, inspection and monitoring remain inadequate, and responsibilities across agencies are poorly defined (Valente et al., 2019). Regulatory bodies often lack the capacity for effective data collection, analysis, and outbreak response (Onyeaka et al., 2021). Additional challenges include adulteration, misbranding, and limited consumer education (Iwar, 2017; Ezirigwe, 2018; Okoruwa & Onuigbo-Chatta, 2021).

Focusing on consumer perceptions, this review contributes to understanding the sociocultural and behavioural dimensions of food safety in Nigeria and other LMICs. It underscores the urgent need for multidimensional strategies that integrate regulation, education, and cultural sensitivity to improve food safety outcomes and reduce preventable disease burdens.

METHODOLOGY

This systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021; Rethlefsen et al., 2021) to ensure transparency, reproducibility, and methodological rigour. The overall aim was to appraise relevant studies, identify knowledge gaps, and provide evidence-based recommendations for research and policy.

Research Design

A systematic review design was selected as it enables comprehensive identification, evaluation, and synthesis of existing empirical studies (Higgins et al., 2022). This approach is particularly suited for multidisciplinary fields such as food safety, where studies vary in design, population, and outcomes. The review included qualitative, quantitative, and mixed-method studies that explored consumer attitudes, perceptions, and behaviours regarding food safety in Nigeria.

Search Strategy

A search strategy (Table 1) was developed using the Population, Exposure, Context, and Outcome (PECO) model (Morgan et al., 2018).

Table 1: Search Strategy

Population (P)	Exposure (E)	Context/Comparator (C)	Outcome (O)
Adolescent boys and girls (10-18 years)	Food safety	LMICs	Consumer behaviour
Adult men and women (19-65 years)	Food hygiene	Nigeria	
	Food contamination		
	Food adulteration		

To improve the search approach, preliminary searches were conducted to refine search terms and identify relevant keywords (see Table 2), verifying that pertinent studies were found using the search syntax. The search combined Boolean operators ("AND", "OR") and truncation symbols to broaden coverage and ensure inclusion of all relevant literature. Search terms related to "consumer behaviour", "food safety", "food hygiene", and "Nigeria" were employed.

Table 2: Search Syntax

	OR		OR		AND		AND		AND	
adult*		adolesecent*		consumer*		food safety		Nigeria		diet*
						foodborne				food acquisition
						food handling				food purchas*
						food preparation				food habit*
						food hygiene				eating*
						food poisoning				food intake*
						food contamination				food consumption*
						safe food				food choice
						food packaging				food preference
						food storage				eating behaviour
						food scare				
						food sanitation				
						food quality				
						food adulteration				
						food inspection				

The final search strategy contained indexing words and text words unique to the various databases (see Table 3). The search syntax was initially created for PubMed and subsequently modified to meet the extra requirements of the other databases. The reference lists of pertinent publications were also searched as a supplement to the first search. The last step was to utilise Google Scholar to find later publications that cited the papers found through searches that were judged to be of the highest quality. These papers were then reviewed for inclusion.

Table 3: Data Sources

Primary Database	Secondary Database	Websites
PubMed	Google Scholar	National Agency for Food and Drug Administration and Control (NAFDAC)
PsychInfo		Food and Agricultural Organisation
CINAHL		International Livestock Research Institute
		International Food Policy Research Institute
		World Health Organization
		World Bank

The search was conducted to capture contemporary and the most updated studies. Reference lists of key articles were manually screened to identify additional eligible peer-reviewed journal publications.

Inclusion and Exclusion Criteria

The inclusion and exclusion criteria are displayed in Table 4.

Table 4: Inclusion & Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Qualitative, quantitative, or mixed-methods study designs	Non-English publications
Studies that demonstrated a direct connection between consumer behaviour, exposure, and food safety	Non-human populations
Studies that focused on Nigeria or included Nigeria	Clinical populations
Studies that provided details on consumer attitudes or behaviour linked to food safety (contain any information, attitudes, or behaviours; deeds or practises; elements influencing dietary decisions, spending patterns, or price; or readiness to pay).	Studies that looked at the relationship between customers and food safety without clearly establishing a connection to dietary habits
Published, peer-reviewed research	Grey literature
	Studies on export markets
	Studies that were solely concerned with domestic food hygiene practises

Date of publishing was not a limitation for the search syntax.

Screening Process

The screening process was conducted in three phases: title, abstract, and full-text review. All retrieved articles were first screened by title to assess their relevance. Those that met the initial criteria proceeded to abstract screening, where eligibility was further evaluated against the inclusion criteria. Full-text versions of articles that passed the abstract stage were then examined in detail. Exclusion criteria were carefully applied and documented at each stage. References of included studies were subsequently reviewed to identify any additional relevant papers. To ensure thoroughness, previously excluded titles, abstracts, and full texts were revisited to confirm that no potentially relevant studies were overlooked.

Data Extraction

Data extraction was guided by a structured template designed to ensure consistency across studies. Extracted information included: author(s), publication year, study location, research objectives, sample characteristics, study design, type of consumer behaviour examined, and main findings. Extracted data were recorded in a spreadsheet for comparison and synthesis. Any discrepancies in extraction were resolved through discussion and verification with a second reviewer.

Quality Assessment

The methodological quality of included studies was assessed using a modified version of the Kmet Quality Appraisal Tool (Kmet et al., 2004). This tool allows appraisal of both qualitative and quantitative studies through clearly defined criteria such as research clarity, data collection methods, analytical rigour, and validity of conclusions. No studies were excluded based solely on quality; however, quality scores were used to inform the interpretation of findings during the synthesis.

Data Analysis

A narrative synthesis was performed to integrate and interpret findings across diverse study designs (Popay et al., 2006). Thematic analysis identified recurring patterns related to consumer risk perception, knowledge, attitudes, and behavioural practices regarding food safety. Quantitative synthesis (meta-analysis) was not feasible due to heterogeneity in study designs, measures, and outcomes. The analysis instead focused on identifying overarching themes and contextual factors influencing consumer perceptions in Nigeria.

RESULTS

Identified Studies

A total of 24 studies met the inclusion criteria for this review (see Figure 1). The PRISMA diagram illustrates the systematic selection process from initial identification to final inclusion. Out of 301 full-text articles screened, 276 were excluded because they did not meet the eligibility criteria 132 were not directly related to food safety, 110 lacked behavioural outcomes, 21 had no Nigerian focus, 9 were non-human studies, and 4 were not published in English.

Most included studies were published between 2005 and 2020, with a significant increase after 2015, representing nearly half (44%) of the total. Four-fifths (80%) were published after 2010, reflecting growing scholarly and policy interest in consumer food safety behaviours in Nigeria (Adebowale and Kassim, 2017; Adebisi et al., 2020).

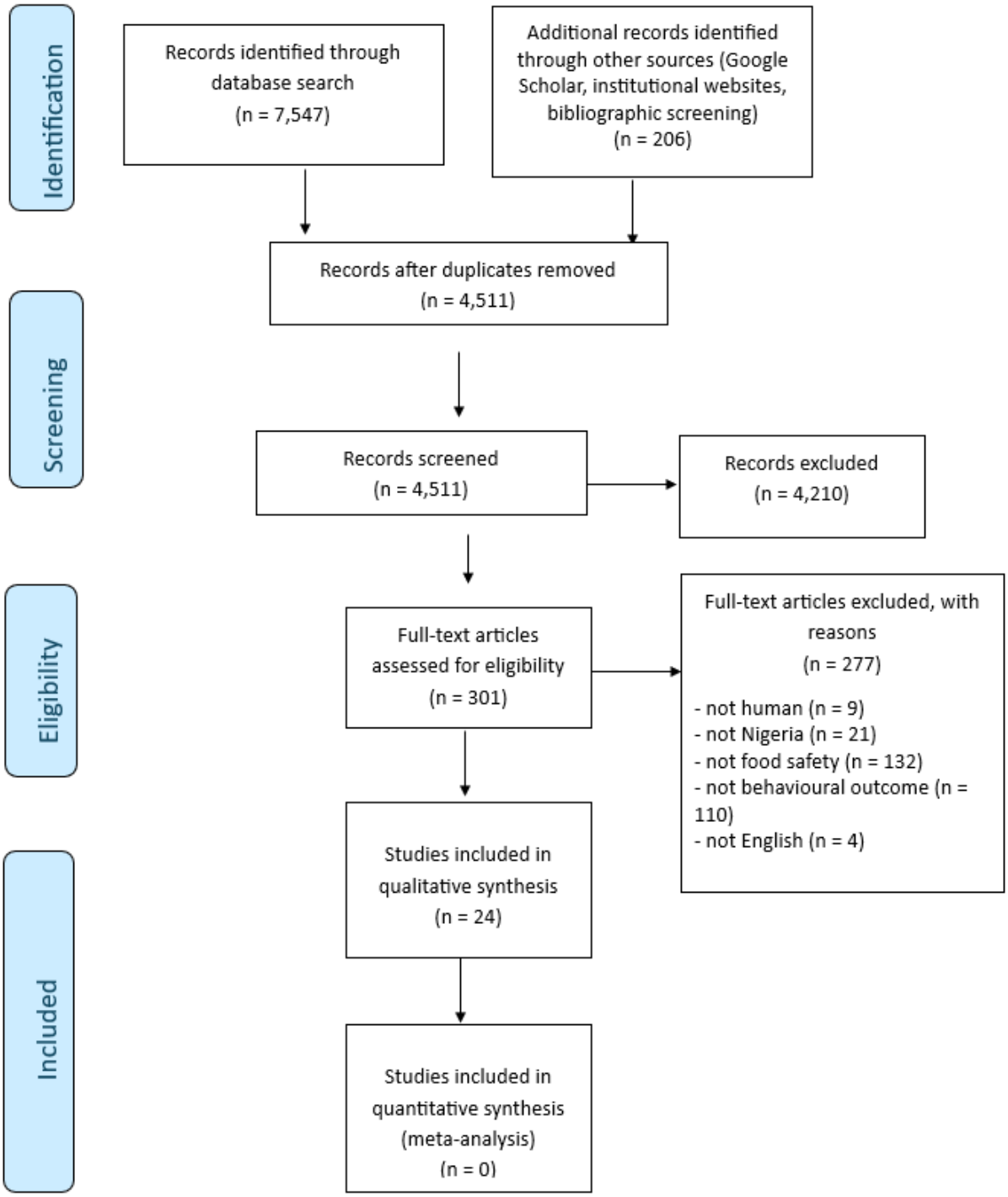

Fig. 1. PRISMA Flow Diagram

Study Characteristics

All but one research was centred on the states of Nigeria. The other research (Odeyemi et al., 2019) included Nigeria in a cross-national comparison. Eighteen studies (75%) focused solely on one Nigerian state, three (0.1%) on two, one on five, and the other two (0.1%) on unspecified number of states. The distribution of studies in Nigeria was uneven, with only 36% of states (13/36) having studies. Only one study was found in each of six states (Ondo, Ekiti, Niger, Kaduna, Edo, Kogi). Six states (Lagos, Ogun, Kwara, Osun, Oyo, Imo) had two or more studies. Most research was concentrated in the south of the country, particularly the southwest. The country's northern region had the least number of studies. Approximately one-third (33.3%) of the studies examined urban regions, while 25% looked at rural areas, 16.7% looked at both urban and rural areas, and the remaining 25% did not indicate whether they were looking at rural or urban areas.

Almost all the studies (23/24) had a strong consumer

emphasis. Only one study (Uchendu, 2018) examined both consumers and vendors. Twelve studies (22%) examined specific foods and drinks (sweet potato, suya, dog meat, chicken eggs, sugar, vegetable oil, chicken, organic vegetables, peanut cake, bread, garri, bush meat, pepper soup, Ngwongwo, sachet water, local gin). The others, who focused on food safety as a general concept that applied to all food types, avoided focusing on any particular food.

Data Extraction

Extracted information included study characteristics, aims, methods, outcomes, and key findings related to consumer knowledge, perceptions, and behaviours toward food safety in Nigeria (see Appendix 1). Most studies were cross-sectional, focusing primarily on urban consumers in southern states, and relied on structured questionnaires. The evidence consistently showed that while awareness of food safety risks was relatively high, this did not always translate into safer purchasing or consumption behaviours. Socioeconomic factors such as income, education, and location strongly influenced consumers' willingness to pay for safer foods and their access to hygienic outlets. Several studies also highlighted misconceptions about food contamination and a general lack of trust in informal food markets.

Quality Assessment

This review employed a structured quality appraisal framework (Kmet Quality Appraisal Tool) to assess methodological rigour across the included studies. The tool was selected for its comprehensive coverage of key criteria such as research design, subject selection, outcome measures, and data analysis. However, many studies lacked sufficient reporting detail, particularly in areas such as randomisation and blinding, which were marked as not applicable due to the predominance of non-experimental designs.

Despite these limitations, the included studies demonstrated satisfactory methodological quality overall. Most clearly articulated their research objectives, employed appropriate designs, and adequately reported analytical methods (Akinbode et al., 2012; Ajayi and Salaudeen, 2014). Reflexivity was evident in several studies, though randomisation and blinding were understandably absent given the behavioural focus of the research. Common limitations included small sample sizes and incomplete reporting of variance estimates. Nevertheless, conclusions were generally supported by the data (Ologbon et al., 2019), offering a reasonable degree of confidence in the findings.

While formal categorisation into high, medium, or low quality was not feasible due to incomplete reporting, the appraisal process highlighted important trends in methodological transparency. Future reviews may benefit from using alternative tools—such as the Mixed Methods Appraisal Tool (MMAT) or CASP checklists—that offer greater flexibility for assessing qualitative and observational research. Detailed quality ratings are summarised in Appendix 2.

Data Analysis

To ensure clarity and coherence in presenting the findings, the data analysis is organised around key themes that emerged from the reviewed studies. These themes reflect patterns in consumer attitudes, perceptions, and behaviours toward food safety in Nigeria. Each theme captures a distinct aspect of how consumers make choices about what they eat, where they purchase food, and how they assess safety risks in different contexts. The themes also explore behavioural adaptations to food contamination concerns and the growing preference for packaged foods as a perceived safeguard against adulteration and poor hygiene.

What consumers buy

Which foods were considered to be safe depended on the freshness of the food and the expiration dates on packaged items (Adebowale & Kassim, 2017; Ologbon et al., 2019). Consumer purchasing decisions were frequently impacted by variables such consumer understanding of food safety, past experiences with foodborne illness, and fears about the safety of certain foods. Customers who have already had a foodborne illness lacked confidence while choosing healthy produce. Compared to less frequent buyers, those who often bought vegetables said they paid greater attention to the safety of the produce. Having access to safer foods was hampered by little awareness on food safety.

Where consumers buy

Shopping patterns reflected a balance between trust, convenience, and affordability. Many consumers shifted to smaller or less-known suppliers to minimise exposure to pesticide-contaminated foods (Osagbemi et al., 2010; Dontsop et al., 2011; Anyam et al., 2013; Emmanuel, 2016; Temitayo, 2017; Uchendu, 2018). Traditional food sources, such marketplaces or street sellers, were less secure but easier for customers to reach. Customers recounted changing where they bought goods to less well-known producers, which includes putting in the effort to travel to more remote areas to get safer food, as their trust in local production increased.

Before buying food at a particular food outlet, customers evaluated the cleanliness and orderliness of the outlet as well as the procedures used by the food handlers, the food displays, packaging, and climatic controls, including in-store refrigeration (Uchendu, 2018). The supermarket was frequently mentioned as a source of secure food. However, consumers also thought that the supermarket's safe food selection was more costly and less fresh. Urban customers who spent more

of their money on food and could afford to purchase at supermarkets had greater concerns about food safety (Adesope et al., 2010; Akinbode et al., 2012; Ajayi & Salaudeen, 2014; Adebowale & Kassim, 2017). Rural customers were reliant on traditional food vendors since they could not afford to purchase at supermarkets (Dontsop et al., 2011; Falola, 2014; Ayinmode et al., 2019; Uchendu, 2018; Awoyemi et al., 2019; Ologbon et al., 2019; Adebisi et al., 2020).

The decision to buy safe foods was impacted by social connections, including guidance from family and friends. Developing a relationship with and trusting a food vendor was a way to lower risk and increase safety, especially in unofficial food establishments. Buying animal products from reputable butchers was another tactic used to guarantee food safety (Uchendu, 2018).

Eating out of home

Consumers dined out less often because of concerns about food safety, especially contamination with pesticides and chemicals (Osagbemi et al., 2010; Dontsop et al., 2011; Anyam et al., 2013; Emmanuel, 2016; Temitayo, 2017; Uchendu, 2018). A decrease in dining out was also associated with greater knowledge of the dangers associated with unsafe food practices (Osagbemi et al., 2010; Uchendu, 2018).

Participants indicated other environmental aspects that affected their choice of eating outlets that had to do with food safety. Where food was cooked, prepared, and sold raised safety issues as well. This demonstrated the relevance of the vendor's surroundings as well as the cleanliness of the immediate food setting. When customers ate out of the house, they frequently reported purchasing food after inspecting the vendor's and the nearby environment's sanitation. Customers evaluated a food outlet's sanitation using their knowledge of food safety and past exposure to foodborne illness. Customers who were worried about the cleanliness of food vendors or outlets were likewise more inclined to dine at restaurants than in bukas (Akinbode et al., 2012; Ajayi & Salaudeen, 2014; Ugoani & Ewuzie, 2016; Uchendu, 2018). Customers pay attention to the immediate hygiene of the restaurant's environment and notice that the cleanliness, fresh air, displays, and food served encourages them to go there more frequently.

When compared to home-cooked meals, street food was typically distrusted and seen as being of inferior quality. The safety of food supplied by street vendors is not widely believed by customers. Urban customers would be prepared to pay extra for foods that are secure and clean (Adesope et al., 2010; Akinbode et al., 2012; Ajayi & Salaudeen, 2014; Adebowale & Kassim, 2017). Some customers choose restaurants based on their reputation or level of trust rather than on observing how well the food was handled (Uchendu, 2018). Other shoppers continue to take chances and make shady street vendor purchases. Consumers were influenced to keep choosing to dine out by affordability, preferences, and flavour. As food vendors and their products were seen to be unclean, some customers urge close relatives to eat meals, particularly breakfast, at home to lower the risk of exposure to foodborne diseases.

Food contamination

Because of their concern over the usage of chemical fertilisers and pesticides during manufacturing, consumers are reluctant to eat fresh vegetables and fruits (Adesope et al., 2010; Akinbode et al., 2012; Falola, 2014; Emmanuel, 2016; Temitayo, 2017; Ben-Chendu, 2018; Ologbon et al., 2019; Awoyemi et al., 2019). Therefore, due to worries about food safety, less people consume vegetables.

Food safety concerns have had an impact on the consumption of meals derived from animals in addition to fruits and vegetables. Due to worries about food safety, consumers purchased fewer meat, poultry, and dairy goods (Osagbemi et al., 2010; Dontsop et al., 2011; Anyam et al., 2013; Emmanuel, 2016; Temitayo, 2017; Uchendu, 2018). By consuming less fish and poultry, consumers also lessened the perceived danger of chemicals, including contamination with pesticides and hormones. Consumers were more inclined to consume less animal-sourced proteins if they had previously experienced a food-borne illness.

Packaged foods

Consumers choose packaged goods because of concerns about food adulteration, food outlet sanitation, vendor hygiene, food presentation, perceived food quality and freshness, and family safety (Danilola et al., 2017; Odeyemi et al., 2019; Ologbon et al., 2019; Balogun et al., 2020). Consumers increasingly preferred packaged foods as a result of the usage of product labels to determine if food was healthy.

DISCUSSION

The objective of this research was to compile information on how consumer behaviours and lifestyles in Nigeria may be impacted by food safety. Previous studies on Nigerian consumers' attitudes and practises related to food safety were investigated. The included papers demonstrate Nigeria's increased interest in food safety research in recent times. The review indicates that consumer choices about where to buy, consume, or procure food are influenced by concerns about food safety, including those about contamination with pesticides and chemicals.

Concerns about food safety cause consumers to alter their food purchasing habits. Even though eating out is a prevalent behaviour in Nigeria, the research suggests that customers may avoid or limit eating out due to worries about food safety (Adesope et al., 2010;

Akinbode et al., 2012; Falola, 2014; Emmanuel, 2016; Temitayo, 2017; Ben-Chendu, 2018; Grace et al., 2018; Ologbon et al., 2019; Awoyemi et al., 2019). Contrarily, food that was farmed and prepared at home was seen to be healthy and safe. Some customers continue to dine outside the home despite their awareness and worry, either because they have no other options or because they love street cuisine. Additionally, the accessibility, affordability, and convenience of street food may exceed or even take precedence over customers' worries about food safety.

Home food safety procedures are frequently employed to make sure that food is safe to consume, such as hygienic and clean vegetable preparation and appropriate storage techniques. However, the amount of time needed to correctly prepare food is frequently highlighted as a hurdle (Ezekiel et al., 2013; Uchendu, 2018; Odeyemi et al., 2019). Additionally, if people buy and eat fewer perishable items, such as fruit and vegetables, because of worries about food safety, diet quality may decline. There were several allusions to the predilection for foods with a lot of processed ingredients, even if packaged meals are not always nutritionally inferior.

The hazards associated with food safety are assessed and managed by consumers, who are generally unaware of the issues. Consumers expressed their dissatisfaction with the use of pesticides in food production and their lack of faith in the food system (Osagbemi et al., 2010; Dontsop et al., 2011; Anyam et al., 2013; Emmanuel, 2016; Temitayo, 2017; Uchendu, 2018). This may be a result of consumers' lack of faith in national rules or inefficient risk communication techniques that fail to raise awareness of food safety issues and reduce consumer risk. Customers frequently mentioned buying from reliable merchants to allay their worries. As customers accumulate safe food over time, trustworthy vendors provide a safety net and a more concrete means to lower risk than relying on national laws in the food chain.

Customers believe that food sold in formal settings—such as supermarkets—is safer than food sold in casual contexts because formal food outlets frequently maintain private food safety inspections and requirements. Despite this assumption, there is little information on the level of food safety at various establishments (Liguori et al., 2022). Some clients purchase veggies and products made from animals online and have them transported to their urban residences. Due to the COVID-19 pandemic, this attitude among consumers appears to be growing, creating new difficulties for reassuring customers and guaranteeing food hygiene distribution networks (Inegbedion, 2020; Ejeromedoghene et al., 2020; Ilesanmi et al., 2021). However, customers in rural areas confront other difficulties since online fruit and vegetable purchases from supermarkets are pricey and inconvenient alternatives (Ayinmode et al., 2015; Awoyemi et al., 2019; Adebisi et al., 2020). Given that there may not be many options, impoverished consumers may choose to purchase what is offered despite worries about food safety. It is crucial to consider the preferences and needs of rural consumers to prevent adverse impacts on purchasing, consumption, and livelihoods.

Urban environments in Nigeria are undergoing a nutrition transition, raising serious concerns about food safety, environmental cleanliness, contamination, and adulteration—all of which may further depress the already low intake of fruits and vegetables in certain areas. Even though many Nigerians cannot afford healthy diets (Maziya-Dixon et al., 2021; Onwujekwe et al., 2021), the avoidance of fresh produce due to safety fears risks exacerbating the already high consumption of highly processed foods and sugary drinks, undermining both current dietary needs and long-term sustainable development goals. This situation is further compounded by the lack of efficient storage systems for fresh fruits and vegetables, such as refrigeration units that rely on a stable electricity supply—an infrastructure challenge that remains unresolved in many parts of Nigeria. Recent assessments estimate that Nigeria needs an additional 50,000 tonnes of cold storage capacity to address post-harvest losses, particularly for perishable produce like fruits and vegetables (Akinyele & Rayudu, 2020; International Institute of Refrigeration, 2025).

In this evaluation, roughly half of the research examined consumer behaviours towards prepared, ready-to-eat food. Although there should be more attention paid to unprepared meals and ingredients, some attention to ready-to-eat foods is justified given the high incidence of infections (Galadima, 2021; Odo et al., 2021). Fresh fruits and vegetables are particularly understudied while being very nutritious, underproduced, and underconsumed across most of Africa. In Nigeria, these foods are also known to enhance the danger of foodborne illness (Adesope et al., 2010; Akinbode et al., 2012; Falola, 2014; Emmanuel, 2016; Temitayo, 2017; Ben-Chendu, 2018; Grace et al., 2018; Ologbon et al., 2019; Awoyemi et al., 2019).

Open-air markets were shown to be understudied despite their significance to Nigeria's food chain. These marketplaces are where most of the food consumed by those with lower incomes is purchased, and they have recently come under fire due to concerns about illness (Osazuwa-Peters, 2021; Adesokan et al., 2021; Apata et al., 2021). Studies also frequently concentrated on just one region of Nigeria, primarily the southwest and metropolitan regions. Thus, there is a need for further regional comparison study along with more studies that concentrate on rural and northern regions.

The quantity of research that has already been done indicates that Nigerian foods have low microbiological quality, with most of the studies concentrate on meals with an animal source. These are the source of the parasitic and bacterial pathogens that cause foodborne illnesses, as evidenced by the high amount of contamination found in the studies that were included (Ben-Chendu, 2018; Ologbon et al., 2019; Awoyemi et al., 2019). Fresh fruits and vegetables, the other highly nutritive and risky food category, have likewise gotten less emphasis in Nigeria. Future studies should concentrate on regional, traditional marketplaces when looking at consumers' views of food safety in relation to fresh produce. In Nigeria, traditional markets provide most poultry, dairy, and fresh fruit offered to people in rural areas. Despite the crucial role that these marketplaces played in ensuring that consumers had access to secure nutrition, it was discovered that they were severely underrepresented in the research that were examined. It is also advised to concentrate on ready-to-eat meals since they are becoming more and more popular in Nigeria and because information from this research indicates that they are just as polluted as raw foods (Adesope et al., 2010; Akinbode et al., 2012; Falola, 2014; Emmanuel, 2016; Temitayo, 2017; Ben-Chendu, 2018; Grace et al., 2018; Ologbon et al., 2019; Awoyemi et al., 2019).

This study notes that while vendor food handling and cleanliness procedures have been the focus of most food safety research in Nigeria, little has been done to explore the vendors' beliefs, attitudes, and motives or the obstacles that could affect their behaviours. This is consistent with international research, as are the subpar procedures shown in most investigations (GAIN, 2020; Parikh et al., 2022). Although it was found that knowledge of food safety and behavioural attitudes were acceptable, a gap still exists in the implementation of learned behaviours, maybe due to the propensity to overreport more favourable characteristics while underreporting socially unacceptable behavioral patterns (a term aptly called 'social desirability') (Parikh et al., 2022). More practice-based observational studies might yield more precise data on food safety procedures (Nordhagen, 2022). Additionally, a more thorough analysis incorporating the triad of information, attitudes, and behaviours, as well as motives and incentives that might affect better food safety-related activities, would be beneficial (Parikh et al., 2022). Curiously, the papers that were evaluated likewise point to a consistency in consumers' perceptions of the reasons behind their food choices, the use of physical characteristics to judge the quality and safety of foods derived from animals, and the adoption of practises that eliminated or decreased their level of risk or concern regarding food safety. Since these studies are crucial to support food safety programmes in Nigeria, obvious need for more action exists, maybe with alternative techniques to impact a persistent change in behavioural attitudes.

The studies covered here contain a few methodological flaws and gaps that make it challenging to evaluate views and practises of food safety in-depth. Most of the studies under consideration used a cross-sectional survey methodology and used a range of questionnaires, none of which appeared to have been pre-tested, validated, or reliability-tested before use. This absence of uniform techniques for evaluating food safety can make it difficult to make meaningful comparisons and perhaps combine the available data to generate regional or national perspectives on food safety (Nordhagen, 2022; Parikh, 2022). The bulk of these research used structured survey techniques, which have the disadvantage that they are limited in their capacity to give in-depth insights into the beliefs, obstacles, motivations, and incentives that may affect the application of information in practise.

Additionally, the reported studies lacked a theoretical foundation and reported just the knowledge, attitudes, and behaviours of the samples under investigation. Food safety perspectives and behaviours may be better understood by using theoretical frameworks on health behaviour or behavioural change, for example the Protection Motivation Theory (PMT) or Theory of Planned Behaviour (TPB). Although there are examples of studies that do employ theoretical basis, such as some applying the TPB (Ruby et al., 2021; Imani et al., 2021; Mughal et al., 2021), significant gaps have been observed in other assessments of food safety research (Bass et al., 2021; Parikh et al., 2022). Future study should consider theory-based approaches to better understand the function of the consumer within the context of the food system, as well as to identify beliefs and practises connected to food safety. Furthermore, compared to research targeting knowledge and attitudes, intervention studies targeting practises or behavioural intents are likely to give a more accurate indicator of efficacy (Mullan et al., 2015; Ruby et al., 2019).

To promote food safety in Nigeria, facilities and material support are necessary. The papers reviewed here consistently noted a lack of appropriate training, a lack of sanitation and water facilities, a lack of equipment, a lack of incentives, and a lack of effective monitoring and compliance regulations (Adesope et al., 2010; Akinbode et al., 2012; Falola, 2014; Emmanuel, 2016; Temitayo, 2017; Ben-Chendu, 2018; Grace et al., 2018; Ologbon et al., 2019; Awoyemi et al., 2019). These basic challenges demand significant structural and policy changes.

Proof emanating from this research highlights how important food safety and cleanliness are in Nigeria at all phases of the food supply network. In an ideal situation, this would involve investigating the interaction between

customers and vendors with respect to behaviours surrounding food safety (Opia, 2020; Mughal et al., 2021; Imani et al., 2021).

The interaction of gender and food safety received less attention in the studies analysed. It will be crucial to do a more thorough gender analysis when designing interventions to improve food safety because women serve as the gatekeepers for food preparation, processing, consumption, and retail (Parikh et al., 2022; Nordhagen, 2022).

It will be crucial to incorporate additional cultural concerns while conducting more study in this area (Anyam et al., 2013; Ugoani & Ewuzie, 2016; Balogun et al., 2020). Cultural practises that can be improved upon have developed to control threats to food safety. Such study will probably not be able to depend on surveys and closed-ended questions, but instead will need to use methods from the behavioural sciences, which may be more suited to examining deeply the motivations underlying behaviours and perceptions.

In light of the overall findings, consumers are shown to have worse food safety habits than their self-reported food safety knowledge and attitudes would imply. This shows that if food safety interventions are to have an impact on behaviours, they must go beyond raising knowledge to include raising motivation, for instance by offering incentives (Opia, 2020; Mughal et al., 2021; Imani et al., 2021). This contrasts with the recommendations given by most of the research that were examined, which tended to emphasise teaching and raising awareness, even when the study had not shown that a lack of knowledge caused bad practises or exposure to risks. Therefore, alternative approaches are required to alter food safety behaviour. It is necessary to have a better grasp of underlying attitudes and beliefs to build treatments that address motives.

Available infrastructure must be improved if food safety in Nigeria's marketplaces is to be restored (Ejeromedoghene et al., 2020; Ilesanmi et al., 2021). According to research presented here that involved assessments of the environments where vendors operate, it was typically determined to be insufficient from the standpoint of food hygiene, particularly in relation to access to water, soaps, and basic sanitation.

It is also usual to utilise labelling strategies to improve food safety; however, the findings of the studies reviewed here raise concerns about the applicability of such strategies in Nigeria. In addition to being utilised inconsistently, labels were also linked to problems with trust in other studies (Osagbemi et al., 2010; Dontsop et al., 2011; Anyam et al., 2013; Emmanuel, 2016; Temitayo, 2017; Uchendu, 2018). Furthermore, even while research on willingness to pay typically reported positive willingness-to-pay attitudes, this was frequently of a minor scale and related to higher earnings and levels of education. Therefore, there is insufficient data to draw the conclusion that labelling would be successful, necessitating more, high-quality study.

Summarily, the research under consideration discovered a steady relationship between educational attainment, household income, and expertise in or use of food safety. Therefore, it's critical to customise treatments for consumers with lesser incomes and less education.

STRENGTHS AND LIMITATIONS

This review followed a rigorous PRISMA-guided process to ensure systematic inclusion and transparent reporting. Through the development of a new analytical framework grounded in the socio-ecological model, food safety concerns were examined across multiple levels of influence. This approach enabled a deeper exploration of consumer behaviours and lifestyles, areas that are often overlooked in existing research. By closely analysing the links between exposure and outcomes, the review provided a clearer understanding of how food safety concerns shape purchasing and consumption patterns.

Some earlier studies were excluded because only articles accessible online were considered. In addition, the review was limited to studies published in English, meaning that relevant research in other languages may not have been captured. Although grey literature was included in the search parameters and relevant websites and databases were consulted, the search was not exhaustive, and a few studies were likely missed.

Despite these limitations, the synthesis offers a comprehensive evidence base for understanding consumer perceptions of food safety in Nigeria and highlights key research and policy priorities for advancing safer and more equitable food systems.

DIRECTIONS FOR FUTURE RESEARCH

Future research should adopt mixed methods designs with larger, more representative samples to capture both perceptions and actual practices. Triangulating self-reported behaviours with microbiological or biochemical assessments will clarify discrepancies between perceived and real risks (Parikh et al., 2022; Nordhagen, 2022). Studies should also explore links between food safety, nutrition, and chronic disease prevention, aligning with broader sustainable development goals.

Based on the requirement for participatory engagement, further research into retail establishments and their categorizations would be beneficial. Direct measurements of how customer satisfaction, risk perception, and purchasing behaviour are affected by food safety are also required.

Since most studies did not completely evaluate customer behaviour and even less research gathered information on real diets, it was challenging to make a

direct connection between influencing variables and outcomes. Data on specific behaviours and practises are required to identify potential for future, tailored, and individualised food safety initiatives (Mullan et al., 2015; Ruby et al., 2019).

The employment of a systematic approach to food safety by researchers and decision-makers is recommended to completely address food safety issues (Parikh et al., 2022). Policies and practises that emphasise nutrition, chronic illness, and overweight/obesity must incorporate food safety (Ruby et al., 2019; Nordhagen, 2022). Neglecting this consumer behaviour focus on food safety research should be especially important for expanding policies and programmes on overweight/obesity in Nigeria and the entire continent of Africa.

Moreover, theoretical models of behaviour change should guide the design of interventions. Engaging consumers, vendors, and regulators through participatory methods can generate practical insights and context-specific strategies.

RECOMMENDATIONS

Stronger evidence on the nature, scope, and potential solutions to food safety problems are essential for reasonable investment in enhancing food safety. Even though regional data and a systematic review have been utilised to offer information on these, the estimations are best approximations and need to be verified on the field. Some information could come from primary research, but there needs to be evidence relevant to the locality (Parikh et al., 2022; Nordhagen, 2022).

More work should be done to appreciate the costs associated with foodborne illness, its prevalence, the advantages and disadvantages of unofficial commerce, and food fraud at the regional level (Agbaje & Oloruntoba, 2018; Opia, 2020; Onyeaka et al., 2022). The most prevalent infections in each region of the nation are mostly manageable using a risk-based approach. Risk-based solutions that are specific to regions should be implemented when their significance has been confirmed, along with detection of high-risk food chains and value systems.

Donors and other stakeholders need to be more knowledgeable and aware of foodborne illness. The distinction between sources of exposure, hazards and risks, the advantages of prioritising food safety issues, the benefits of directing resources where they can be most helpful, the probability of unforeseen circumstances, and the advantages of tying agriculture and healthcare policy together should all be better understood. By fostering communication and building capacity, this understanding can be developed (Black et al., 2016; Spink, 2019; Parikh et al., 2022).

Numerous endeavours to enhance the agricultural and value chain management techniques in Nigeria have had some success (Emmanuel, 2016; Temitayo, 2017; Uchendu, 2018; Opia, 2020). Many of these have goals that include food safety. Nonetheless, this systematic review asserts that food safety will not automatically occur unless it is properly handled by knowledgeable professionals. There is plenty of room to expressly include food safety into current development plans.

Interventions that target conventional and small-scale industries only touch the surface and rely heavily on incentives in the lack of a substantial evidence base. Policy may instead be influenced by perceptions of consumers, special interests, and pressures on the government (Parikh et al., 2022; Nordhagen, 2022).

There is a need to expand education programmes about food safety that are aimed at either the general public or food merchants in particular. The enforcement of present regulations, as well as need for better regulations, were frequently mentioned as key areas for improvement (Osagbemi et al., 2010; Dontsop et al., 2011; Anyam et al., 2013; Emmanuel, 2016; Temitayo, 2017; Uchendu, 2018). Food quality may be raised through accreditation, labelling, and certification programmes. The majority of Nigeria's food system is dependent on the informal sector, which may have a substantial influence on both human and economic value, making it vital to improve and upgrade the standards of food hygiene (Parikh et al., 2022; Nordhagen, 2022).

CONCLUSION

This systematic review synthesised 24 studies examining Nigerian consumers' attitudes and behaviours toward food safety. The analysis revealed that most studies were conducted in the southwest and urban regions of the country, with a predominant focus on prepared and ready-to-eat meals. The majority relied on structured self-reported surveys as their primary method of data collection, often with limitations such as unclear sampling methods and poorly designed questionnaires. While awareness of foodborne risks is increasing, significant behavioural gaps persist, driven by poor infrastructure, weak regulatory enforcement, and entrenched cultural practices.

Beyond consolidating existing evidence, this review identifies important priorities for future research. Greater attention should be directed toward fresh produce and traditional marketplaces, as well as toward understanding the underlying motives, beliefs, and values shaping consumer perceptions of food safety within diverse cultural contexts. Future studies would benefit from adopting theory-informed, mixed-methods or observational designs that move beyond self-reported data to capture real-world practices more accurately.

Given that Nigeria's population and rate of urbanisation continue to grow, the prevalence of foodborne illnesses is likely to rise unless proactive measures are taken. Strengthening food safety must therefore become a central component of the nation's development and public health agenda, ensuring equitable access to safe and nutritious food for all citizens.

AUTHOR CONTRIBUTION

The lead author, Biokoro Ejimerhomu Jennifer, and the supervising author, Kennedy Oberhiri Obohwemu, jointly contributed to the conceptualisation, study design, coordination, and primary drafting of the manuscript. All authors contributed to the literature review, critical appraisal, interpretation of findings, and provided feedback on successive drafts. All authors approved the final version of the manuscript.

CONFLICT OF INTEREST

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Appendix 1: Data Extraction

Author, Year	State, Region	Research Focus	Recruitment	Outcomes	Findings	Comments
Adebisi, 2020	Kwara	To determine the knowledge, acceptability, and readiness to pay of consumers in Kwara State, Nigeria for orange flesh sweet potatoes (OFSP).	The study's respondents were chosen using a three-stage sampling technique. Three (3) local council areas (Edu, Ifelodun, and Patigi) in Kwara State, which are mostly used for the cultivation of orange flesh sweet potatoes, were chosen for this purpose in the first stage. The second stage included choosing four local governments' communities at random. In the third round, we chose 20 households at random from each neighbourhood. 240 agricultural households make up the sample. In front of other family members, in-person interviews with the household leader were conducted. A standardised questionnaire was utilised to gather data on socioeconomic indicators, consumer awareness of the health advantages of orange-fleshed sweet potatoes, consumer perception and readiness to pay for the product, as well as any deterrents.	Consumer behaviour, Willingness to pay	Of the respondents, 65% acknowledged the health advantages of OFSP, and in the research region, 89.3% of customers were most willing to spend more than the bid price for OFSP. Additionally, the household head's age, household size, education, bid amount, and knowledge of the health advantages of OFSP have a big impact on how eager customers are to pay for OFSP. The rarity of OFSPs, the difficulty of cooking, their perishability, and their price are all barriers to their consumption.	The public should be made more aware of the advantages of OFSP above its indigenous equivalent through research institutions, extension organisations, health professionals, NGOs, and the media. This will increase consumption and lessen vitamin a micronutrient deficit. Additionally, OFSP should always be made accessible at affordable costs because high bid amounts may turn off prospective customers.
Adebowale & Kassim, 2017	Ogun	1. To assess household consumer awareness of food safety and associated behaviours in rural and urban	120 volunteers who volunteered to participate in the study were given the study's idea and goals before the survey instrument was given to them (Figure 1). Because it was a	Consumer knowledge of food safety	Data indicated that both rural and urban customers were poorly informed about food safety procedures and unaware of foodborne diseases. There was a considerable difference in household consumer knowledge of foodborne infections and their related difficulties between rural and urban areas. The marital status of the respondents and their	Food-related diseases and a lack of consumer understanding about food safety have been noted, highlighting the pressing need to enhance food safety education, including household cleanliness standards in Nigeria.

		areas of Ogun State, Nigeria. 2. To look at the respondents' knowledge of food safety and the links between their demographics and their awareness of foodborne diseases.	pilot research and there were funding constraints, only 120 participants could be included in the study. This study addressed household customers, in particular those between the ages of 16 and above who often handle or prepare food. Finally, 61 rural and 59 urban household participants were signed up, albeit it's possible that these numbers don't accurately reflect Ogun State's home consumer population. The completion of a questionnaire was helped by non-educated rural customers who interpreted the questions to make them easier for others to comprehend. The distribution of the questionnaires took place during the workweek.		understanding of food safety and procedures were related.	
Adesope, 2010	Oyo and Lagos	To find out if households in South-Western Nigeria are prepared to pay for safety labels on sugar and vegetable oil.	Lagos and Oyo, the two most densely populated and metropolitan states in the South-West, were purposefully chosen (SW). Based on a likelihood related to the size of the states, five Local Government Areas (LGAs) were randomly selected. Respondents were chosen at random from three strata in each LGA: low-, medium-, and high-income regions. In all, 390 customers were sampled, including 190 Oyo residents and 210 Lagos residents. Using a standardised questionnaire, data on socioeconomic, market, and food	Willingness to pay (WTP), Consumer behaviour	Less people (33.3%) who use sugar and (43.8%) and consume vegetable oil had sufficient knowledge regarding concerns about food safety. Consumer knowledge of vitamins A in vegetable oil is higher (66.3%) than that of sugar (21.1%). The mean WTP for consumers seeking information on food safety was N36.41k/kg for sugar and N15.98/liter for vegetable oil. For both sugar and vegetable oil, this amounted to an equity risk premium of 91.3% and 53.3% of the highest bid for food safety.	Compared to vegetable oil, consumers are more prepared to pay for information on the food safety of sugar. However, purchasing from a registered store and having a high income enhanced customers' desire to pay for a safety label.

			safety characteristics were collected.			
Ajayi & Salaudeen, 2014	Osun and Lagos	To establish the level of consumer knowledge of food safety in Nigeria and to identify certain unsafe eating patterns.	The poll was carried out between February and March 2013 to assess the public's dangerous eating habits, understanding of food safety, and awareness of food hazard. A series of self-complete questionnaires was created and distributed to students, university personnel, other people living around the university in Osun State, and others who travelled from different areas of Nigeria to attend religious events in Lagos State. There were four sections in the survey instrument. The respondents' demographics were covered in the first question set. The second segment focused on the respondents' eating and hand-washing routines, the third on their high-risk consumption and purchase patterns, and the fourth on their food-handling practises and knowledge of food safety. 87 of the 100 surveys that were dispersed at random were returned.	Awareness of food safety	Every single respondent routinely eats somewhere other than their house. The majority of customers favoured covered eateries, although 14% chose to dine at open canteens and on the streets. 30% of people use their fingers or utensils to eat. Before and after eating, around 91.5% and 96.5% of people wash their hands with soap. More than 51% drink unpasteurized raw milk, 61% sip borehole or well water, and 85% ingest suya. The health effects of suya intake and foodborne infections were both topics that 68% of respondents stated they were knowledgeable about. Statistics showed relationships between gender, age, income level, relationship status, risky eating patterns, and knowledge of food hazards.	Although consumers may be aware of food dangers, this awareness hasn't led to a change in eating habits, hence initiatives should be focused on enhancing food standards in Nigeria.
Akinbode, 2012	Ogun	To investigate the willingness of consumers to pay (WTP) for safer street food.	150 respondents in total were chosen at random from food stands (bukas) located in a variety of neighbourhoods throughout the city, including low-income Ago-oko, Ita-morin, Ijemo, Ake, and Ijaiye, middle-income Idi-aba,	Willingness to pay	The average customer was 35 years old and made N29,903.00 annually. The WTP of customers is significantly and favourably impacted by income and education. A WTP estimate of N12.70 was found for every N100 worth of street food.	Due to their willingness to pay for the higher quality, higher income and educated neighbourhoods should have safer street stalls. Public awareness campaigns can also include food safety education to raise consumer understanding of food safety, particularly in communities with a high concentration of low-income and uneducated residents.

			Olomore, Obantoko, Onikolobo, and Adigbe, and high-income Ibara Estate, Elega Estate, Asero Estate, Kenta Idi-Aba Estate.			
Anyam, 2013	Lagos	To investigate customer readiness to pay for bread's food safety qualities in the city of Lagos.	In order to determine willingness to pay, a well-structured questionnaire including Choice Experiment (CE) items was employed. Employing a two-stage random sample procedure, information was gathered from 150 respondents.	Willingness to pay	Price and non-financial factors, such as the bromate label, licensing, nutritional tag, flavour, and texture, all had a significant role in determining the decisions made by consumers.	Since the results demonstrate that customers are more prepared to pay for bromate-free and nutritious labelling than the industry standard, the government and manufacturers should strongly encourage their strict adherence.
Awoyemi, 2019	Kwara	To evaluate the behaviours and understanding of farming families in Nigeria's Kwara State's Irepodun Local Government Area (LGA) on food safety.	104 participants for the research were chosen using a two-stage selection procedure. The first reason Irepodun LGA was purposefully chosen among the sixteen LGAs in Kwara State was due to the area's heavy proportion of farming households. In the second stage, 30% of the farmers on a list provided by the Kwara Agricultural Development Programme Office were chosen. Thus, from Elerinjare, Batanyin, Igbo owu, Omode, and Idofian, respectively, came 20, 22, 22, 15, and 25 farmers. A total sample size of 104 respondents was obtained by choosing respondents from each of these five communities. Given a 96% response rate, only 100 questionnaires were collected from the respondents. This suggests that the data analysis involved 100 respondents.	Food safety knowledge, Food safety practices	Most agricultural households are unaware of the best measures for food safety. Lack of information, insufficient training, inadequate awareness, and insufficient funding are all barriers to food safety measures. In the chosen agricultural families, PPMC analysis revealed a substantial relationship between income and educational attainment and farmers' adherence to food safety procedures.	Sensitization and enlightenment campaigns, adequate modern technology provision, training and monitoring and evaluation by relevant stakeholders will all help to increase farming households' knowledge of and attitudes toward food safety, resulting in safe food for the general public.

Ayinmode et al., 2015	Ondo and Ekiti	1. To use the modified agglutination test to look into the prevalence of serum antibodies to T. gondii in dogs killed for food in two states in southwestern Nigeria. 2. To evaluate consumer knowledge, practises, and behaviours about T. gondii infection.	In order to evaluate the knowledge, behaviour, and practises that may impact contact with T. gondii infection in humans, dog consumers in the two regions where dog samples were obtained were given a standardised questionnaire.	Serum antibodies prevalence to T. gondii, Consumer behaviours	Out of 278 dogs, 55 (19.8%) tested positive for T. gondii antibodies, with titres of 1 : 20 in 37, 1 : 40 in 6, 1 : 80 in 8, 1 : 160 in 1, 1 : 320 in 2, 1 : 640 in 0 and 1 : 1280 in 1. Gender and sample site were both substantially linked with T. gondii (P 0.05), although age and physical condition of the dogs were not. The majority of people in the sample site were found to be unaware of the danger of contracting T. gondii from eating dog meat, and only a small number of people were discovered to exhibit unfavourable behaviours including eating raw dog meat and giving it to cats.	Dogs killed for food in Nigeria's Ondo and Ekiti states are prone to T. gondii infection, highlighting the necessity for consumers of dogs to have the correct toxoplasmosis health education.
Balogun et al., 2020	Lagos	To find out how much customers in Lagos State, Nigeria, are ready to pay for packaged chicken eggs.	Consumers of chicken eggs in Lagos state were surveyed using a structured questionnaire to gather primary data for this study. The socioeconomic makeup of the respondents, their opinions about packaged chicken eggs, and their financial readiness are all included in the data gathered. Consumers of packaged chicken eggs made up the stratified multi-stage probability sample that made up the sample. Lagos State is divided into five administrative regions. Due to the widespread availability of packaged chicken eggs in the supermarkets in those regions, three divisions were specifically chosen. From each division, an LGA was chosen for the second step of sampling. The last stage involved selecting consumers of chicken eggs at	Willingness to pay, Consumer behaviours	The premium amounts for 7% of the willingness to pay (WTP) estimate for packed eggs, which was 968 on average. As consumers aged, the WTP for packaged eggs fell (p 0.1). Maleness raised WTP by 13.4%, and marital status increased WTP by 15.8%. While respondents' WTP grew by 15.8% when they frequented supermarkets, it climbed by 0.8% when consumers' income increased by one naira.	It is advised to have several sources of revenue and a nearby retail location for packaged chicken eggs to be more easily accessible to consumers.

			random from each LGA for an interview using a standardised questionnaire. Only 134 of the 150 consumers of packaged eggs in the final sample—who had completed their questionnaire—were utilised in the study.			
Ben-Chendu et al., 2018	Imo	To evaluate the Owerri Municipal LGA in Imo State's readiness to pay for environmental solid waste disposal services.	Three phases of selection were used to create the sample for the study. The first stage consisted the purposeful selection of three electoral wards in the Owerri Municipality, and the second stage involved the random selection of two key places within each selected ward. The rate of waste management operations within these regions, which were characterised as high, medium, and low, served as the basis for choosing the voting wards. The final step involves choosing 20 households at random from each of the three electoral wards. 120 homes in all were chosen for the study. Individual interviews were used to gather data and information utilising a well-structured questionnaire. In order to gather information on the age of the household head, educational attainment, length of residence in the area, education, amount of waste produced, gender of the household head, total income, ownership of the home in which the household resides, and responsibility for	Willingness to pay	A total of 0% was donated to ESWDS since 31.3% of respondents felt that the government and their agency, IMO-ENTRACO, were responsible for ESWDS and were unwilling to donate any funds to the cause of environmental protection. The average offer was N285, which demonstrated a high level of readiness to pay. Age, educational level, income level, years of residence, ownership of the home, quantity of household solid waste generated, bid amount, membership in the environmental committee, and responsibility of IMO-ENTRACO were found to be determinants of willingness to pay for ESWDS while level of education, income level, ownership of the home, quantity of household solid waste generated, and bid amount, age, were found to be factors that determine the amount they are willing to pay for ESWDS.	In order to encourage those families who are prepared to pay, programmes supporting investment in trash disposal should be started while price for this operation should be made accessible. Additionally, a public awareness campaign using the media might be used to effectively tell the public about the need to support investment in solid waste disposal.

			solid waste management, well-structured questionnaires, personal interviews, and focus group discussions were used to collect the primary data. Through pertinent articles, books, and workshop training materials, secondary data were gathered.			
Danilola et al., 2017	Lagos	To look into the trustworthy sources of data on food safety, to pinpoint the main food safety information consumers are looking for, and to pinpoint the drivers behind why people read about food safety.	Primary data were gathered through the utilization of a standardised questionnaire. This study was conducted in Lagos State by asking consumers of pre-packaged meals for information. The sampling process involved two stages. The first entailed choosing two (2) Shoprite shopping malls at random from a list of five (5) Shoprite shopping malls located throughout Lagos State. The methodical selection of every fifth consumer of pre-packaged foods was the second stage. 220 respondents in all were chosen for the study. Respondent information was gathered through interviews and a standardised questionnaire.	Sources of food safety information, Consumer behaviours	After physicians, family, friends, and coworkers, television, and the internet, food labels were ranked as the fifth most reliable source of nutrition-related information. Consumers are more motivated to read food labels by the expiration date of the product rather than any other information, and product comparison.	Food regulatory agencies should work to improve the laws governing food labelling, which can increase consumer trust in the information on food labels. They should also develop awareness campaigns to draw consumers' focus to the importance of food labels, which go beyond simply listing the brand name and expiration date.
Dipeolu et al., 2009	Ogun	To ascertain the elements influencing the consumer's desire to pay for organic veggies.	Randomly chosen respondents came from the University of Agriculture in Abeokuta, Ogun State, Nigeria, numbering 152 in total. A pre-tested questionnaire used to gather primary data from the respondents included questions regarding	Willingness to pay	The majority of respondents were familiar with organic farming and had already seen and consumed organic crops. The information is likely based on local farmers' management techniques, which involve using little to no chemical pesticides or fertilisers to cultivate vegetables. Undoubtedly, they knew very nothing about crops that were organically grown. For organic veggies, around 1/3 of respondents were ready to pay more. They were prepared to pay average premiums ranging from 23% for cucumber to 73% for ugwu	There is a market demand in the southwest of Nigeria in the case of widespread cultivation. It is proposed that greater information be provided on the difference between organic food that is certified and uncertified.

			socioeconomic indices, consumer awareness, prior experiences with organic goods, purchasing preferences, and readiness to pay premiums for certain organic veggies. Additionally, a few questions were created to find out how respondents felt about organic veggies in comparison to conventional ones.		(fluted pumpkin). Many of the responders concurred that organic veggies are better for you and have healthier ingredients.	
Dontsop et al., 2011	Akwa Ibom	The variables influencing customers' willingness to pay extra for safe bread are examined in order to evaluate the desire for bread, as well as to ascertain consumers' degree of awareness of the detrimental health consequences of bromate and their faith in safety labelling.	The study was carried out in Akwa Ibom State's Etinan Local Government Area. The state is located in Nigeria's southeast. The local government is bordered by the local governments of Uyo and Nsit Ibom. The data were gathered using a multi-stage random sampling method. Six (6) wards were randomly chosen for the first stage. Three (3) villages were chosen at random from each ward for the second stage. Ten (10) respondents were chosen at random from each hamlet in the final stage, and fifteen (15) respondents were chosen from four (4) reasonably big villages. A total of 200 households were included in the sample as a consequence of this process. However, one hundred eighty-two (182) surveys were subsequently utilised for the study following data cleaning.	Consumer behaviours, Willingness to pay	The likelihood of damage from bromate residue in bread is known to about 53% of customers, and 49.1% of consumers have faith in safety labelling. For each gramme of safe bread, 10-89% of interested consumers were willing to spend 35 and 70 kobo, respectively. Age and income had substantial positive and negative associations that contributed 1% to the explanation of the bread demand. Age, trust, and risk each contributed 10%, 1%, and 1% of the variance in explaining customer desire to pay for safe bread, respectively (with positive associations).	Programs for raising awareness through the media, enlightenment designed for illiterate populations, and a focus on food regulating organisations should be implemented.
Ehirim,	Imo	To determine	Data from 80 chicken	Consumer	The primary information sources for the	Technical advancements, the purchase of

2010		the degree of trust chicken buyers have placed in the safety nets offered by NAFDAC and to identify the variables influencing Imo State's choice for safe chicken.	customers in the 3 zones of the state were collected using a multi-stage sample approach. Due to their huge markets for chicken products and the existence of licenced commercial diners there, the local government areas in the metropolitan regions of the three zones were chosen. Once more, the neighbourhoods chosen feature a diverse population of customers who shop at the same stores despite having varying income levels. The local governments of Okigwe, Orlu, and Owerri Municipal Council were chosen. A well-structured questionnaire was used to interview 40 chicken product customers from each of the local government regions who were chosen at random. A total of 120 surveys were delivered to the customers between July and December 2007. Only 80 replies, however, were thought to be pertinent to the study. The questionnaire was designed with clear illustrations of chicken goods being displayed in outdoor markets as well as within restaurants like Mr. BIGGS, where the food is marked with NAFDAC-approved trademarks and labels. Customers can easily identify the product's origins as a result. Another corporate vendor unit remaining under NAFDAC's authority	behaviours	chicken safety net are the educational process in schools and unofficial sources. While the earlier source might not reveal the current cause of the safety concern, the latter source is disorganised, unguided by facts, and extremely viral, which might cause market volatility if it turns out to be wrong. Consumers prefer self-evaluation of safety over the use of food labelling and sanitary conditions. Despite the state's growing preference for food safety, customers still choose the open market system due to its disorganised safety practises and dearth of advanced technologies that would encourage trust in the product's dependable safety. The free market, which lacks NAFDAC standards, provides most customers with affordable services. The likelihood that a consumer would choose a safe product has an inverse connection with education level, bid amount for safety, and the quantity of safety information sources, which came as a huge surprise. Due to the financial burden of safety nets, education and the quantity of safety sources of information behaved differently. Despite their degree of knowledge, consumers in the areas cannot pay the price of safe chicken. Food safety is frequently compromised by consumers. Once more, it was discovered that raising consumer income, age, and family food spending will increase the likelihood that safe chicken products will be preferred in the region.	storage sites such refrigerators and ovens with continuous power supplies to always preserve the goods, stringent daily product inspections by NAFDAC, and consumer accessibility to affordable safety services in the state.

			is the open market source, however it receives little oversight because the items' sources of origin are difficult to trace.			
Emmanuel, 2016	Osun	To research the senior secondary school students in Ile-Ife, Osun State, Nigeria's knowledge and practises about food safety.	At Ambassadors College in Ile-Ife, Osun State, Nigeria, a cross-sectional research on senior secondary school students' habits and understanding of food safety was carried out in November 2015. This respected private secondary school in Ile-Ife town served as the study's location. Ile-Ife is a historic Yoruba city located in Osun State in Nigeria's south-western region. The secondary school students in the College's senior secondary one, two, and three (SS1, SS2, and SS3) were the study's population. A 27-item, purpose-designed, self-administered, anonymous questionnaire with closed-ended questions was used to elicit information from respondents. There are four arms at each secondary class level, from SSI to SS3. In order to create a sample size of 420 students for the study, a minimal number of 140 senior secondary school students were randomly chosen from each of the three class levels (SS1, SS2, & SS3) of the senior classes of Ambassadors College, Ile-Ife. These students ranged in age from	Consumer behaviours	The percentage of respondents who had good food safety knowledge overall was 75.8% (310); the percentage of those who had poor knowledge of food safety was only 24.2% (99). The majority of respondents, 65.8% (269), also had high levels of food safety practises, while only 34.2% (140) had low practises on food safety. Additionally, the results revealed a substantial relationship between mothers' educational attainment and their children's understanding of food safety, as well as a significant relationship between their practise of food safety and their age, sex, class, and household composition.	The study's participants were mostly selected from a private high-school in Ile-Ife, hence the study's findings cannot be broadly generalised since they do not accurately reflect all of the city's secondary school pupils.

			12 to 20 years. 409 of the 420 questionnaires that were sent out were returned and utilised in the study, representing a response rate of 97%. A guarantee of the privacy of the data submitted in the questionnaire was given to each responder.			
Ezekiel et al., 2013	Lagos, Ogun, Oyo, Niger, and Kadun a	To assess consumer knowledge of the snack's aflatoxin content and any potential health hazards associated with regular consumption.	47 peanut cake samples weighing about 1.5 kg each were bought from marketplaces in the following Nigerian states: Lagos, Oyo, Ogun, Kaduna and Niger. Following the comminution of the bulk samples, 90–100 g representative sub-samples from each bulk were collected using the quartering procedure. Part A was used to isolate Aspergillus species, and Part B was used to analyse AFB1 using liquid chromatography and electrospray ionization-tandem mass spectrometry. Each representative sample was split into two equal portions. Prior to analysis, all samples were kept in sterile zip-lock bags at 4 C. Surveys were created to gauge how well-informed peanut cake buyers were regarding the potential of aflatoxin exposure. At the moment of sample collection at the marketplaces throughout Nigeria's five states, 329 questionnaires were given out to customers.	Consumer behaviour	Whereas *Aspergillus tamarii* had the lowest mean incidence (2.7%), Aspergillus flavus L-strain remained the most prevalent (>56%) throughout the states. In Lagos and Kaduna specimens, the occurrence of atoxigenic strains was statistically (p 0.05) greater than that of toxigenic strains, but in Niger, the incidence of toxigenic strains was substantially (p 0.05) higher than that of atoxigenic strains. All of the cake samples that were analysed had levels of AFB1 that were up to 2824 mg/kg more than the NAFDAC's recommended limit. The occurrence of toxigenic bacteria in the specimens and AFB1 levels showed a weakly positive connection (r 14 0.32, p 14 0.03). The consumer education data revealed that 64 percent of the respondents—the bulk of whom are young people of socioeconomic and childbearing age—consumed peanut cake. 85 percent of the customers were unaware that the food was contaminated with aflatoxin and might pose health hazards if consumed.	Given the relatively low educational level, there is a requirement for immediate intervention techniques and public education programs targeted at persons from poor socioeconomic backgrounds.

Falola, 2014	Kwara	To summarise the socioeconomic features of the respondents, learn what people think about food labels, and find out what elements in the research region affect people's propensity to read food labels.	For the investigation, a three-stage sampling method was used. Firstly, four LGAs were chosen at random from the state's 16 LGAs. Six groceries or food stores were then specifically chosen for each of the chosen LGAs. Third, a total of 120 responses were collected by distributing structured questionnaires to five consumers from each of the chosen supermarkets and food stores. Socioeconomic information about the respondents was gathered, including information about their sexual identity, relationship status, age, highest level of education gained, employment, family size, household income, and the number of preschoolers. Additionally, respondents were asked to rank the nutritional expertise of the people who plan and prepare their meals as follows: none (0), low (1), medium (2), and high (3). Additionally, respondents were asked to assess how important they thought the pricing of food products was, since this may indicate whether or not they would read the labels on their food. This was given the following importance ratings: Not important (1), Less Important (2), Fairly Important (3), Important (4), and	Consumer behaviours, Willingness to read food labels	Women were more likely than males to read food labels, and this tendency was positively correlated with respondent age, family income level, level of education, and degree of nutritional expertise. However, the respondents' propensity to read food labels decreased as the number of preschoolers and the size of the home increased.	Relevant stakeholders must educate the general public on the use of food labels in determining nutritional content and potential health effects.

			Very Important (5) (5). Additionally, respondents were questioned about how they regard food labels and if they are inclined to read them.			
Odeyemi et al., 2019	Cross-national study	To ascertain the awareness, attitude, and behaviours of consumers on food safety in emerging nations in Asia and Africa.	453 customers, including 265 Africans and 188 Asians, provided the data. Comparing customers from Africa and Asia, there were significant differences in knowledge, attitudes, and practises related to food safety (p 0.05).	Consumer behaviours	Consumers in Cameroon in Africa had the lowest understanding of food safety (73.15 16.43), followed by Ghana (78.19 15.84) and Nigeria (88.16 8.88). The least knowledgeable customers in Asia were in Iran (73.33 19.84), followed by Malaysia (88.36 11.64) and Pakistan (89.42 9.89). 89% of those surveyed were aware of food poisoning, and 304 (67.1%) consumed food that was left at room temperature for an extended period of time. Between Africa and Asia, there were significant differences in consumer knowledge, attitudes, and behaviours related to food safety (p 0.05). In general, respondents from Asia are more knowledgeable about food safety than those from Africa.	Users must be informed of the risk of contracting food-borne illnesses from eating tainted food. Every case of a foodborne illness should be reported by the consumer to the closest hospital for adequate care and documentation. A central registry for documenting food borne disease outbreaks should be set up in each nation, together with ongoing observation of the presence of gastrointestinal pathogens in food and encouragement of food handler education programmes. However, it should be emphasised that there were an equivalent percentage of participants in each of the nations that were questioned, and some of them filled out the questionnaire incorrectly, which led to the loss of data.
Ologbon et al., 2019	Ogun	To examine the knowledge of ready-to-eat food quality and safety among rural families in the Yewa villages in Ogun State, Nigeria.	The respondents were chosen using a multi-stage sampling approach. Two of the division's five local government areas (LGAs) were specifically chosen for the first stage based on their ownership of traits that might encourage the popularity of food-away-from-home/packaged meals in a community. The presence of higher education institutions in the administrative centres of both LGAs—a campus of Olabisi Onabanjo University in Ayetoro and a Federal Polytechnic in Ilaro—is notable among these traits because it encourages the population density of college students across the two towns and the surrounding	Consumer behaviours	Before consuming packaged goods, 79%, 76%, and 58% of the household heads seldom ever checked expiration dates or visible damage on food packs or adhered to manufacturer's recommendations. As a result, 86% of respondents stressed the need of knowing the source(s) of foods, while nearly 79% disputed that packaged goods were no longer suitable for ingestion after expiry but acknowledged that refrigeration kept prepared food safe. In terms of knowledge of food quality, 91% of respondents were worried about the hygiene of food processing locations, and 98% regularly checked food packages.	The ability of family members to attend school should be given top attention since a greater level of education would increase people's understanding of the safety of packaged goods. Such instructional initiatives will enable safe food preparation at home and, thus, the customers' continuing independence in their homes.

			areas. Ayetoro, Igbogila, Ibooro, Sawonjo, and Saala-Orile in Yewa North LGA and Ilaro, Owode, Erinja, Oke-Odan, and Ajilete in Yewa South LGA were the five significant settlements that were randomly chosen in each of the two local government areas at the second stage. Five (5) housing units (HUs) were chosen in each of the towns in the third stage, and five (5) households were recruited from each HU at the fourth stage. As a result, 250 household heads from the research region were sampled; however, 10 questionnaires in total were not rejected due to missing data.			
Oni et al., 2005	Edo	Using a case study of potassium bromate in bread in Benin City, Edo State, to examine customer readiness to pay for safety labelling in Nigeria	The study used information primarily from original sources. 200 respondents were given structured questions to complete as part of the source. For the sample frame, the bread eaters in the research region were chosen at random using a random sampling approach. Both probit models and descriptive statistics (frequency distribution) are used as analytical techniques in this study.	Willingness to pay for safety labels	The majority of respondents (60%) who bought bread did so from hawkers, and roughly 60% of them were aware that bread contains bromate. Labeling was utilised by 40% of customers to identify bread free of bromates. Other approaches have been described to address pricing variations in bread with identical weight, flavour, and scent. Additionally, the results showed that 60% of the respondents learned about the harmful effects of bromate via news (both print and mass media). Econometric analysis reveals that factors including education, gender, income, prior awareness of bromate, and respondents' beliefs about the harmful effects of bromate have a considerable impact on their desire to pay for safety labels. The likelihood that consumers will pay for a safety label is positively influenced by academic achievement, sexual identity, salary, and foreknowledge of bromate, whereas the price of bread and respondents' beliefs about the harmful effects of bromate on human wellbeing have an impact on consumers' desire to shell out more for safety tags.	A defined market for buying bread is necessary, as are community-based awareness campaigns and an expansion of the National Agency for Food and Drug Administration's (NAFDAC) involvement beyond media promotion. Additionally, there is a need to educate older people who reside in remote areas about the negative effects of bromate in bread. Continuous awareness campaigns are also necessary to educate the bread-eating illiterates. Due to their incapacity to read, write, and maybe understand the information sent by news and media, this is significant. Extension agents that are able to communicate with them and comprehend their language may provide this sort of awareness. Given that the sampled customers are primarily middle-class and employed as government officials, it is anticipated that as incomes rise, so would consumers' purchasing power and desire to pay more for safety labels. By partially exposing bakeries in their neighbourhood to regulatory bodies to monitor their operations and advise them against including bromate in bread, consumers may help the process of safety

						improvements.
Osagbemi et al., 2010	Kogi	Identify the risk variables for food poisoning that consumers are aware of, as well as the effects that relevant socio-demographic characteristics have on consumer knowledge, attitudes, and practises related to food poisoning.	A multi-stage sampling technique was used. First, 6 wards were chosen at random from a total of 11 wards. Second, 12 communities were chosen at random from a total of 26 communities in the six chosen wards. Then, each village was considered to be a cluster. Using the grid approach, the clusters' maps were split into four identical pieces, and the central point was found. Each cluster's centre was then determined using this information. The index residence for the interview was chosen by rotating a bottle at the middle of each cluster and choosing the home whose front entrance is nearest the direction the tip of the bottle pointed. Based on whose front door was nearest to the index household, the following home was chosen. Then, until the appropriate sample size was reached, the next homes were chosen based on the home whose front door was nearest to the last one tested. Throughout the course of the study, 414 adult residents who had responsibilities related to food handling were questioned. A pretested structured questionnaire created by the researchers was used to gather data.	Consumer behaviours	Although there was a high degree of awareness (100%) about food poisoning, nothing was known about its causes. Only roughly 37.1% of the respondents said consuming tainted food was the cause. The prevalence of food poisoning was modest (22.2%). Family members and friends were the main sources of information on food poisoning (81.6%) and 62.1%, respectively. Only formal education degree had a substantial impact on respondents' experiences with food poisoning.	Despite widespread knowledge of foodborne illness, little was known about its causes. Despite their lack of understanding of the true causes of food poisoning, there was a high level of practise of food cleanliness. People had a favourable attitude about contaminated food and were interested in learning more about it and how to avoid it. To increase respondents' knowledge and further deepen their awareness, education programs and general awareness initiatives were advised.
Temitayo, 2017	Osun	To evaluate the level of food	To gather data from respondents, a 27-	Consumer behaviours	The majority of the pupils taken into account for this study had solid	

		safety knowledge and practises among senior secondary school students at the International School, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria; to investigate the relationship between specific demographic characteristics and the level of food safety knowledge and practises; and to ascertain the connection between awareness levels and food handling practices.	item, specifically developed, anonymous, self-administered close-ended questionnaire was employed. The survey has undergone preliminary testing. Then 420 questionnaires for the research were supplied to the school to be distributed. To take part in the study, 420 seniors from the International School, OAU, Ile-Ife, who ranged in age from 12 to 20 years old, were randomly selected. Each class level yielded a minimum of 140 senior high school pupils. A 94% response rate (394 of the 420 responses) of questionnaires that were sent were retrieved and utilized in the study. A guarantee of the privacy of the data submitted in the questionnaire was given to each responder.		understanding of food safety. The majority of responders practise high levels of food safety. Only a small percentage of respondents reported poor food safety habits. Among the other sociodemographic factors taken into consideration in this study, only a significant link between religion and the respondents' knowledge scores on food safety was discovered (p 0.05). Food hygiene awareness scores did not significantly correlate with respondents' age, sexual identity, class, tribe, family structure, or mothers' level of education (p>0.05). The outcome also demonstrated a substantial correlation between respondents' class and their performance on food safety practises. There was a strong association between the students' practises and understanding about food safety.	Because the study relies solely on self-reported data, self-report bias is a possibility. By making the survey a supervised self-administered procedure, an attempt was made to lessen the influence of this bias in order to rectify the situation. Given that certain students at the International School and OAU College still score poorly on food safety awareness tests, attention should be paid to monitoring and analysing food safety practises among these students. Given that class attendance has been linked to students' food safety behaviours, ongoing instructional initiatives are required to help these pupils. A state policy addressing food safety education that is delivered to the schools on the behaviours of these young kids who are also users is needed since they are at danger of contracting food borne illnesses and can be shielded from them by the government. These private college students' habits and understanding of food safety may be compared to those in public or rural secondary schools in order for the findings to be applied broadly. It is also possible to do research on the habits and understanding of students from different colleges about food safety for the greater Ile-Ife municipality.
Uchendu, 2018	Lagos	To determine if homes and food merchants in Lagos, Nigeria, have inadequate food safety standards.	410 market food vendors and 70 street food/fruit vendors participated in a cross-sectional direct observational research to gather qualitative data on food safety procedures in Lagos State's six largest markets (Oshodi, Idumota, Mushin, Ejigbo, Isolo, and Ikotun) and streets. 200 women who lived in these	Consumer behaviours	Food handlers in this research community generally had low standards for food safety and cleanliness, which had both short-term effects on food contamination and nutritional loss as well as long-term effects on foodborne illnesses and unrecognised hunger.	Food handlers in this research sample had some typically high-poor food quality and safety and hygiene behaviours. Food contamination and nutritional loss are the immediate effects, whereas foodborne illnesses and hidden hunger are the long-term effects. Poor food safety practises in this research group will be addressed by policies incorporating dietary and nutritional awareness through public awareness campaigns and monitoring.

			families were polled in focus groups on their procedures for food safety. The prevalence of inadequate food safety practises was examined and debated.			
Ugoani & Ewuzie, 2016	Unspecified States in South-East, Nigeria	To investigate the degree to which blue-collar employees in Nigeria manage their own health in connection to food safety issues.	Among the 300 respondents for this study, 200 were men and 100 were women, with ages ranging from 21 to 70 (M = 46, SD = 25). The participants were chosen from South-East Nigeria's general populace.	Consumer behaviours	In Nigeria's metropolitan and semi-urban areas, approximately 63% of blue-collar workers routinely frequent the many unsanitary pepper soup stalls that are dispersed throughout. Approximately 70% of blue-collar employees use sachet water, sometimes referred to as 'pure water', which is typically made from borehole water. This may be a significant source of water-borne illnesses. About 73 percent of Nigerian blue-collar workers consume bush meat, which is typically sold at car parks and other public places, making them more susceptible to different food-borne illnesses.	Participants were more susceptible to food- and water-borne infections such salmonella, staphylococcus aureus, streptococcus aureus, Campylobacter jejumi, and Escherichia coli due to the high prevalence of street food consumption and the sometimes filthy circumstances in which it is cooked.

Appendix 2: Quality appraisal of included studies

Research	Quality Appraisal													
	Q1. Research question/objective	Q2. Research design	Q3. Subject selection	Q4. Subject characteristics	Q5. Random allocation	Q6. Researcher blinding	Q7. Subject blinding	Q8. Outcome measure	Q9. Sample size	Q10. Data analysis	Q11. Estimate of variance	Q12. Control for confounding	Q13. Result reporting	Q14. Conclusions
Adebisi et al., 2020	+	+	+	+	n/a	n/a	n/a	+	−	+	+	−	+	+
Adebowale & Kassim, 2017	+	+	+	+	n/a	n/a	n/a	+	−	+	+	+	+	+
Adesope et al., 2010	+	+	−	+	n/a	n/a	n/a	+	−	+	+	−	+	+
Ajayi & Salaudeen, 2014	+	+	−	+	n/a	n/a	n/a	+	−	+	−	−	+	+
Akinbode et al., 2012	+	+	−	+	n/a	n/a	n/a	−	−	+	−	−	+	+
Anyam et al., 2013	+	+	−	−	n/a	n/a	n/a	−	−	+	−	−	+	+
Awoyemi et al., 2019	+	+	+	+	n/a	n/a	n/a	−	−	+	−	−	+	−
Ayinmode et al., 2015	+	+	−	+	n/a	n/a	n/a	−	−	+	+	−	+	+
Balogun et al., 2020	+	+	+	+	n/a	n/a	n/a	+	−	+	+	−	+	+
Ben-Chendu et al., 2018	+	+	−	+	n/a	n/a	n/a	−	−	+	+	−	+	+
Danilola et al., 2017	+	+	+	+	n/a	n/a	n/a	−	−	+	+	−	+	−
Dipeolu et al., 2009	+	+	−	+	n/a	n/a	n/a	+	−	+	+	−	+	+
Dontsop et al., 2011	+	+	−	−	n/a	n/a	n/a	−	−	+	+	−	+	+
Ehirim et al., 2010	+	+	−	−	n/a	n/a	n/a	−	−	+	−	−	−	+
Emmanuel, 2016	+	+	−	+	n/a	n/a	n/a	+	−	+	−	−	+	+
Ezekiel et al., 2013	+	+	+	+	n/a	n/a	n/a	−	−	+	+	−	+	+
Falola, 2014	+	+	+	+	n/a	n/a	n/a	+	−	+	+	+	+	+
Odeyemi et al., 2019	+	+	−	−	n/a	n/a	n/a	−	−	+	−	−	+	−
Ologbon et al., 2019	+	−	−	−	n/a	n/a	n/a	−	−	+	−	−	+	−
Oni et al., 2019	+	+	+	+	n/a	n/a	n/a	+	−	+	−	−	+	+
Osagbemi et al., 2010	+	+	+	+	n/a	n/a	n/a	+	−	+	−	−	+	+
Temitayo, 2017	+	+	+	+	n/a	n/a	n/a	+	−	+	−	−	+	+
Uchendu, 2018	+	−	+	−	n/a	n/a	n/a	+	−	+	−	−	+	+
Ugoani & Ewuzie, 2016	+	−	−	−	n/a	n/a	n/a	−	−	+	−	−	+	+

Key: − Partially reported or partially addressed; + Fully reported or fully addressed; n/a means not applicable to research