



ASSESSMENT OF PRACTICE OF FOOD HYIEGENE AMONG FOOD HANDLERS IN BOARDING SECONDARY SCHOOLS IN NORTHWEST ZONE, NIGERIA

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Abstract

This study assessed the practice of food hygiene among food handlers in boarding secondary schools in the Northwest Zone of Nigeria. A descriptive survey research design was employed, targeting a population of 1,112 food handlers, from which a sample of 470 was drawn using a multistage sampling technique across four states. Data were collected through a structured questionnaire based on a modified four-point Likert scale, and the reliability of the instrument was confirmed through a pilot study, yielding a Cronbach's alpha of 0.88. Descriptive statistics, including means and standard deviations, were used to answer the research question, while a one-sample t-test at 0.05 significance level was used to test the hypothesis. Findings revealed that while certain practices such as storing uncooked foods in clean, dry environments, washing cooking utensils, and covering food were moderately observed, many essential hygiene practices, including consistent handwashing, cleaning and sanitizing the cooking environment, using protective clothing, pest control, and periodic medical check-ups, were inadequately practiced. The grand mean score of 2.34, below the criterion mean of 2.50, indicated generally poor compliance with recommended food hygiene practices. The one-sample t-test confirmed that the overall practice of food hygiene among food handlers was not statistically significant ($t_{\text{Cal.}} = 0.681$; $p = 0.678 > 0.05$). These findings underscore the urgent need for structured training, regular supervision, and strict enforcement of food safety protocols in boarding schools to mitigate risks of foodborne illnesses among students. The study concludes that improving food hygiene practices among school food handlers is a critical public health imperative.

Keywords: Food Hygiene, Food Handlers, Boarding Schools, Food Safety, Northwest Nigeria

Introduction

Food is an essential necessity of life, providing energy, promoting growth, and supporting disease prevention; however, its manifold sources and the numerous processes it undergoes before consumption create a significant risk of becoming an infective agent if improperly handled (Kamboj et al., 2020). The practice of food hygiene encompassing all conditions and measures necessary to ensure the safety and suitability of food at every stage of production, handling, preparation, and storage is central to preventing foodborne illness (Abdulbaqi et al., 2019; Harande et al., 2025). Food handlers have been identified as playing prominent roles in the transmission of foodborne diseases through their day-to-day practices, and can pose a significant public health problem when safe food handling is not observed (Aluh et al., 2017).

Improper food handling practices such as inadequate hand washing, failure to use protective clothing, poor personal hygiene, cross-contamination, and inappropriate storage or reheating of food have been associated with foodborne illness outbreaks (Amin et al., 2024). Solomon et al. (2025) noted that attention to the cleanliness of hands, body, and clothing by food handlers is critical in preventing cross-contamination, particularly in institutional settings such as boarding secondary schools. The consequences of unsafe food handling practices extend beyond individual illness, they incapacitate people, cause pain and suffering, disrupt commerce and industry, and place constraints on healthcare systems (WHO, 2022).

The problem of unsafe food handling is not limited to developing countries. Up to one-third of the population of developed countries is affected by foodborne illness each year, and globally, it is estimated that 1.8 million people die annually from diarrheal diseases, most of which are attributable to contaminated food or water (Akorede et al., 2022; FAO & WHO, 2016). In Nigeria, over 20,000 persons reportedly die each year as a result of food exposure to improperly used pesticides, while foodborne disease outbreaks are frequently underreported, obscuring the true magnitude of the problem (WHO, 2022). Each weekday, millions of African students consume meals prepared and served at school, making the food handling practices of school food service workers a matter of significant public health concern (Teffo & Tabit, 2020).

Boarding secondary schools represent a unique and high-risk environment for food safety, as food is cooked in large quantities for large numbers of students by multiple food handlers, increasing the potential for widespread foodborne illness (Solomon et al., 2025). The consolidation of food preparation into large institutional kitchens as occurs in boarding schools, hotels, and restaurants has been associated with an increase in foodborne disease outbreaks (Sharif et al., 2013). Unsafe practices observed among food handlers in such settings include purchasing food stuffs from open markets without proper washing, using previously contaminated water for food preparation, failing to wash hands with soap after using the toilet, and not wearing protective clothing such as aprons, gloves, or hair covers (Gbolabo et al., 2020).

In boarding secondary schools in Nigeria, food handlers have been observed to exhibit unsafe food handling practices that directly threaten the health of students. These include leaving food exposed to flies, using dirty water to wash utensils, coughing or spitting in food preparation areas without covering the mouth, and keeping unkempt hair and dirty footwear while handling food (Akorede et al., 2023). Such unsafe practices can cause food hazards, thereby leading to food poisoning, which is detrimental to human health. Proper hygiene practices on the food production line are often ignored, and the inadequacy of safe water supply, combined with poor environmental sanitation, has been identified as a contributing cause of foodborne illness outbreaks among secondary school students (Abdulbaqi et al., 2019; Akorede et al., 2020).

Several studies have emphasized that poor food handling practices rather than lack of knowledge alone are a primary driver of foodborne illness in institutional settings (Akorede et al., 2023; Teffo & Tabit, 2020). Teffo and Tabit (2020) specifically pointed out that knowledge alone is insufficient to promote safe food handling behaviours, and that alternative educational strategies based on motivational health education and promotion models are required to bring about meaningful change in practice (Tolulope et al., 2015). Coleman and Roberts (2015) further noted that food hygiene education should target all staff in food processing environments to achieve behavioural change and the adoption of positive food handling attitudes. This is consistent with the position of the WHO (2017), which stresses that effective food handling practices are essential to minimizing foodborne disease in catering operations including school food services.

Despite the recognized importance of food handling practices, evidence from Nigerian studies suggests that food handlers in boarding schools frequently fail to adhere to established food safety standards, including basic personal hygiene, proper food storage, and the prevention of cross-contamination (Adebowale et al., 2017; Oludare et al., 2016). The hygienic quality of prepared food can be assured if basic food safety principles are consistently practised (Adebowale et al., 2017). However, this is far from the reality in many boarding secondary schools in the Northwest Zone of Nigeria, where unsafe food handling practices continue to be prevalent.

Food hygiene is a basic public health issue affecting all nations. Approximately two million children die yearly as a result of diarrheal diseases, with millions more suffering frequent episodes and their debilitating consequences, most of which are caused by food- or water-borne pathogens (Akorede et al., 2022; WHO, 2022). In Nigeria, foodborne disease outbreaks in schools have been documented, though the epidemiological data are often unavailable or underreported. A notable example occurred in 1994, when a class of medical students at the University of Lagos fell ill after consuming salad inadvertently contaminated with *Salmonella* (Akorede et al., 2023).

Observations in boarding secondary schools across the Northwest Zone reveal persistent unsafe food handling practices among food handlers. These include purchasing vegetables and perishable goods from open markets where flies and insects are present, washing food items only once and with previously used water, using latrines and washing hands with water alone without soap, and failing to wear protective clothing such as aprons, gloves, or hair covers during food preparation and service. Additionally, some food handlers have been observed with unkempt hair, dirty footwear, and habits of spitting and coughing without the use of handkerchiefs, while leaving food exposed to flies and washing utensils with dirty water in unhygienic environments (Gbolabo et al., 2020).

These unsafe practices create conditions conducive to food contamination and the transmission of foodborne pathogens, posing serious risks to the health of boarding school students. Given the large number of students who depend on school food services daily and the high-risk nature of mass food preparation, there is an urgent need to assess the prevailing food hygiene practices of food handlers in boarding secondary schools in the Northwest

Zone of Nigeria. It was these observed deficiencies that prompted the present study, which seeks to assess the practice of food hygiene among food handlers in boarding secondary schools in Northwest Zone, Nigeria.

Purpose of the Study

The main purpose of this study is to assess the practice of food hygiene among food handlers in boarding secondary schools in northwest zones, Nigeria.

Research Question

What are the practices of food hygiene among food handlers in boarding secondary schools in Northwest Zone, of Nigeria?

Hypothesis

Practice of food hygiene among food handlers in boarding secondary schools in Northwest Zone, Nigeria is not significant.

Methodology

The research design employed in this study was a survey research design, which was deemed appropriate for the study's objectives. According to Isiaq and Abdullahi (2025), survey research involves a detailed and critical examination of a topic or situation to ascertain the current state of affairs. The population of the study comprised all food handlers in boarding secondary schools across the North West Zone, which includes states such as Sokoto, Kebbi, Katsina, Zamfara, Kaduna, Jigawa, and Kano. The total number of state boarding secondary schools in this zone is 226, with 1,943 food handlers employed across these schools. The data on the number of schools and food handlers were obtained from the State Ministry of Education (2022).

The sample size for the study was determined to be 470 food handlers, drawn from a population of 1,112. A multistage sampling technique was employed to select the sample, which included simple random sampling, stratified sampling, and proportionate sampling. In the first stage, four states (Katsina, Jigawa, Kebbi, and Sokoto) were randomly selected from the seven states in the North West Zone using a hat-drawn method. In the second stage, the sample size of 470 was determined using the Research Advisor table for determining sample size, which recommended this number based on a population of 1,112, a 0.035% margin of error, and a 95% confidence interval. The third stage involved stratifying each selected state into three senatorial zones (Northern, Southern, and Central), and in the fourth stage, two senatorial zones were randomly selected from each state. Finally, a proportionate sampling technique was used to select 470 food handlers from the four states, ensuring that the sample was representative of the population. Convenience sampling was then used to distribute the questionnaires to the selected food handlers, as they were sparsely distributed across the schools.

The data collection instrument was a close-ended questionnaire which assessed the practice of food hygiene among the food handlers using a 4-point Likert scale. The validity of the instrument was established through vetting by experts in the Department of Human Kinetics and Health Education at Ahmadu Bello University, Zaria. A pilot study was conducted with 50 participants to test the reliability of the instrument, and the data collected were analyzed using Cronbach's alpha, which yielded a reliability index of 0.88, indicating high internal consistency. The data collection involved the researchers administering 470 copies of questionnaire across the selected senatorial zones. Mean and standard deviation was used to answer the research question. The null hypothesis was tested using a one-sample t-test at a 0.05 level of significance.

Results

Research Question: What are the practices of food hygiene among food handlers in boarding secondary schools in Northwest Zone, of Nigeria?

Table 1: Respondent Practice of Food Hygiene among Food Handlers

S/N	Statement	Mean	SD
1	I use to take my bath first thing in the morning before handling food.	2.39	1.18
2	I always clean and sanitize cooking and serving food environment before handling food	2.23	1.25
3	I always cover food to prevent flies and other insects from entering or touching the food.	2.65	1.19
4	I always use insecticides and pesticides to control insects and rodents.	2.02	0.92
5	I usually store uncooked foods in a clean dry environment.	3.29	1.13
6	I always wash and sanitize cooking utensils before using to avoid bacteria transmission.	2.71	1.14
7	I always wash vegetables and animal originated foods such as meat and fish properly under a running water before cooking	2.45	0.87
8	I use to wash and sanitize my hands to prevent food poisoning.	2.54	1.18
9	I do use cap, mask, protective gloves and adequate protective clothing to reduce the risk of food contamination.	1.76	0.82
10	I use to go for medical care every 6 months.	1.38	0.81
Grand Total Mean		2.342	

Decision/Criterion Mean = 2.50

Table 1 presents the respondents' practices of food hygiene among food handlers in boarding secondary schools in the Northwest Zone of Nigeria. The decision criterion mean is 2.50, which implies that any item with a mean score of 2.50 and above is regarded as accepted (practiced), while any item with a mean score below 2.50 is considered rejected (not adequately practiced). The results show that only a few food hygiene practices are adequately carried out by the food handlers. Specifically, storing uncooked foods in a clean and dry environment recorded the highest mean score (3.29), indicating that respondents commonly practice proper storage of raw food items. Similarly, the practice of washing and sanitizing cooking utensils before use to avoid bacterial transmission also recorded a relatively high mean score (2.71), suggesting that many food handlers are aware of the need to maintain clean utensils during food preparation. In addition, covering food to prevent flies and other insects from touching the food obtained a mean score of 2.65, which is above the criterion mean, indicating that respondents moderately practice this important food safety measure.

However, several other hygiene practices recorded mean scores below the criterion mean of 2.50, indicating poor compliance among food handlers. For instance, the practice of taking a bath before handling food had a mean score of 2.39, while washing vegetables and animal-based foods such as meat and fish under running water before cooking recorded a mean score of 2.45. These results suggest that many food handlers do not consistently observe these basic hygiene practices. Similarly, cleaning and sanitizing the cooking and serving environment before handling food had a mean score of 2.23, showing that environmental sanitation is not consistently practiced.

Furthermore, the use of insecticides and pesticides to control insects and rodents recorded a mean score of 2.02, indicating that pest control measures are not adequately implemented in the food preparation areas. Also, regular hand washing and sanitization to prevent food poisoning had a mean score of 2.54, which is only slightly above the decision criterion, suggesting that although the practice exists, it may not be consistently carried out by all food handlers.

More concerning is the poor practice of using protective items such as caps, masks, gloves, and appropriate clothing, which recorded a low mean score of 1.76. This indicates that most food handlers rarely use protective gear while preparing or serving food, thereby increasing the risk of food contamination. The lowest mean score (1.38) was recorded for going for medical check-ups every six months, suggesting that periodic medical examinations among food handlers are rarely practiced.

Overall, the grand mean score of 2.34, which is below the criterion mean of 2.50, indicates that food hygiene practices among food handlers in boarding secondary schools in the Northwest Zone of Nigeria are generally

inadequate. This finding suggests that although a few hygiene measures such as proper storage of uncooked food and washing of utensils are practiced, many essential food safety practices such as environmental sanitation, use of protective clothing, pest control, and regular medical check-ups are not consistently observed.

Hypothesis: Practice of food hygiene among food handlers in boarding secondary schools in Northwest Zone, Nigeria is not significant.

Table 2: One sample t test statistical analysis results on significance of Practice of food hygiene among food handlers in boarding secondary schools in Northwest Zone, Nigeria.

	N	Mean	SD.	df	t _{Cal.}	t _{Cri.}	p - value
Practice	470	2.342	1.02	469	0.681	1.965	0.678

t_{Cal.} > t_{Cri.} at df 469, calculated p – value (0.678) > 0.05, t = |0.681|

Table 2 presents the one-sample t-test analysis conducted to determine whether the practice of food hygiene among food handlers in boarding secondary schools in the Northwest Zone of Nigeria is significant. The statistical test produced a calculated t-value (t_{Cal.}) of 0.681 with 469 degrees of freedom (df). This value was compared with the critical t-value (t_{Cri.}) of 1.965 at the 0.05 level of significance. Since the calculated t-value (0.681) is less than the critical t-value (1.965), the test statistic does not fall within the rejection region. This indicates that the observed mean difference is not large enough to be considered statistically significant. Furthermore, the p-value obtained from the analysis is 0.678, which is greater than the significance level of 0.05. This further confirms that the difference is not statistically significant, as the probability of obtaining such a result by chance is relatively high.

Based on these results, the null hypothesis which states that the practice of food hygiene among food handlers in boarding secondary schools in the Northwest Zone of Nigeria is not significant is therefore accepted. This implies that the overall level of food hygiene practices among the food handlers is not significantly different from the expected standard, indicating that food hygiene practices are generally low and inadequate. In practical terms, this finding suggests that food handlers in these boarding secondary schools may not be consistently implementing proper food hygiene measures during food preparation, storage, and serving. The lack of significant hygiene practices could increase the risk of food contamination and foodborne diseases among students in boarding schools.

Discussion of Findings

The finding from this study that food hygiene practices among food handlers in boarding secondary schools in the Northwest Zone of Nigeria are generally inadequate corroborated several previous studies. Aguila (2020), in a study conducted in Turkey, found that food safety practice scores averaged only 48.4%, with particular weaknesses in temperature control and hand washing, validating the present study's revelation that basic hygiene behaviors such as regular hand washing and environmental sanitation are not consistently observed. Similarly, Fatoki (2016) found that nearly half of food handlers in Oregon scored below the 70% pass rate on food hygiene assessments, with personal hygiene practices averaging below the benchmark, thereby supporting this study's conclusion that food handlers frequently fall short of expected hygiene standards. Furthermore, Wandolo (2016), in a comparative study of hospitality training institutions in Kenya, corroborated the present finding by establishing that HACCP prerequisites were not adhered to in most institutions and that poor personal hygiene and inappropriate storage practices were prevalent, closely mirroring the pattern observed in this study where storage of uncooked food was among the few adequately practiced behaviors while other critical practices remained deficient.

The present study's finding that the use of protective gear such as caps, masks, and gloves recorded the lowest practice scores alongside the near-total absence of regular medical check-ups further finds consensus in existing literature. Gomes-Neves et al. (2015) similarly found that food handlers demonstrated poor knowledge and practice regarding microbiological hazards and key food safety requirements, attributing this largely to low educational levels among food handlers, a condition that is comparably prevalent among food handlers in Nigerian boarding secondary schools. Jianu and Chis (2016) also supported this study's position by establishing that even trained food handlers in Romania exhibited low knowledge and practice levels in key areas including personal hygiene and sanitation, suggesting that training alone where it even exists is insufficient to guarantee adequate

food hygiene practice. The statistical insignificance of this study further confirms that hygiene practices have not meaningfully deviated toward acceptable standards, a position that resonates with Aguila's (2020) observation that untrained food handlers consistently underperform relative to expected benchmarks.

The researcher firmly holds that food hygiene practices among food handlers in boarding secondary schools in the Northwest Zone of Nigeria are critically inadequate and pose a significant public health risk to school-age students. The weight of both the present findings and the body of empirical literature reviewed leaves no ambiguity: without mandatory, structured, and regularly reinforced food hygiene training, combined with strict institutional supervision and enforcement of food safety standards, the conditions that enable foodborne illness will persist. School authorities and government health agencies must treat this not as a peripheral concern but as an urgent educational and public health imperative.

Conclusion

Based on the findings of the study, it can be concluded that the overall practice of food hygiene among food handlers in boarding secondary schools in the Northwest Zone of Nigeria is generally inadequate. Although some hygiene practices such as proper storage of uncooked foods, covering food to prevent contamination, and washing of cooking utensils are moderately practiced, many essential food safety measures are poorly observed. These include regular sanitation of the cooking environment, consistent hand washing, use of protective clothing, pest control, and periodic medical examinations of food handlers.

Recommendations

Based on the findings of this study, it is recommended that school authorities and relevant health agencies should organize regular training and sensitization programs for food handlers to improve their knowledge and practice of proper food hygiene. There should also be strict supervision and monitoring of food preparation areas by school management and quality assurance officers to ensure compliance with established food safety standards.

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