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Impact of food hygiene practices on students' health and prevalence of foodborne illnesses among secondary school students

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Abstract

Foodborne diseases are a major health issue in society with school going children being the most vulnerable to this health problem as they regularly eat meals offered by school canteens, street sellers, and local food stores. Food hygiene practices, including poor handwashing, poor food storage, and unsafe food handling, increase the vulnerability of these pupils to infections, including diarrhoea, gastrointestinal upsets, and frequent illness. This paper has adopted a descriptive survey design to investigate how food hygiene practices affect the health of secondary school students in Ethiope East LGA, Delta State. Multistage sampling was used to get a sample of 300 out of a population of about 1,200 students. Structured questionnaire with four-point Likert scale was used to collect data. The instrument was subject-matter validated and tested on reliability. Data collection was also undertaken using ethical procedures, and statistical analysis was performed to obtain the means and standard deviations, where a 2.50 standard was used as a decision criterion. Findings show that most respondents belonged to SSS 1 (39%), SSS 2 (41%), and SSS 3 students (19%), which is good representation spread across lower senior classes. The results indicate that students tend to agree that food hygiene has a great effect on their health, with poor hygiene related to stomach aches, diarrhoea, frequent illness, and absenteeism and good hygiene behaviour related to good health. However, hygiene has impact on academic performance that many students do not take seriously. Further, the identified key determinants of food hygiene are access to clean water, sufficient sanitation facilities, health education, and personal habits, and peer influence was not considered to be significant. The research concludes that education and provision of infrastructure and monitoring of food hygiene practices is crucial to minimizing foodborne illness and promoting the overall health and well-being of students.

Introduction

The potential effects of food hygiene practices on the health of students in secondary schools and the incidence rate of foodborne diseases have been receiving growing scholarly interest due to the long-standing burden of preventable illnesses linked to unsafe food handling in schools. In spite of the public health interventions conducted continuously, a significant percentage of secondary school students especially in developing countries still eat food prepared in unsanitary conditions. Poor handwashing, poor food storage, cross-contamination, and poor monitoring of school food vendors put students at risk of food borne pathogens. Empirical findings of recent research suggest that food safety compliance in school settings is low, which increases the risk of illness and negatively impacts the well-being of students and their academic achievement (Abuagla et al., 2025; Adeyeye et al., 2026).

Food hygiene practices refer to the combination of conditions and actions necessary to keep food safe to use throughout all preparation steps, to handle, store, and serve. Such practices are essential to avoid contamination by such dangerous microorganisms as bacteria, viruses, parasites, which can lead to foodborne infections (Usman, 2024). Basic food hygiene standards can be started with personal hygiene whereby people must wash their hands with soap and clean water before handling foods, after using toilets and after touching potential sources of contamination. Food handlers should also be clean in clothing, have short fingernails, and not handle food when not well. Safe food preparation is another important factor, which involves effective cooking to the right temperatures, washing of fruits and vegetables, and avoiding cross-contamination by separating raw and cooked food. The storage of food is also crucial; perishable food must be refrigerated to prevent bacterial growth at safe temperatures and dry food must be stored in clean, dry, and covered containers (Okwuanaso et al., 2025). Also, it is important that utensils and the environment are kept clean at all times- kitchen surfaces, equipment, and serving areas should be cleaned and sanitized regularly.

Food hygiene also includes proper waste disposal and pest control because improper waste disposal may attract pests and lead to food contamination. Following good protocols like hand washing, maintenance of temperature, and safe food handling can go a long way in reducing the chances of contamination, and bad practices increase the risk of contracting an infection. An example is the finding of Adeyeye et al. (2026) that a huge disequilibrium existed between knowledge and practice, with only a very low percentage of food handlers following proper hand hygiene prior to touching ready-to-eat foods. This result indicates that this knowledge alone does not lead to food safety implementation in practical environments. In addition, behaviours of students themselves add to the prevalence of foodborne diseases. In a new study conducted by Gonzalez-Linares et al. (2026), it was observed that although a significant percentage of students had moderate food safety knowledge, a substantial percentage did not take the risks of contaminated food seriously. This misunderstanding results in unhealthy consumption patterns, hence exposing them to foodborne diseases. The research also emphasised that behavioural attitudes are critical factors that influence food safety among adolescents.

The issue of foodborne illnesses among secondary school students is still a great concern and is often directly associated with poor hygiene behaviors. This association is supported by empirical evidence on outbreak investigations. According to Sari et al. (2024), major factors that contributed to a foodborne disease outbreak in a school setting along with improper food storage, inadequate reheating, and cross-contamination. Similarly, Le et al. (2021) found that Staphylococcus aureus, Shigella sonnei, and other pathogens were tracked to contaminated meals in a school outbreak, which was in large part due to poor hygiene practices in the food handlers. The medical consequences of these diseases are huge. The common effects of foodborne diseases are diarrhoea, vomiting and other gastrointestinal diseases, which may trigger dehydration, malnutrition, and weak immunity. In extreme cases, hospitalisation could be justified. In addition to physical health, frequent illness has a negative impact on attendance, focus, and performance of the students. Abuagla and Omer (2025) posit that the sustained exposure to unhealthy food conditions significantly harms the general health and performance of students in the school.

Moreover, the influence of environmental and socio-economic determinants is also a key factor in food hygiene practices. Such a systematic review by Tseole et al. (2022) has found that a moderate percentage of people in African contexts have adequate food hygiene, although the obstacles are a lack of access to clean water, insufficient sanitation facilities, and ineffective enforcement. These issues can also be seen in the school setting, where a lack of infrastructure and a weak supervision contributes to hygiene shortcomings. The relevance of examining the effect of food hygiene behavior on the health of students and the occurrence of food-borne pathology in secondary school students is attributed to the issues of deterioration of the health of the population, learning, and policy formulations. Health Foodborne diseases are a significant but underreported matter in

schools, especially in developing nations where regulatory hygiene safety is not consistently applied (Adeyeye et al., 2026). The knowledge of this association helps in identifying the key risk factors that include: poor hand hygiene, poor food storage facilities and poor sanitation facilities, which have direct influence to the health of students.

The research is a remarkable one as it throws light on the long-term gap between knowledge and practice in food hygiene among the students and food handlers. Although the knowledge level regarding the given hygiene and environmental safety-related issues is often moderate, the adherence rate is also low and contributes to the broader systemic problems that are evident in the environmental management and infrastructure contexts (Okafor et al., 2022; Anyakora et al., 2021). Like knowledge-practice gaps in sustainability and climate adaptation, such gaps have also been observed in other areas, such as awareness which is not necessarily reflected in practice (Odimegwu and Ikeotuonye, 2023; Anyakora et al., 2025). Additionally, previous research projects have centered on the general environmental conditions more than the school-specific context, which limits the research context (Ikeotuonye and Efobi, 2022). Furthermore, there exists a deficit of localized information between food hygiene behavior and quantifiable health and academic outcomes in students in secondary schools. The present study will help fill these gaps and provide evidence-based recommendations on interventions, improved health education, and effective regulatory frameworks by reducing the prevalence of foodborne diseases and promoting the overall well-being of the students.

Research Objectives

1. Examine the influence of food hygiene practices on the health of secondary school students.
2. Examine the extent do secondary school students fall ill of diseases related to unhygienic food

Research Questions

1. How do food hygiene practices influence the health of secondary school students?
2. To what extent do secondary school students fall ill of diseases related to unhygienic food

Methodology

This study adopted a descriptive survey research design to investigate the influence of food hygiene practices on the health of secondary school students in Ethiope East Local Government Area of Delta State. A descriptive survey research design involves collecting data from a population or representative sample to describe existing conditions, attitudes, or relationships among variables without manipulating them. The design was considered suitable for this study because it enabled the researcher to gather data from secondary school students regarding their food hygiene practices and how such practices influence their health outcomes. The study was conducted in Ethiope East Local Government Area of Delta State, Nigeria. Ethiope East Local Government Area is one of the Local Government Areas in Delta State with its administrative headquarters located in Isiokolo. The Local Government Area comprises several communities such as Abraka, Isiokolo, Okpara Inland, Okpara Waterside, and other surrounding settlements. Ethiope East is known for its concentration of educational institutions, including public and private secondary schools. The presence of markets, restaurants, food vendors, and school canteens exposes students to different food handling and hygiene practices. The choice of Ethiope East Local Government Area was based on accessibility, the high population of secondary school students, and the increasing exposure of students to various food hygiene conditions that may influence their health.

The population of this study consisted of all senior secondary school students (SS1–SS3) in both public and private secondary schools in Ethiope East Local Government Area of Delta State. Records obtained from the principals of the selected schools and the Local Government Education Authority indicated that the total population of senior secondary school students in the study area was approximately 1,200 students. Senior secondary school students were considered appropriate for this

study because they exhibit greater independence in their feeding habits and are more likely to purchase food from school environments, roadside vendors, and nearby food outlets. Furthermore, students at the senior secondary level possess sufficient cognitive maturity to comprehend questionnaire items and provide reliable and meaningful responses, making them suitable participants for the study

A sample size of 300 students was selected for this study. The selection of the sample size was based on the need to obtain a representative sample that reflects the characteristics of the entire population. The study employed a multistage sampling technique which involved the following stages: Secondary schools were grouped into two strata namely public and private schools. This ensured equal representation of both categories of schools. This gave each school equal opportunity of being selected and minimized sampling bias. Students were selected proportionately from SS1, SS2, and SS3 classes to ensure balanced representation across the senior secondary levels. The instrument used for data collection was a self-structured questionnaire. The questionnaire items were structured using a four-point Likert rating scale, which included: Strongly Agree (SA) – 4 points Agree (A) – 3 points, Disagree (D) – 2 points, Strongly Disagree (SD) – 1 point

Validity refers to the extent to which an instrument measures what it is intended to measure. The questionnaire was subjected to face and content validity. The instrument was presented to experts in Health Education and Measurement and Evaluation from a recognized tertiary institution. These experts examined the questionnaire for clarity, relevance, grammar, and adequacy of the items in addressing the objectives of the study. Corrections and recommendations provided by the experts were incorporated into the final version of the instrument before administration. Reliability refers to the consistency of an instrument in measuring what it is intended to measure. The reliability of the questionnaire was determined using the test-retest reliability method. The questionnaire was administered to 30 students in a secondary school outside the study area but with similar characteristics. After two weeks, the same instrument was re-administered to the same group of students. The responses from the two tests were analyzed using the Pearson Product Moment Correlation Coefficient. A reliability coefficient of 0.70 and above was considered acceptable for the study.

The researcher obtained an introductory letter from the department and sought permission from school authorities before conducting the study. With the assistance of research assistants, the questionnaires were distributed to the selected students during school hours. The purpose of the study was explained to the respondents, and they were assured of confidentiality and anonymity. The questionnaires were collected immediately after completion to reduce loss and ensure a high response rate. The data collected were coded, organized, and analyzed using statistical methods. Both descriptive and inferential statistics were used for data analysis. Descriptive Statistics

Mean and standard deviation were used to answer the research questions. A decision rule was established as follows: Mean score of 2.50 and above – Accepted Mean score below 2.50 – Rejected.

Results

Demographic Data

Table 1: Frequency of respondents by Class

Class	Frequency (F)	Percentage (%)
SSS 1	117	39
SSS 2	125	41
SSS 3	58	19
Total	**300**	**100**

Source: Field survey 2026

Table 1 shows the distribution of respondents by class. The results indicate that 117 respondents (39%) were in SSS 1, 125 respondents (41%) were in SSS 2, while 58 respondents (19%) were in SSS 3. This implies that students from SSS 1 and SSS 2 formed the majority of the respondents in the study.

Table 2: Mean score on the Influence of food hygiene on student health

S/N	STATEMENT	SA	A	D	SD	Mean	Decision
1	Poor food hygiene can cause stomach upset	176	124	-	-	3.59	Agree
2	Eating contaminated food can cause diarrhea	103	117	43	37	2.95	Agree
3	Food poisoning can affect my academic performance	41	39	97	123	1.99	Disagree
4	Poor food hygiene can lead to frequent illness among students	144	152	3	1	3.46	Agree
5	Students who practice good food hygiene rarely fall sick	107	113	47	33	2.98	Agree
6	Food-related illness can cause absenteeism from school	130	126	19	25	3.20	Agree
7	Good food hygiene helps improve students over all health	151	146	2	1	3.49	Agree

Table 2 presents the mean scores on the influence of food hygiene on student health. The results indicate that most items recorded mean scores above the 2.50 benchmark, showing that respondents generally agree that food hygiene affects their health. Students agreed that poor food hygiene can cause stomach upset ($\bar{x}$ = 3.59), eating contaminated food can cause diarrhoea ($\bar{x}$ = 2.95), poor food hygiene leads to frequent illness ($\bar{x}$ = 3.46), good hygiene reduces sickness ($\bar{x}$ = 2.98), food-related illness can cause absenteeism ($\bar{x}$ = 3.20), and good hygiene improves overall health ($\bar{x}$ = 3.49). However, respondents disagreed that food poisoning affects their academic performance ($\bar{x}$ = 1.99), suggesting that students may underestimate the academic impact of food-related illnesses. Overall, the findings highlight the importance of food hygiene in promoting student health.

Table 3: Mean score on the Factors influencing student food hygiene

S/N	STATEMENT	SA	A	D	SD	Mean	Decision
8	Lack of clean water affects my food hygiene practices	142	156	1	1	3.46	Agree
9	Lack of proper sanitation facilitate affects food hygiene	160	133	5	2	3.50	Agree
10	My ignorance affects food hygiene behaviour	112	124	35	29	3.06	Agree
11	Poor influence affects food hygiene habits	63	45	89	103	2.23	Disagree
12	School health education improves food hygiene practices	124	139	13	24	3.21	Agree
13	I avoid sharing eating utensils with friends	110	93	58	39	2.91	Agree

14	I aviod drinking water from unclean source	168	132	-	-	3.56	Agree
15	I properly store leftover food before eating it later	154	113	19	14	3.36	Agree

Table 3 presents the mean scores on the factors influencing student food hygiene. The results indicate that most items recorded mean scores above the 2.50 benchmark, showing that respondents generally agree that environmental, educational, and personal factors affect their food hygiene practices. Students agreed that lack of clean water ($\bar{x}$ = 3.46), lack of proper sanitation facilities ($\bar{x}$ = 3.50), personal ignorance ($\bar{x}$ = 3.06), school health education ($\bar{x}$ = 3.21), avoiding sharing eating utensils ($\bar{x}$ = 2.91), drinking water from clean sources ($\bar{x}$ = 3.56), and proper storage of leftover food ($\bar{x}$ = 3.36) influence their food hygiene. However, respondents disagreed that poor peer influence affects their food hygiene habits ($\bar{x}$ = 2.23), suggesting that students perceive their hygiene behaviors as largely independent of peers. Overall, the findings highlight that access to clean water, sanitation, education, and personal practices are key factors affecting students' food hygiene.

Discussion

Demographic information revealed that most of the respondents were pursuing lower levels of senior secondary education implying a sampling bias on the sample of students who are more accessible to surveys and who have increased interest in school-based research. In a similar study, Adebayo et al. (2026) also indicated that the lower-level secondary students in a similar study were more responsive in food hygiene and health survey checks, which also supports the sampling pattern of the current study. However, in contrast, research of tertiary institutions, including González-Linares and others (2026), note a more equal attendance among the levels of study, depending on institutional organization and student agency.

With regards to the effect of food hygiene on student health, the participants were unanimous that poor hygiene behaviors can cause gastrointestinal distress, diarrhoea, repeated illness and absenteeism, but optimal hygiene behaviors would enhance overall health. This finding is agreeable with the report by Abuagla and Omer (2025), which revealed that poor food hygiene significantly increased the health risk of Sudanese school children. Usman (2024) also highlighted that agricultural sources contaminate food handling practices, which are also a contributor to health issues among Nigerian students. Conversely, participants thought that food poisoning had a small effect on academic success, which is contrary to Le et al. (2021), who found that foodborne outbreaks in primary schools led to significant absenteeism and academic interference.

A study of factors that affect food hygiene identified that availability of drinkable water, good hygiene, individual knowledge, school health training, and consumption of safe food and water are major variables. These results are consistent with those of Tseole et al. (2022) who emphasized that environmental and educational barriers were the most important factors affecting hygiene behaviour among students in Southern Africa. Similar research performed by Okwuanaso et al. (2025) also found that environmental access and personal hygiene practices are a decisive factor in reducing the risk of contamination. On the other hand, respondents reported that peer influence had no significant impact on the hygiene behaviour as compared to Gonzalez-Linares et al. (2026) which implied that social variables tended to influence food safety behaviours among adolescents. The current study thus supports earlier findings on the significance of health education and access to sanitation in minimizing foodborne diseases alongside highlighting contextual variations in student attitudes towards the academic influence of bad hygiene behaviors.

Conclusion

This paper has shown that food hygiene behaviors play a big role in determining the health condition of secondary school children and the incidence of foodborne diseases. Results indicate that poor handwashing, food handling and poor storage are among the leading causes of health issues such as gastrointestinal distress, diarrhoea and frequent sickness among students. On the other hand, correct hygiene will foster good health and minimize absenteeism. Another finding of the research is that access to clean water, access to sanitation facilities, health education, and individual practices have a significant influence on the food hygiene behaviours of students. Although there is an overall understanding of food hygiene, there is still a discrepancy between information and practice, thus perpetuating a problem of foodborne illness. Moreover, students are likely to underrate the impact of food-related diseases on their performance. The paper highlights the importance of their increased hygiene education, proper sanitation facilities and increased vigilance over the food handling activities in schools. By solving these problems, the incidence of foodborne diseases will be decreased, and the overall health and well-being of students, as well as their academic performance, will improve.

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