

Food Hygiene Literacy and Practice among Female Secondary School Educators: Pathways to Sustainable Health in Delta State, Nigeria

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Abstract

Original Research Article

This study examined food hygiene literacy and practices among female secondary school educators as pathways to sustainable health in Delta State. Two research questions and two null hypotheses guided the study, focusing on the extent of food hygiene literacy and engagement in hygienic practices, as well as differences based on marital status and school location. A descriptive survey design was adopted. The population comprised 8,207 female educators in government-owned secondary schools, from which a sample of 370 was proportionately selected using multistage sampling across the three senatorial districts. Data were collected using a validated and reliable structured questionnaire (Cronbach's Alpha = 0.788 and 0.745) and analyzed using mean, standard deviation, and t-test at the 0.05 level of significance. Findings revealed that female secondary school educators possessed a high extent of food hygiene literacy and engaged to a high extent in food hygiene practices that promote sustainable health. Marital status did not significantly influence literacy levels, indicating that literacy level and practice are stronger determinants of hygienic behavior than demographic characteristics. However, a significant difference was observed between rural and urban educators in their engagement in food hygiene practices, underlining the influence of environmental and infrastructural factors. The study concludes that female educators represent strategic agents for advancing sustainable community health. While their strong literacy base supports positive hygiene behaviors, bridging rural–urban infrastructural gaps is essential for consistent practice. The study recommends continuous professional training, educator-led community hygiene advocacy, and improved water and sanitation infrastructure to strengthen sustainable health outcomes across Delta State.

Keywords: Delta State, Female, Literacy, Practice, Secondary School Educators, Sustainable Health.

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Introduction

A key component of long-term sustainable health is food hygiene, which includes procedures that shield food from contamination at every stage of its life, from manufacturing and preparation to consumption. Educators' food hygiene literacy and practice are particularly

important in educational and community settings since they affect students' health behaviors as well as their own well-being (Centers for Disease Control and Prevention [CDC], 2021; Ezeagu et al., 2023; World Health Organization [WHO], 2024; Akhigbe & Udoh, 2025). As teachers, caregivers, and role models, female secondary



school educators in particular play a crucial role in influencing the views of students and family members about safe food handling and healthy living (Food and Agricultural Organization [FAO], 2023; World Health Organization [WHO], 2024).

Foodborne illnesses continue to be a major public health issue in Delta State, Nigeria, where millions of acute instances of food poisoning and hundreds of fatalities are reported each year (Bleich et al., 2017; National Institutes of Health, 2020; World Health Organization [WHO], 2024). Due to bulk food preparation, unofficial food selling, and uneven sanitary regulations, secondary schools are considered high-risk locations. In this situation, female educators have two roles: they carry out the health education curriculum and frequently oversee school-based food sellers, many of whom are females, both directly and indirectly affecting food safety regulations in households and classrooms (Chima-Uzosike, 2024).

However, empirical evidence indicates that there is still a gap between literacy and practice. Only a small percentage of school-based stakeholders regularly apply this information to safe hygienic procedures, even though a large percentage of them exhibit sufficient theoretical knowledge of food hygiene (Nkosi & Tabit, 2021; Kunadu et al., 2022; Ogunyemi, 2022; WHO, 2022; Adewumi, 2023; Cortese et al., 2023). The urban-rural divide exacerbates this disparity. In comparison to rural schools, where inadequate instructional materials, a limited supply of potable water, and infrastructure deficiencies hinder effective hygiene practices, urban schools often report superior sanitation facilities and access to laboratory infrastructure (Okafor & Nwogu, 2021; Osuchukwu & Udom, 2022; Ikogho & Akpokiniovo (2025). It's interesting to note that while some behaviors, like handwashing, may be more prevalent in rural areas, other aspects, like menstruation and body hygiene, are frequently better controlled in metropolitan environments. These disparities highlight the need to examine how location, marital status-specific roles, and institutional resources influence food hygiene literacy and engagement in practice among female educators (Okon et al., 2022; WHO, 2024).

The application of food hygiene literacy in day-to-day activities is still uneven, despite relatively solid theoretical understanding. Functional health literacy issues, such as trouble deciphering nutrition labels and food safety regulations, may be particularly problematic for rural female educators (United States Department of Agriculture [USDA], 2022; National Agency for Food and Drug Administration and Control [NAFDAC], 2025). Studies indicate that women are generally more knowledgeable about food than males, but structural obstacles like cultural norms and resource constraints might make it difficult to put this knowledge into effect (Awad Allah et al., 2017; Jebriil & Alhassan, 2021; Pant & Karki, 2021; Rice & Liamputtong, 2021; Fikru & Melaku, 2022; Jakstas et al., 2023). Despite their historic significance, traditional food handling techniques and community dining rituals can occasionally go against advised cleanliness standards and raise the risk of contracting foodborne illnesses (Jakstas et al., 2023; WHO, 2024).

Food cleanliness is widely acknowledged as being crucial to lowering the prevalence of foodborne illnesses and protecting public health. Safe food handling procedures are important tactics for preventing infectious diseases and fostering long-term health results, according to organizations like the World Health Organization, Food and Agriculture Organization, and Centers for Disease Control and Prevention. At the local level, female educators' skill, dedication, and supportive settings play a major role in converting these worldwide suggestions into successful school and household practices.

In Delta State, Nigeria female secondary school educators are usually professionally trained and with credentials such bachelor's degrees in education and related fields or the National Certificate in Education (NCE). They teach students, especially girls, and encourage overall development in addition to imparting curriculum knowledge. Nutrition, food preparation, and safe handling practices are even more directly taught by female educators, especially Home Economics teachers. As a result, they have an impact outside of the classroom on homes and communities, making

them essential players in sustainable health promotion.

However, several obstacles prevent the best possible engagement with food hygiene practice. Consistent adherence to recommended standards may be hampered by cultural food customs, limited access to clean water, inadequate infrastructure, a lack of teaching resources, and the numerous household responsibilities that many women bear (Tamiru & Woldemariam, 2020; Fadimir & Raji, 2021; Fikru & Melaku, 2022; Jebiril & Alhassan, 2021; NAFDAC, 2025). In addition to endangering the health of educators themselves, these limitations expose communities, families, and children to avoidable foodborne infections that cause morbidity, mortality, and financial losses.

Even though food hygiene is covered in Nigeria's secondary school health curriculum, food-related sickness outbreaks continue to occur in Delta State's homes and schools. Notably, structural discrepancies that impact educators' ability to model and enforce basic hygiene are highlighted by differences in sanitary infrastructure, where a much larger percentage of urban schools maintain acceptable facilities than rural schools. These discrepancies, when combined with the established literacy-practice divide, raise important concerns about the extent female educators practice food hygiene.

Assessing the food hygiene literacy and practices of female secondary school educators in Delta State, Nigeria is crucial because of their significant influence on health-related behaviors. To close the gap between literacy and practice, it is crucial to comprehend how marital roles and location dynamics interact. In the end, this study evaluates food hygiene literacy and practice among female secondary school educators in Delta State, Nigeria, and ascertain the pathways for attaining sustainable health outcomes.

Research Questions

The study was guided by the following research questions.

(i) What is the extent of literacy possess by female secondary school educators about

food hygiene practices in Delta State, Nigeria?

(ii) What is the extent of engagement possess by female secondary school educators about food hygiene practices in Delta State, Nigeria?

Hypotheses

The following null hypotheses were examined at the 0.05 level of significance to fulfill the study's objectives:

Ho₁: There is no significant difference between single and married female secondary school educators concerning the extent of literacy possess about food hygiene practices in Delta State, Nigeria.

Ho₂: There is no significant difference between rural and urban female secondary school educators concerning the extent of engagement possess by female secondary school educators about food hygiene practices in Delta State, Nigeria.

Methodology

The study was carried out in government-owned secondary schools in Delta State, which is situated in the South-South geopolitical zone of Nigeria (roughly between latitudes 5°00'–6°30'N and longitudes 5°00'–6°45'E). In addition to their professional duties, female educators in Delta State are culturally expected to prepare meals and care for their children, reflecting prevailing social norms.

Eight thousand, two hundred and seven female secondary school educators working in government-owned secondary schools in Delta State, Nigeria's 25 Local Government Areas made up the study population (Delta State Post-Primary Education Board, 2025). A sample of 370 female secondary school educators was proportionately drawn from a population of 8,207, based on the 95% confidence level and 0.05 margin of error recommended by Krejcie and Morgan (1970) for populations between 5,000 and 10,000. A multistage sampling technique was employed. First, stratified sampling grouped educators into three senatorial

districts in Delta State with Delta Central (2,733), Delta North (3,177), and Delta South (2,297). Second, three LGAs were randomly selected from each district, totaling nine LGAs, and ten government-owned secondary schools were randomly chosen from these areas. Finally, female educators were proportionately selected from the schools, yielding 122 from Delta Central, 144 from Delta North, and 104 from Delta South, for a total sample of 370.

Data were collected using a structured questionnaire titled Food Hygiene Literacy and Practices Among Female Secondary School Educators for Sustainable Health in Delta State, Nigeria Questionnaire (FHLPASSESCHDSNQ). The instrument comprised Sections A and B to assess literacy of food hygiene and level of engagement in food hygiene practices. Each Sections utilized a 5-point Likert scale (Very High Extent to Very Low Extent).

The instrument’s face validity was established by three experts: one from the Department of Vocational Education (Home Economics Unit) and one from the Department of Guidance and Counseling (Tests and Measurements Unit) at Delta State University, and a public health officer from the Delta State Ministry of Health. They assessed the questionnaire for clarity, relevance, content coverage, appropriateness of instructions, and overall adequacy. Their feedback informed necessary revisions to ensure the instrument’s accuracy and suitability for data collection.

Instrument reliability was established through a pilot study involving 50 female secondary school educators in government-owned schools in Edo State, selected due to their cultural and geographic similarity to those in Delta State. Responses were analyzed using Cronbach’s Alpha in SPSS (Version 26), yielding coefficients for Sections A and B of 0.788 and 0.745 respectively. The results indicated high internal consistency, confirming the instrument’s reliability and suitability for the study.

Data was collected with the assistance of three research assistants who, alongside the researcher, administered questionnaires in selected schools after obtaining principals’ approval. Of the 376 questionnaires distributed, 370 were completed and retrieved immediately, yielding a 98.4% response rate. Only properly completed questionnaires were included in the analysis. Data was analyzed using means and standard deviations, while hypotheses were tested at the 0.05 significance level using t-test. A benchmark mean of 3.00 determined High or Low Extent. Null hypotheses were rejected when calculated p-values were less than 0.05.

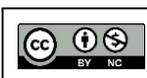
Results

Research Question One

What is the extent of literacy possess by female secondary school educators about food hygiene practice in Delta State, Nigeria?

Table 1: Mean and Standard Deviation on the Extent of Female Educators Possessing Literacy of Food Hygiene Practices in Delta State, Nigeria (N=370)

	N	Mean	SD	Decision
1 I know the correct temperatures required to safely store cooked and raw food.		3.58	1.13	HE
2 I understand the importance of handwashing before and during food preparation.		3.55	1.20	HE
3 I am aware of the health risks associated with cross-contamination between raw and cooked foods.		3.60	1.14	HE



4	I know how long perishable food items can be safely left at room temperature.	3.62	1.13	HE
5	I understand the symptoms and causes of common foodborne illnesses.	3.71	1.05	HE
6	I am knowledgeable about sanitizing food preparation surfaces and cooking utensils.	3.64	1.04	HE
7	I know how to store food properly to prevent spoilage	3.60	1.10	HE
8	I know how to apply the procedures that ensure safe handling in food preparation	3.61	0.94	HE
9	I know how to read and interpret food labeling for expiry dates and storage instructions.	3.54	1.07	HE
10	I am familiar with proper refrigeration practices for leftovers and dairy products.	3.60	1.06	HE
11	I understand the importance of separating cleaning tools (e.g., chopping boards) for different food types.	3.66	0.97	HE
12	I know the role of personal hygiene (e.g., trimmed nails, covered hair) in food safety.	3.41	1.17	HE
13	I can identify potential signs of food spoilage (e.g., odor, texture, discoloration).	3.54	1.16	HE
14	I am aware of the dangers of consuming undercooked animal products such as meat, eggs, or fish.	3.76	0.86	HE

*HE = High Extent

Table 1 indicates that female secondary school educators in Delta State demonstrated a high level of food hygiene literacy, with mean scores for all 14 items ranging from 3.41 to 3.76, exceeding the 3.00 benchmark. Highest-rated areas included awareness of the risks of consuming undercooked animal products ($\bar{X} = 3.76$), understanding symptoms and causes of foodborne illnesses ($\bar{X} = 3.71$), and the importance of separating cleaning tools for different food types ($\bar{X} = 3.66$). Standard deviations (0.86–1.20) indicate consistent

responses and general agreement among participants regarding their high level of food hygiene literacy for sustainable health.

Hypothesis One

There is no significant difference between single and married female secondary school educators concerning the extent of literacy possess about food hygiene in Delta State, Nigeria.

Table 2: T-test Analysis of the Difference between Single and Married Female Secondary School Educators Concerning Literacy of Food Hygiene Practices Possessed in Delta State, Nigeria

Respondents	N	Mean	SD	t-cal	df	p-value	Decision
Married Female Teachers	275	44.01	6.58				
				-0.50	368	0.62	Accept Ho
Single Female Teachers	95	44.39	5.69				

*Alpha = 0.05, t-cal = t-calculated, df = Difference

At an alpha level of 0.05, Table 2 displays a t-calculated value of -0.50 and a p-value of 0.62. The null hypothesis is accepted since the p-value, which is 0.62, is higher than the alpha threshold. According to this investigation, there is no discernible difference in the level of food hygiene literacy among married and single female secondary school educators in Delta State, Nigeria. This finding suggests that female secondary school teachers' literacy of food

hygiene for sustainable health in Delta State, Nigeria, is not substantially influenced by their marital status.

Research Two

To what extent do female secondary school educators engage in food hygiene practices in Delta State, Nigeria?

Table 3: Mean and Standard Deviation on the Extent to Which Female Secondary School Educators Engage in Food Hygiene Practices in Delta State, Nigeria (N=370).

S/N	Food Hygiene Practices	N	Mean	SD	Decision
26	I regularly wash my hands before handling food.	370	3.29	1.03	HE
27	I ensure that raw and cooked foods are stored separately to prevent cross-contamination.	370	3.39	1.01	HE
28	I clean cooking surfaces before and after preparing meals.	370	3.54	1.16	HE
29	I use clean and properly sanitized utensils for food preparation.	370	3.42	1.14	HE
30	I avoid cooking food that has exceeded its expiration date.	370	3.45	1.12	HE
31	I refrigerate leftovers promptly at appropriate temperatures.	370	3.48	1.09	HE
32	I thoroughly cook meat, eggs, and other animal products before serving.	370	3.58	1.09	HE
33	I regularly clean and disinfect food storage areas such as refrigerators and pantries.	370	3.45	1.16	HE
34	I avoid leaving perishable food items at room temperature for extended periods.	370	3.52	1.13	HE
35	I wear clean clothing and tie back my hair while cooking to prevent contamination.	370	3.66	0.99	HE

36	I wash fresh fruits and vegetables in salt water before consumption	370	3.52	1.13	HE
37	I teach food hygiene practices within my school environment.	370	3.57	1.06	HE

*HE = High Extent

With mean scores on 12 categories ranging from 3.29 to 3.66, all over the 3.00 norm, Table 3 demonstrates that female secondary school educators in Delta State practice good food hygiene. Wearing clean clothes and tying back hair while cooking ($\bar{X} = 3.66$), cooking animal products thoroughly ($\bar{X} = 3.58$), and cleaning cooking surfaces both before and after usage ($\bar{X} = 3.54$) were all highly regarded behaviors. Standard deviations (0.99–1.16) show that respondents are generally in agreement and

consistently engage in food hygiene procedures for sustainable health.

Hypothesis Two

There is no significant difference between rural and Urban female secondary school educators concerning the extent of engagement possess by female secondary school educators about food hygiene practices in Delta State, Nigeria.

Table 4: T-test Analysis of the Difference between Rural and Urban Female Secondary School Educators Regarding Engagement in Food Hygiene Practices in Delta State, Nigeria

Respondents	N	Mean	SD	t-cal	Df	p-value	Decision
Rural	135	39.22	9.61				
				0.55	368	0.02	Reject Ho
Urban	235	38.64	9.83				

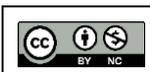
*Alpha = 0.05, t-cal = t-calculated, df = Difference

At an alpha level of 0.05, the result in Table 4 displays a t-calculated value of 0.55 and a p-value of 0.02. The null hypothesis is rejected since the p-value, which is 0.02, is less than the alpha threshold. This indicates that when it comes to their involvement in food hygiene practices for sustainable health in Delta State, Nigeria, female secondary school educators in rural and urban areas differ significantly. This finding suggests that, in Delta State, Nigeria, location has a major impact on female secondary school educators' participation in food hygiene practices for sustainable health.

Discussion of Findings

Female Educators Possessing Literacy of Food Hygiene

In Delta State, Nigeria, female secondary school educators had a high extent of food hygiene literacy, according to the findings in research question one. This result is consistent with that of Nkosi and Tabit's (2021) study, which discovered that crucial hygiene activities like washing hands with soap and running water are adversely affected by low food hygiene literacy. According to research by Madaki and Bavorova (2023), Moreb et al. (2023), and



Chuang et al. (2021), focused food hygiene education and information availability greatly improve food hygiene literacy and compliance habits. Furthermore, this study has shown that female educators have overcome literacy deficiencies throughout time, as seen by their high level of food hygiene expertise. This suggests that the pathway to attaining sustainable health in Delta State, Nigeria, depends on the high level of food hygiene literacy among female secondary school teachers.

Additionally, the results of hypothesis two demonstrated that there is no discernible difference in the practice of food hygiene for sustainable health between married and single female secondary school educators in Delta State, Nigeria. This result is consistent with the findings of Osaili et al. (2022), who found that women who handle domestic food may lessen their adoption of safe food practices by attributing foodborne illness to external factors rather than personal responsibility, such as fate or previous contamination. According to Osuchukwu and Udom (2022), there is a statistically significant correlation between literacy levels and practice. This argument may be related to women's nature rather than their marital status, according to the study's findings. According to Okon et al. (2022), there is a strong positive correlation between practice and knowledge. This indicates that in Delta State, Nigeria, female secondary school teachers' literacy of food hygiene for sustainable health is not substantially influenced by their marital status. The importance of food hygiene in fostering a sustainable, healthy, and socially just society is thus highlighted by the high literacy rate of female secondary school educators.

Female Teachers' Engagement in Food Hygiene Practices

In Delta State, Nigeria, secondary school female educators engage in food hygiene practices for sustainable health to a high extent, according to the study's findings in research question three. In contrast, Okafor and Ugwoke (2024) noted that despite a respectable level of commitment to fundamental hygiene practices, there were clear deficiencies in the usage of appropriate clothing and hand hygiene.

Similarly, Ezeagu et al. (2023) found that although female secondary school students in Delta State, Nigeria had mediocre theoretical understanding, a significant portion demonstrated inadequate practical food hygiene skills. Nonetheless, the results of this study are consistent with Okon et al. (2022) study, which found that 86 out of 100 food handlers demonstrated appropriate hygienic practices due to strong understanding. This finding implies that the attitude toward putting what has been taught into practice is a reflection of the knowledge that has been acquired throughout time. This is demonstrated by the high percentage of female secondary school educators who participate in food hygiene initiatives.

Table four results also demonstrated that, in Delta State, Nigeria, female secondary school educators' engagement in food hygiene practices for sustainable health differs significantly based on location. This indicates that female secondary school educators in Delta State, Nigeria, location based on rural and urban divide differ significantly in their engagement to food hygiene practices for sustainable health. The findings indicate that location is a crucial factor since educators in Delta State, Nigeria, rural or urban school had quite different food hygiene practices. This implies that in order to promote sustainable health, some hygiene practice treatments might need to be modified according to the location of the female educators' houses.

The Pathways to Sustainable Community Health in Delta State, Nigeria

The foundation for more significant advancements in sustainable health is the high level of food hygiene literacy among female educators in Delta State, Nigeria. The high literacy level observed indicates that sustained educational exposure and access to hygiene information have positively influenced their knowledge base over time. Such literacy serves as a critical driver of appropriate hygiene behaviors, reinforcing the established link between literacy level and practice in achieving sustainable community health outcomes.

This literacy level can be used to direct particular paths toward sustainability. Focused

food hygiene education for educators and communities contributes to the high literacy rates among female secondary school educators. Incorporating hygiene instruction into school curricula and community workshops enhances adherence to practices like handwashing, which is critical to literacy of food hygiene practices. Thus, scalable and educator-driven models for sustainable health behavior adjustment is achievable through increasing the literacy of female educators in both rural and urban areas and enabling them to advocate for cleanliness both at the school and home systems. This suggests that literacy level and practice, rather than personal demographic characteristics, are stronger determinants of hygienic behavior. This underscores the importance of continuous educational interventions that prioritize literacy enhancement irrespective of social background.

These contextual differences highlight the need for tailored interventions that address the unique challenges faced in various settings. Sustainable health promotion strategies must therefore integrate educational empowerment with improved access to water, sanitation, and hygiene infrastructure, particularly in underserved communities. Initiatives that combine educator-led outreach with access to clean water and sanitation address environmental risks including oil contamination. Community ownership reduces reliance on outside help and promotes sustainability. To further enhance the community, take into account educators input on hygiene literacy and offer health workers incentives and community-based insurance. Investments in solar boreholes, eco-stoves, and biosand filters help vulnerable Delta communities overcome hygiene challenges. Strong, fair health systems are ensured by these multi-stakeholder activities.

Conclusion

This study concludes that female secondary school educators in Delta State actively participate in practices that promote sustainable health and exhibit a high extent of food hygiene literacy. Their solid literacy base highlights the benefits of ongoing education and reaffirms the connection between literacy and proper hygiene practices in fostering sustainable health

outcomes. The results show that hygienic behaviors are not greatly impacted by marital status, indicating that reading level and practice are more important variables than individual demographics. Nonetheless, significant differences between educators in rural and urban areas demonstrate how infrastructure and environmental factors affect how well hygiene measures are implemented.

In general, female educators show themselves to be key players in promoting sustainable health. Their ability to maintain and expand favorable health results throughout Delta State's schools and homes will be strengthened by bolstering educational empowerment in conjunction with fair improvements in water, sanitation, and hygiene facilities, especially in underprivileged areas.

Recommendations

Based on the findings, the following are recommended for sustainable health in Delta State, Nigeria:

- (i) The Delta State Ministry of Education should organize regular workshops and professional development programmes on food hygiene for female secondary school educators;
- (ii) Female educators should be encouraged to advocate for hygiene support educator-driven, scalable models of sustainable health behavioral change in schools and the communities around them; and
- (iii) The Government of Delta State, Nigeria should address the rural-urban disparities by ensuring infrastructures like clean water sources (such as solar-powered boreholes), improved sanitation facilities, eco-friendly cooking systems, and household water treatment solutions (e.g., biosand filters) are provided in rural areas.

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