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# EFFECTIVENESS OF INFORMAL ENVIRONMENTAL HEALTH EDUCATION IN REDUCING PUBLIC HEALTH RISKS AMONG MARKET WOMEN IN OGUN STATE

By

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## ABSTRACT

*This study examined the perceived effectiveness of informal environmental health education in reducing public health risks among market women in Ogun State, Nigeria. A descriptive survey design was adopted, and 300 market women were selected through multi-stage sampling from two major markets in the Ijebu and Egba divisions. Data were collected with a structured questionnaire titled Survey on Informal Environmental Health Education and Public Health Risks among Market Women, which showed high internal consistency (Cronbach's α = .91). The study assessed six public health outcomes: hygiene practices, waste disposal practices, food safety practices, disease prevention awareness, use of personal protective items, and overall health behaviour. Data were analysed using descriptive statistics and Pearson Product Moment Correlation. Informal environmental health education was positively associated with food safety practices ($r = .549$, $p < .01$, $r^2 = .30$), use of protective items ($r = .521$, $p < .01$, $r^2 = .27$), hygiene practices ($r = .511$, $p < .01$, $r^2 = .26$), disease prevention awareness ($r = .463$, $p < .05$, $r^2 = .21$), and waste disposal practices ($r = .437$, $p < .05$, $r^2 = .19$). These results suggest weak-to-moderate practical effects, with informal education explaining approximately 19% to 30% of the variance in selected public health behaviours. The study concluded that informal environmental health education is a useful, low-cost strategy for improving health-related practices in community marketplaces, although the correlational design does not establish causation. It recommended sustained market-based health talks, peer education, visual aids, and collaboration among health authorities, market associations, and community leaders.*

**Keywords:** Informal environmental health education, public health risks and market women

## 1.0 INTRODUCTION

Environmental health is a branch of public health that deals with all the physical, chemical, and biological factors external to a person and all related factors that can potentially affect health. It focuses on preventing diseases and creating health-supportive environments (Alabi et al., 2021). Environmental health issues, especially in developing countries, are closely linked to poor hygiene, pollution, and poor waste management, which contribute to many preventable diseases (Abalansa et al., 2021). Informal environmental health education refers to health knowledge and awareness passed outside the classroom through radio broadcasts, community meetings, peer conversations, and NGO-led outreach programs. It is especially relevant in informal settings where formal education or training may be limited (Hoang et al., 2021). Such informal education plays a critical role in shaping attitudes and behaviours regarding health and hygiene. It helps individuals understand how their environment affects their health and what simple actions can reduce risks (Almasi et al., 2019). Market women, for instance, may learn how proper waste disposal or use of clean water reduces disease transmission. Over time, this knowledge can improve public health by promoting better hygiene practices and limiting exposure to harmful environmental factors (Dutta et al., 2023).

Market women are key stakeholders in the informal economy of Nigeria. They are predominantly self-employed women who trade goods in open markets and are often responsible for the sale of food and household items. Their role in the economy is essential, especially for food distribution and local employment (Idama et al., 2024). However, in the course of their daily activities, they are exposed to several health risks. These include constant exposure to unclean water, uncollected waste, poor ventilation in enclosed stalls, and sometimes toxic substances from poor handling of materials (Iloabuchi et al., 2024). Because market environments are usually crowded and lack proper sanitation infrastructure, market women become vulnerable to disease outbreaks like malaria, typhoid, and foodborne infections. Additionally, as they interact with large portions of the population, their hygiene practices can significantly influence the health of the community (Jemiluyi, 2021).

Markets in Nigeria, including those in Ogun State, are known for poor waste management, stagnant drainage systems, inadequate toilet facilities, and overcrowding. These conditions make them hotspots for diseases like cholera, typhoid, and malaria (Ezeh et al., 2024). Markets that lack proper sanitation facilities are breeding grounds for flies, rodents, and mosquitoes. This not only threatens the health of vendors but also puts customers and surrounding residents at risk (Abogunrin-Olafisoye & Adeyi, 2025). Studies have shown that poor environmental health practices in Nigerian markets often stem from lack of awareness and limited access to formal education. Despite attempts by government agencies to enforce market sanitation laws, compliance remains low due to poor implementation and lack of stakeholder engagement (Iloabuchi et al., 2024). Informal traders often do not receive any structured health training, leading to continued unsafe

practices such as dumping waste in open drains or displaying food uncovered in dusty environments (Alabi et al., 2021).

Informal environmental health education has proven to be effective in low-income settings where formal education is limited. It uses culturally relevant tools such as market associations, town hall announcements, religious gatherings, and community drama to pass messages (Lebbie et al., 2021). These forms of education are more relatable and accessible to market women who may not understand scientific health terms but respond well to practical advice in their local language. For instance, a radio jingle about handwashing before handling food can influence behaviour more than posters or flyers that require reading skills (Hoang et al., 2021). Community health workers and NGO programs often serve as the first point of contact for women in informal settings, using these channels to spread awareness about disease prevention and environmental hygiene (Abalansa et al., 2021). In areas like Ogun State, where public health infrastructure is not always sufficient, such informal education helps fill the knowledge gap. It empowers market women to adopt better health behaviours such as proper waste disposal, use of personal protective gear, and safe food handling practices (Almasi et al., 2019). These changes, though small at the individual level, can lead to significant reductions in public health risks when adopted widely across the market population (Ezeh et al., 2024).

In many urban and semi-urban markets in Ogun State, environmental health conditions remain poor. Market stalls are frequently surrounded by uncollected waste, stagnant water, and improperly disposed food remains, creating conditions that encourage cholera, typhoid, malaria, and other preventable diseases. Market women, who are central to daily commercial activities, often operate in these environments without adequate information on health risks or practical ways to reduce them. Although government agencies periodically enforce sanitation regulations and conduct environmental campaigns, the outcomes have remained limited because of low literacy levels, inconsistent monitoring, weak infrastructure, and insufficient community-based engagement. Ogun State was selected because of its dense commercial markets, rapid urban and semi-urban growth, and the strategic role of market women in food distribution and household-level health practices. Some non-governmental organisations, community health workers, and radio programmes have attempted informal health education in market settings, but their influence on daily hygiene, food safety, waste disposal, disease prevention, and protective practices has not been adequately measured. Existing studies also tend to discuss health education generally without paying sufficient attention to the unique market context. Therefore, this study evaluates the perceived effectiveness of informal environmental health education in reducing public health risks among market women in Ogun State.

### 1.1 Research Questions

The following research questions guided the study:

i. Will informal environmental health education significantly improve hygiene practices among market women?

ii. Will informal environmental health education significantly improve waste disposal practices among market women?
iii. Will informal environmental health education significantly improve food safety practices among market women?
iv. Will informal environmental health education significantly increase awareness of disease prevention among market women?
v. Will informal environmental health education significantly promote the use of personal protective items among market women?
vi. Will informal environmental health education significantly improve the overall health behaviour of market women?

### 1.2 Hypotheses

These following hypotheses were tested;

**i.** Informal environmental health education will not significantly improve hygiene practices among market women in Ogun State.
**ii.** Informal environmental health education will not significantly improve waste disposal practices among market women in Ogun State.
**iii.** Informal environmental health education will not significantly improve food safety practices among market women in Ogun State.
**iv.** Informal environmental health education will not significantly increase awareness of disease prevention among market women in Ogun State.
**v.** Informal environmental health education will not significantly promote the use of personal protective items among market women in Ogun State.
**vi.** Informal environmental health education will not significantly improve overall health behaviour among market women in Ogun State.

## 2.0 Literature Review

### 2.1 Concept of Environmental Health

Environmental health refers to the branch of public health concerned with all aspects of the natural and built environment affecting human well-being. According to the World Health Organization (WHO), environmental health addresses the physical, chemical, and biological factors external to a person, and all the related factors impacting behaviours (WHO, 2024). Academics define it more broadly to include human interactions with the environment, including how people manage waste, access clean water, and maintain hygiene in their surroundings (Mehmood et al., 2024). The main components of environmental health include sanitation, hygiene, waste control, clean water access, and air quality regulation. Proper waste disposal is crucial for avoiding the spread of diseases, especially in dense areas like markets. Poor sanitation can lead to disease outbreaks, while poor air quality increases respiratory issues (Mahmood et al., 2020). In Nigeria, improper waste management remains a key environmental health issue. Urbanisation and market expansions have intensified these problems due to limited government enforcement and weak infrastructure (Mafiana et al., 2022).

There is a clear connection between environmental health and public health. When environmental conditions worsen, the health of populations declines, particularly among vulnerable groups like market women who work daily in open and often unsanitary environments (Oladimeji et al., 2024). Inadequate waste disposal, poor drainage, and exposure to pollution can lead to diseases such as malaria, typhoid, and cholera, which are still prevalent in Nigeria (Olukosi et al., 2020). Women in markets frequently face health challenges because of proximity to unclean surroundings and lack of access to timely health information. In many developing countries, including Nigeria, the challenge is worsened by weak governance, poverty, and low awareness about environmental hazards. For example, deforestation for commercial expansion reduces air quality and increases temperatures, worsening living and working conditions (Maijama'a et al., 2020). Such environmental degradation also reduces biodiversity and increases exposure to harmful pollutants that affect human health (Mafiana et al., 2022).

### 2.2 Informal Environmental Health Education

Informal education refers to learning that takes place outside formal school systems. It includes non-institutional learning through conversations, peer sharing, storytelling, radio programmes, religious gatherings, market association meetings, and other community activities. Informal environmental health education is especially important for market women in Nigeria because many traders may not have access to structured public health training. Studies on Nigerian markets show that public enlightenment, training, and community-based sanitation education can improve awareness and strengthen waste management behaviour among market women (Ajiboye, 2017; Itasanmi et al., 2019; Ezedike et al., 2020). Informal methods such as market meetings, town announcers, peer-led talks, and local-language demonstrations are practical because they are oral, repetitive, participatory, and adapted to the realities of the market environment.

The benefits of informal environmental health education are strongest in low-literacy and resource-constrained settings. Health educators can link poor waste disposal, unsafe food handling, open drainage, and inadequate handwashing to illnesses that traders and customers experience directly. Evidence from studies on market women in Nigeria shows that poor sanitation infrastructure, limited water access, and weak hand hygiene remain major concerns in market settings (Ezeike, 2026; Ezedike et al., 2020). Training and public enlightenment are therefore relevant because they can increase awareness, support behaviour change, and encourage participation in sanitation exercises (Ajiboye, 2017; Itasanmi et al., 2019). However, education alone is not sufficient; effective change also requires waste bins, regular waste collection, functional toilets, clean water, and enforcement by local authorities and market leaders.

### 2.3 Role of Market Women in Public Health Systems

Market women in Nigeria are a core part of the informal sector. They sell food items, farm produce, household goods, and other commodities in open markets, and their activities support local employment, food distribution, and household welfare. Because many market women handle food and interact with large numbers of customers daily, their hygiene and sanitation practices have

implications for wider public health. Studies on market women in Nigeria have linked market sanitation conditions to hand hygiene, waste disposal, food safety, and exposure to diseases such as diarrhoea, cholera, typhoid, and malaria (Ezedike et al., 2020; Ezeike, 2026). This makes market women both a vulnerable group and a strategic population for environmental health education.

Sanitation practices in markets are also a concern. Food waste, plastics, packaging materials, and wastewater are often poorly managed, especially where waste bins, toilets, drainage, and collection services are inadequate. In Nigerian market studies, traders have reported poor access to clean water, inadequate toilet facilities, open waste disposal, and weak participation in sanitation exercises (Ezeike, 2026; Itasanmi et al., 2019). These conditions create opportunities for flies, rodents, mosquitoes, and other disease vectors to thrive. Informal environmental health education can therefore empower market women with practical knowledge on hygiene, waste disposal, safe food handling, and disease prevention, while also encouraging market associations to demand better sanitation services from relevant authorities.

### 2.4 Common Public Health Risks in Marketplaces

Nigerian marketplaces face a wide range of environmental and public health risks. One of the most serious challenges is poor waste management. Solid and organic waste is often disposed of in open spaces without regular collection, creating foul odours and attracting flies and rodents. Studies among market women in Nigeria show that poor waste disposal, inadequate toilets, limited water supply, and weak hand hygiene are common problems in market environments (Ezedike et al., 2020; Ezeike, 2026). Stagnant water from blocked or poorly maintained drains also creates breeding sites for mosquitoes, increasing malaria risk. These conditions affect not only traders but also customers, nearby residents, and food consumers.

The lack of adequate toilet and handwashing facilities in many markets also raises concerns. Where traders cannot access clean water and functional toilets, open defecation, unsafe disposal of wastewater, and poor hand hygiene may occur. These practices increase the likelihood of waterborne and food-borne diseases, especially when food is displayed or handled in contaminated environments. National evidence also shows that sanitation remains a major public health challenge in Nigeria, with open defecation and inadequate sanitation contributing to diarrhoeal diseases and cholera risks (Pona et al., 2021; UNICEF, 2025). Therefore, marketplace health risks should be addressed through a combination of informal education, WASH infrastructure, routine sanitation monitoring, and active participation of market associations.

### 2.5 Theoretical Framework

This study is anchored on the Health Belief Model and supported by Social Cognitive Theory. The Health Belief Model explains health behaviour through perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy (Abraham & Sheeran, 2015). In the context of market women, informal environmental health education may increase awareness of susceptibility to diseases such as cholera, typhoid, malaria, and food-borne infections. It may also strengthen perceived benefits by showing how handwashing, safe food

display, proper waste disposal, and use of protective items can reduce health risks. Market meetings, radio messages, peer discussions, community drama, and health talks can serve as cues to action that encourage safer daily practices. Social Cognitive Theory further explains how market women may learn through observation, peer modelling, reinforcement, and collective support within market associations (Bandura, 1986). Together, these theories provide a basis for linking informal education to behavioural outcomes while recognising that knowledge alone may not produce change unless social support, enabling resources, and perceived ability to act are also present.

### 2.6 Review of Related Studies

Nkem et al. (2024) conducted a qualitative study in Ogoni, Niger Delta, to understand how the oil industry impacts health and well-being through economic exclusion. Using in-depth interviews with 22 residents across four local governments, the study found that oil-related activities contributed to environmental degradation, disrupted livelihoods, and reduced access to healthcare. Three core themes emerged: loss of income affected families' ability to afford basic needs like healthcare; lack of environmental remediation and unfair benefit-sharing worsened displacement; and low investment in development and health infrastructure limited access to care and job opportunities. The study applied the concept of social exclusion to explain how denial of access to resources and opportunities contributes to poor health outcomes. Though comprehensive, the study focused mainly on oil-related exclusion and did not explore informal environmental health education as a means of improving community health. It also did not address informal learning strategies market women use to protect themselves or educate others. This presents a gap in assessing how grassroots awareness efforts may empower vulnerable populations to reduce public health risks.

Abogunrin-Olafisoye and Adeyi (2025) reviewed the environmental and health effects of informal waste electrical and electronic equipment (WEEE) recycling in Nigeria. Their findings show that crude methods such as open burning and manual dismantling lead to severe air, water, and soil contamination. The health consequences for informal workers and nearby residents include respiratory illnesses and exposure to toxic substances. The study emphasized that limited regulation, poor infrastructure, and low public awareness make it difficult to implement safe recycling practices. Socioeconomic and cultural factors also affect how waste is handled in different regions, which means tailored interventions are needed. While the review highlights risks associated with informal practices, it did not examine how informal environmental education could reduce these risks. Specifically, there was no analysis of how awareness creation among vulnerable groups like market women could foster safer waste disposal and public health protection. This gap highlights the need to explore whether informal education can serve as a grassroots tool for behavioral change and risk reduction among women in the informal sector.

Chiziba et al. (2024) examined how socioeconomic, demographic, and environmental factors influence malaria transmission in urban Nigeria. The researchers used Demographic and Health Survey data and spatial indicators to assess malaria prevalence among children under five. Their multivariable models revealed that better education, higher income levels, improved housing,

population density, and environmental conditions like rainfall and vegetation played key roles in determining malaria risk. The study confirmed that tackling urban malaria requires a blend of social and environmental interventions. Although comprehensive, the research emphasized disease control rather than preventive education. It did not explore how informal environmental health education could raise awareness or change behaviors that reduce vector exposure. Also missing is any gendered analysis, especially in how market women – who often make daily environmental decisions – might use informal education to prevent disease transmission. This leaves a gap in understanding how informal, community-led learning can be a strategy for reducing health risks in low-income urban environments.

Itasanmi et al. (2019) investigated how age and education affect environmental knowledge, attitude, and behavior among market women in Ibadan, Oyo State. Using a descriptive survey method, the researchers sampled 403 market women randomly from several markets in the city. The instrument was pilot-tested with female artisans, yielding high reliability scores (Cronbach's $\alpha$ = .947 for knowledge, .70 for attitude, and .766 for behavior). Data were collected through questionnaires administered with help from trained assistants. Six hypotheses were tested using T-test and ANOVA. The findings revealed that older women had significantly different environmental knowledge and behaviors compared to younger women, although their attitudes were similar. Furthermore, education was found to significantly influence knowledge, attitude, and behavior. The study concluded that continuous learning and basic education for market women are essential for improving environmental consciousness. However, the study focused on formal demographic factors like age and education, overlooking informal health education interventions. Also, it did not assess the influence of non-formal awareness or community-based education programs on environmental and public health behavior. The current research intends to fill this gap by evaluating the perceived impact of informal environmental health education on market women's hygiene practices, waste disposal, and disease prevention, using a broader and more inclusive framework.

Pona et al. (2021) assessed Nigeria's environmental health situation, highlighting current challenges and future needs. The authors reviewed existing literature and analyzed data from the Institute of Health Metrics and Evaluation to identify major causes of death and Disability-Adjusted Life Years (DALYs) linked to environmental factors. Findings showed that air pollution, poor sanitation, and unsafe water were top contributors to health problems. The study noted that lower respiratory infections due to air pollution rose to become the leading cause of death in Nigeria by 2017. Household air pollution, ambient ozone exposure, and lead contamination were also linked to increased morbidity. Despite some improvements in WaSH (Water, Sanitation, and Hygiene) practices, many risk factors have worsened. The authors emphasized the need for environmentally sustainable policies and active involvement of policymakers and the public to mitigate environmental health risks. However, the study adopted a broad national perspective and did not focus on specific population groups such as market women, who may be more vulnerable to environmental health risks due to their exposure in crowded market environments. It also lacked an evaluation of community-driven health education strategies. The current study addresses these

gaps by focusing specifically on market women in Ogun State, evaluating how informal environmental health education influences their health behaviors and perceived public health risks.

Ezedike et al. (2020) explored health-seeking behaviors and waste management practices among women in major markets in Owerri, Nigeria. A cross-sectional survey was conducted with 739 market women across three large markets to understand how they manage waste and seek healthcare. Results showed that the type of goods sold significantly influenced motivation to manage waste for disease prevention. However, understanding of the 3Rs (Reduce, Reuse, Recycle) was not strongly associated with the women's health-seeking methods. Principal Component Analysis revealed two major waste-related health dimensions: acute and chronic diseases. The most common types of waste were vegetables and plastics, with plastics being reused the most. Government agencies were primarily responsible for waste disposal. The study recommended community-level knowledge transfer programs to improve sustainable waste practices. A key gap in the study is the lack of attention to the role of informal environmental health education as a variable that could influence waste-related behavior. While it assessed health-seeking behavior generally, it did not examine how exposure to informal awareness efforts or local health campaigns could shape women's practices and disease prevention strategies. The present study aims to bridge this gap by investigating the perceived effectiveness of informal environmental health education on market women's hygiene, waste disposal, and food safety behaviors in Ogun State.

Adeyanju et al. (2025) examined the environmental and public health impacts of urbanization and industrialization in Nigeria. The study linked rapid city growth and expanding industries with worsening pollution, poor waste management, and public health crises. It highlighted major sources of pollution—such as emissions from factories and improper waste disposal—as key contributors to air and water contamination, which in turn promote respiratory diseases, vector-borne illnesses, and other health threats. The authors emphasized the need for policy reforms that promote sustainable urban and industrial development. Key solutions proposed include stricter environmental regulations, investment in green infrastructure, and community-level environmental awareness programs. However, while this study acknowledged the importance of community involvement, it did not evaluate the specific role of informal education strategies at the grassroots level, especially among women in informal sectors like markets. It also lacked focus on how public health risks among market women—who operate in overcrowded, often unsanitary environments—could be reduced through informal environmental education.

## 3.0 Methodology

**3.1 Research design:** The study used a descriptive survey research design.

A descriptive survey design was considered appropriate because the study sought to measure respondents' perceptions and self-reported practices at a single point in time. A mixed-methods design could have provided deeper qualitative explanations, but the survey approach was selected to obtain quantifiable evidence from a relatively large sample across the selected markets.

**3.2 Study population:** The target population included market women from major markets across Ogun State.

**3.3 Sampling technique:** A multi-stage sampling method was adopted. In the first stage, purposive sampling was used to choose two old geopolitical divisions of Ogun State—Ijebu and Egba—from the four existing divisions: Yewa, Egba, Ijebu, and Remo. The reason for selecting these older divisions is that they represent the state's socio-cultural structure. Yewa, formerly known as Egbado, shares cultural ties with Egba, and Remo, formerly Ijebu-Remo, shares similar traits with Ijebu. Next, the largest markets in the selected divisions were chosen using purposive sampling: Ita-Osu new market in Ijebu-Ode (for Ijebu) and Oba Lipede market in Abeokuta (for Egba). In each market, 150 market women were randomly selected using simple random sampling, giving a total sample of 300 respondents.

**3.4 Sample:** The study sample consisted of 300 market women. The markets were grouped into five categories based on the types of goods sold—farm produce, provisions, fish/meat, and clothing. Respondents were selected from each group using simple random sampling.

The sample size of 300 was adopted to provide adequate representation from the two selected markets, with 150 respondents drawn from each market. This equal allocation allowed comparison across market contexts and ensured that the major categories of goods sold were represented. However, because only two markets were included, the findings should be generalised with caution beyond similar market settings in Ogun State.

**3.5 Instrumentation:** The instrument used for the study was a self-designed, structured questionnaire titled *Survey on Informal Environmental Health Education and Public Health Risks among Market Women (SIEHEPHRMW).*

The questionnaire contained sections on respondents' socio-demographic characteristics, exposure to informal environmental health education, hygiene practices, waste disposal practices, food safety practices, disease prevention awareness, use of personal protective items, and overall health behaviour. Items were developed from the study objectives, reviewed literature, and common environmental health practices observed in market settings. Responses were measured mainly on a four-point Likert scale ranging from strongly agree to strongly disagree.

Content validity was established by submitting the draft questionnaire to public health and environmental health specialists for review. Their comments were used to improve wording, remove ambiguous items, and ensure that the questions adequately covered the major constructs of the study. The pre-test also helped confirm that the items were understandable to both literate and non-literate respondents when administered with assistance.

**3.6 Reliability of the Instrument:** The reliability of the questionnaire was tested using the split-half method on 30 market women from Bodija market in Oyo State (to prevent influence on the actual sample). The result showed a high reliability score of 0.91 using Cronbach Alpha. Based on this, 300 copies of the questionnaire were distributed to market women in the selected markets with the help of eight trained research assistants. Literate respondents completed the forms on their own, while non-literate women were guided through a face-to-face interview approach.

**3.7 Data Analysis:** The data were analysed using charts and tables. Research questions were answered with descriptive statistics using charts. The hypotheses were tested using Pearson Product Moment Correlation (PPMC), and the analysis was carried out using SPSS version 26.

**3.8 Ethical consideration and approval:** Approval was obtained from the market association leaders through the offices of the Executive Chairmen in Ijebu-Ode and Abeokuta South Local Government Areas. Each respondent signed a consent form after the study was clearly explained to them. Research assistants were trained on how to conduct the survey with respect and proper procedure.

## 4.0 Results

### Analysis of Research Questions

**Research Question 1:** Informal environmental health education will not significantly improve hygiene practices among market women in Ogun State.

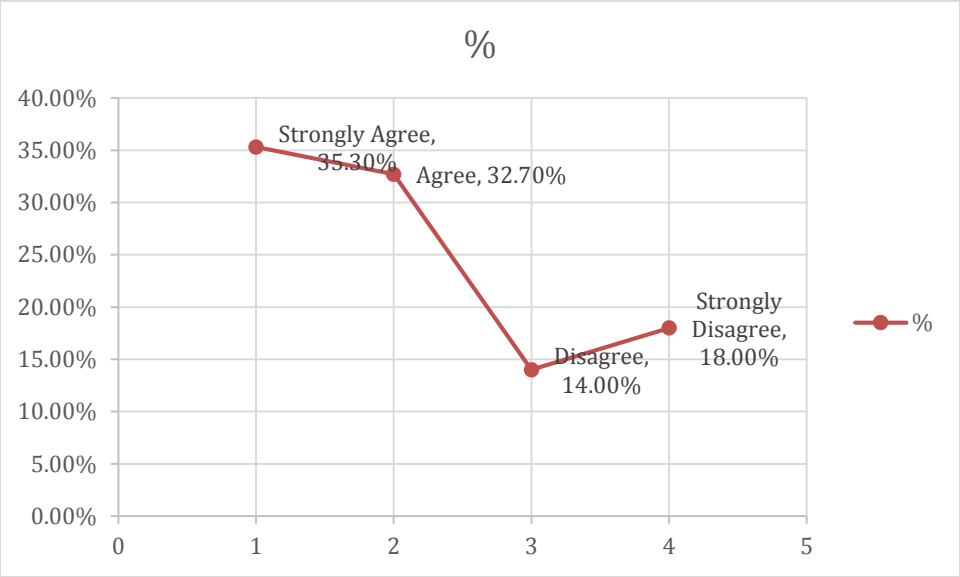



**Figure 1:** Graphical Representation of Descriptive Analysis of Research Question One

The chart shows that informal environmental health education significantly improves hygiene practices among market women in Ogun State. 106 (35.3%) respondents strongly agreed, 98 (32.7%) agreed, 42 (14.0%) disagreed, and 54 (18.0%) strongly disagreed that it improves hygiene practices.

**Research Question 2:** Informal environmental health education will not significantly improve waste disposal practices among market women in Ogun State.

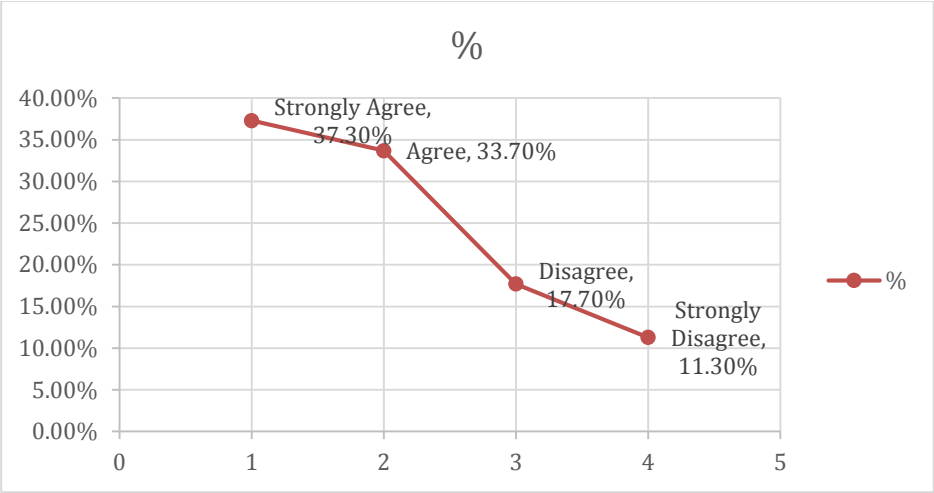



**Figure 2:** Graphical Representation of Descriptive Analysis of Research Question Two

The chart indicates that informal environmental health education has a positive effect on waste disposal practices among market women in Ogun State. 112 (37.3%) strongly agreed, 101 (33.7%) agreed, 53 (17.7%) disagreed, while 35 (11.3%) strongly disagreed.

**Research Question 3:** Informal environmental health education will not significantly improve food safety practices among market women in Ogun State.

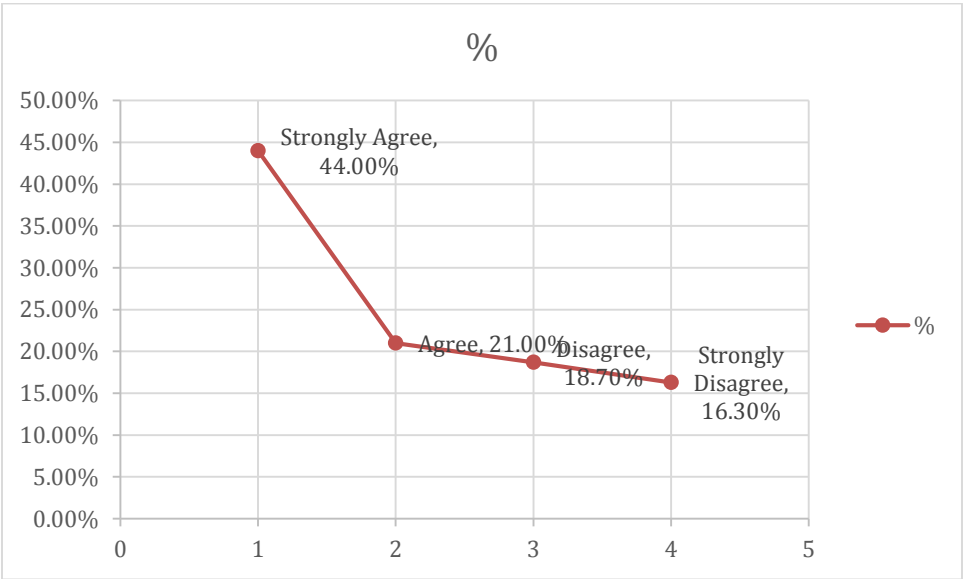



**Figure 3:** Graphical Representation of Descriptive Analysis of Research Question Three

The chart reveals that informal environmental health education significantly improves food safety practices among market women in Ogun State. 132 (44.0%) strongly agreed, 63 (21.0%) agreed, 56 (18.7%) disagreed, and 49 (16.3%) strongly disagreed.

**Research Question 4:** Informal environmental health education will not significantly increase awareness of disease prevention among market women in Ogun State.

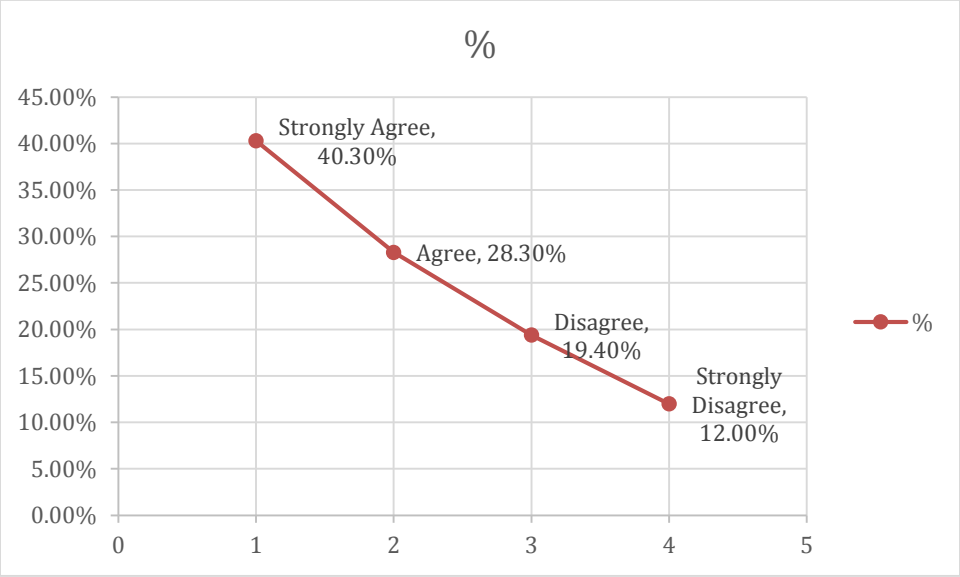



**Figure 4:** Graphical Representation of Descriptive Analysis of Research Question Four

The chart shows that informal environmental health education increases awareness of disease prevention among market women in Ogun State. 121 (40.3%) strongly agreed, 85 (28.3%) agreed, 58 (19.4%) disagreed, and 36 (12.0%) strongly disagreed.

**Research Question 5:** Informal environmental health education will not significantly promote the use of personal protective items among market women in Ogun State.

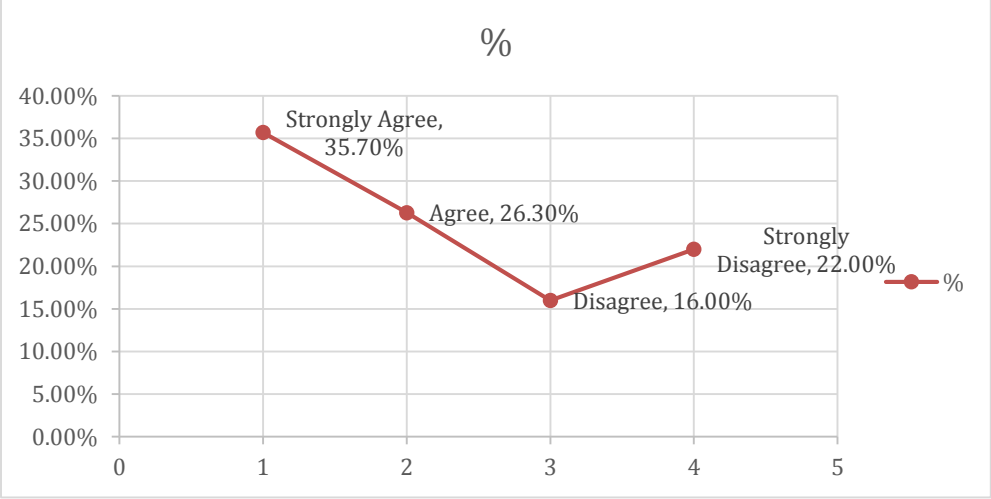



**Figure 5:** Graphical Representation of Descriptive Analysis of Research Question Five

The chart indicates that informal environmental health education helps promote the use of personal protective items among market women in Ogun State. 107 (35.7%) strongly agreed, 79 (26.3%) agreed, 48 (16.0%) disagreed, and 66 (22.0%) strongly disagreed.

**Research Question 6:** Informal environmental health education will not significantly improve overall health behaviour among market women in Ogun State.

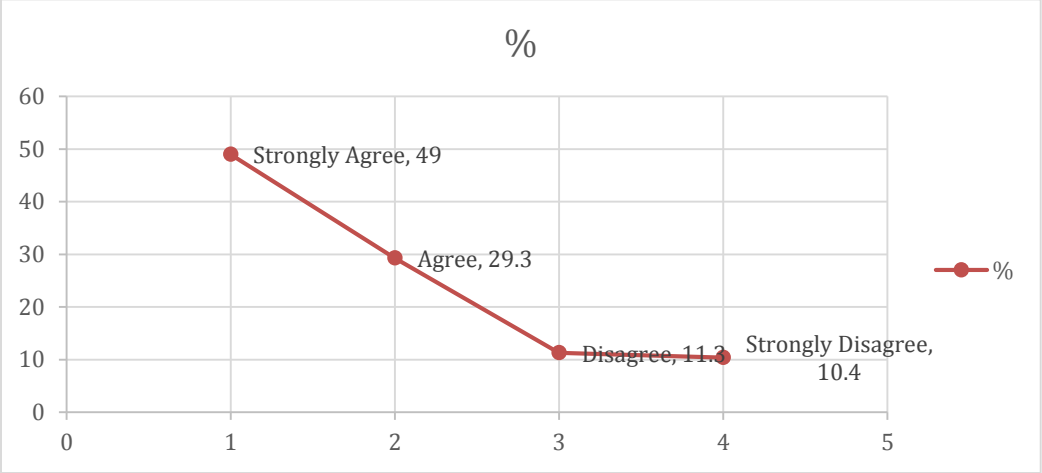



**Figure 6:** Graphical Representation of Descriptive Analysis of Research Question Six

The chart shows that informal environmental health education significantly improves the overall health behaviour of market women in Ogun State. 147 (49.0%) strongly agreed, 88 (29.3%) agreed, 34 (11.3%) disagreed, and 31 (10.4%) strongly disagreed.

**Test of Hypotheses**

**$H0_1$:** Informal environmental health education will not significantly improve hygiene practices, waste disposal practices, food safety practices, awareness of disease prevention, use of personal protective items and overall health behavior among market women in Ogun State.

**Table 4.4:** *Correlation Matrix between Informal Environmental Health Education and Reduction of Public Health Risks among market women*

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| **1. IHE** | 1 | .511** | .437* | .549** | .463* | .521** |
| **2. HP** | .511** | 1 | .383* | .319 | .425* | .399* |
| **3. WDP** | .437* | .383* | 1 | .335 | .287 | .351* |
| **4. FSP** | .549** | .319 | .335 | 1 | .468* | .409* |
| **5. DPA** | .463* | .425* | .287 | .468* | 1 | .397* |
| **6. UPI** | .521** | .399* | .351* | .409* | .397* | 1 |

**Correlation is significant at the 0.05 level (2-tailed)*

***Correlation is significant at the 0.01 level (2-tailed)*

**KEYS:** ***IHE*** *= Informal Health Education,* ***HP*** *= Hygiene Practices,* ***WDP*** *= Waste Disposal Practices,* ***FSP*** *= Food Safety Practices,* ***DPA*** *= Disease Prevention Awareness,* ***UPI*** *= Use of Protective Items*

Table 4.4 shows the correlation between informal environmental health education and selected public health behaviours among market women in Ogun State. The analysis reveals positive and statistically significant relationships between informal health education and food safety practices ($r = .549$, $p < .01$, $r^2 = .30$), use of protective items ($r = .521$, $p < .01$, $r^2 = .27$), and hygiene practices ($r = .511$, $p < .01$, $r^2 = .26$). Waste disposal practices ($r = .437$, $p < .05$, $r^2 = .19$) and disease prevention awareness ($r = .463$, $p < .05$, $r^2 = .21$) also showed significant positive relationships. These $r^2$ values indicate that informal environmental health education accounted for approximately 19% to 30% of the variance in the selected outcomes, suggesting weak-to-moderate practical effects. Therefore, the null hypotheses were rejected. However, because the analysis was correlational, the results should be interpreted as evidence of association rather than proof that informal environmental health education directly caused improvements in the measured behaviours.

### 4.1 Discussion of Findings

The findings showed a positive association between informal environmental health education and hygiene practices among market women in Ogun State. This suggests that women who reported greater exposure to informal health messages were more likely to report practices such as handwashing, stall cleaning, and personal hygiene. The result is consistent with studies that emphasise the value of local health talks, peer learning, and community-based messages in improving hygiene behaviour. Interpreted through the Health Belief Model, informal education may have acted as a cue to action by increasing awareness of disease risks and the benefits of simple preventive measures. However, the correlational design means that the finding should not be interpreted as definitive evidence of causation.

The relationship between informal environmental health education and waste disposal practices was significant but comparatively weaker than the relationships observed for food safety and hygiene. This may be because waste disposal does not depend only on individual knowledge; it also requires functional waste bins, regular collection, drainage maintenance, and enforcement by local authorities. Thus, while informal education can improve awareness and motivation, structural barriers may limit behavioural change. This finding highlights the need to combine education with practical environmental support within markets.

Food safety practices had the strongest association with informal environmental health education. This may reflect the direct relevance of food handling, storage, covering of food items, and cleanliness to the daily economic activities of many market women. Informal messages delivered through trusted market leaders, health workers, or peer groups may therefore be easier to translate into routine food-related practices. The finding supports the argument that practical, context-specific health education is more likely to influence behaviour when the recommended actions are visible, repeated, and directly connected to traders' livelihoods.

The study also found a positive association between informal environmental health education and disease prevention awareness. This suggests that informal platforms such as radio programmes, storytelling, market meetings, and community health visits can improve recognition of disease symptoms and preventive actions. Within the Health Belief Model, such messages may increase

perceived susceptibility and perceived severity while also improving self-efficacy. Nevertheless, awareness alone may not always lead to sustained prevention unless supported by access to clean water, sanitation facilities, and affordable protective materials.

The positive relationship between informal environmental health education and the use of personal protective items indicates that women exposed to informal health messages may be more likely to use aprons, gloves, masks, or other protective materials. This may be explained by peer modelling and reinforcement within market associations, as proposed by Social Cognitive Theory. However, the adoption of protective items may also be influenced by affordability, comfort, availability, and the type of goods sold. Future studies should therefore examine which protective items are most feasible for different categories of traders.

Overall health behaviour was positively linked with informal environmental health education, suggesting that repeated exposure to market-based health information may support broader behavioural change. The pattern of results shows that informal education is most closely associated with behaviours that are practical, visible, and directly related to daily trading activities. However, alternative explanations should be considered. For example, women who were already more health-conscious may have been more attentive to informal health messages. The findings should therefore be interpreted cautiously and as a basis for further intervention studies rather than as conclusive evidence of causal impact.

## 5.0 Conclusion and Recommendations

In conclusion, informal environmental health education is positively associated with improved hygiene practices, waste disposal practices, food safety practices, disease prevention awareness, use of personal protective items, and overall health behaviour among market women in Ogun State. The strongest associations were observed for food safety, use of protective items, and hygiene practices, while waste disposal and disease prevention awareness showed moderate relationships. These findings suggest that informal education can be a practical and low-cost strategy for strengthening public health behaviour in market settings, particularly when delivered through trusted and culturally familiar channels. However, because the study used a descriptive and correlational design, the findings should be interpreted as associations rather than direct evidence of causation. For informal education to produce sustained improvement, it should be supported with market sanitation infrastructure, consistent monitoring, stakeholder collaboration, and affordable protective resources. Therefore, the following recommendations are suggested:

(i) As an immediate priority, local health authorities and market associations should organise regular informal health talks on handwashing, stall cleanliness, safe water use, and personal hygiene during market meetings.

(ii) Local governments and waste management agencies should provide waste bins, improve waste collection schedules, and combine these services with informal training on proper waste sorting and disposal.

(iii) Environmental health officers should provide practical food safety demonstrations on covering food, separating raw and cooked items, cleaning utensils, and preventing contamination during routine market visits.

(iv) Community health workers should use drama, storytelling, radio messages, and local language announcements to teach disease symptoms, prevention measures, and when to seek care.

(v) Non-governmental organisations and donor agencies should support periodic distribution of affordable protective items, while market leaders encourage peer modelling of gloves, aprons, masks, and other feasible protective materials.

(vi) Implementation should be phased over six to twelve months, beginning with high-risk sections of the markets such as food, fish, meat, and fresh produce areas, followed by periodic evaluation of knowledge and self-reported practices.

### 5.1 Suggestions for Further Studies

Further studies should explore the long-term impact of informal environmental health education on health outcomes such as reduced disease incidence, especially among vulnerable groups in the marketplace. While this study focused on market women in Ogun State, future research could include male traders, transporters, and food vendors to provide a broader perspective. Also, researchers could compare the effectiveness of informal versus formal health education methods in similar contexts. Another useful direction is to examine the role of community influencers or market leaders in sustaining informal health education efforts. There is also a need to investigate the challenges and barriers that limit the effectiveness of informal health education such as language differences, lack of materials, or inconsistent messaging. Using both quantitative and qualitative methods in future studies would provide richer insights into behavior change dynamics. Finally, exploring the use of digital informal platforms such as WhatsApp or radio programs could offer an innovative angle on how environmental health messages can reach more people efficiently and cost-effectively.

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