

IMPACT OF ENVIRONMENTAL SANITATION ON PUBLIC HEALTH STATUS IN ESAN WEST LOCAL GOVERNMENT AREA, EDO STATE, NIGERIA

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Abstract

Environmental sanitation is a key determinant of public health in developing regions. Despite interventions by government and non-governmental agencies, rural and semi-urban communities in Nigeria still experience poor waste disposal, open defecation, and inadequate drainage. These conditions contribute to a high burden of preventable diseases such as cholera, typhoid fever, malaria, and diarrhea, which cause significant morbidity and mortality. This study examines environmental sanitation and public health status in Esan West Local Government Area of Edo State, Nigeria. A descriptive survey research design was adopted, utilizing a quantitative approach. Data were collected via a structured questionnaire administered to a sample of 400 respondents selected through multistage sampling techniques; 345 copies of the questionnaire were successfully retrieved and analysed using linear regression. The findings revealed that waste collection has a positive and significant impact on disease prevention in Esan West Local Government Area, Edo State ($B_1 = 0.352$, $t\text{-value} = 6.519 > p\text{-value} = .000$). The findings further showed that waste disposal has a positive and significant impact on disease prevention in Esan West Local Government Area, Edo State ($B_2 = 0.281$, $t\text{-value} = 4.607 > p\text{-value} = .000$). The results also indicated that the relationship between water supply and disease prevention in Esan West Local Government Area, Edo State is positive and significant ($B_3 = 0.318$, $t\text{-value} = 5.483 > p\text{-value} = .000$). The study concludes that improved environmental sanitation is essential for enhancing public health outcomes. It recommends increased government investment in sanitation infrastructure, improved enforcement of sanitation policies, and greater community participation in sanitation activities to achieve sustainable disease prevention and better health outcomes in Esan West and similar local government areas in Nigeria.

Keywords: Environmental Sanitation, Disease Prevention, Public Health Status, Semi-Urban Area

Introduction

Environmental sanitation is a fundamental determinant of public health and sustainable development. It encompasses waste management, water supply, drainage, vector control, and hygiene promotion to reduce environmental risks to human health. A core function of environmental sanitation is disease prevention, achieved by interrupting transmission pathways for waterborne, vector-borne, and fecal-oral infections (Prüss-Ustün et al., 2019). Poor sanitation remains a leading cause of morbidity and mortality, particularly in low- and middle-income countries (World Health Organization [WHO], 2019). The WHO estimates that inadequate

sanitation contributes to 432,000 diarrheal deaths annually worldwide, along with heightened rates of cholera, typhoid, and parasitic infections (WHO, 2021).

Effective sanitation reduces disease burden, lowers healthcare costs, increases productivity, and improves social welfare (Ameh & Ajayi, 2020). Global evidence demonstrates that improved sanitation reduces malaria and diarrheal cases by 16–36%, while reliable water supply and safe storage lower cholera incidence through improved water quality and quantity (Husseini et al., 2022; Gallandat et al., 2024; World Health Organization, 2023). Waste collection prevents disease by reducing human exposure to decomposing refuse and eliminating breeding sites for flies and rodents that transmit diarrheal pathogens (Taylor et al., 2023). Waste disposal practices determine whether infectious agents are safely contained or left to contaminate soil, water sources, and communities, with unimproved disposal significantly increasing diarrheal risk (Husseini et al., 2022). Water supply reliability and quality are inversely associated with cholera and other diarrheal diseases, as consistent access reduces reliance on unsafe sources and enables hygiene practices that break transmission (Gallandat et al., 2024).

However, in many African countries, rapid urbanization, weak institutions, and inadequate infrastructure have remained debilitating issues in environmental sanitation (Mberu et al., 2016). In Nigeria, unsanitary conditions drive frequent outbreaks of cholera, malaria, typhoid, and other preventable diseases. Although the National Environmental Sanitation Policy emphasizes integrated waste management, clean water supply, and improved drainage, implementation remains uneven across states and LGAs (FGN, 2019; Ogunniran, 2019). Indiscriminate dumping and irregular refuse collection are common, especially in rural and semi-urban areas where local governments hold primary responsibility.

Esan West LGA in Edo State faces these same challenges: irregular waste collection, poor disposal practices, inadequate water supply, and limited community involvement. These conditions create breeding grounds for mosquitoes, flies, and rodents that transmit malaria, cholera, and Lassa fever (Eze et al., 2021). Poor access to water further increases reliance on unsafe sources and raises the risk of waterborne diseases (Nnaji & Utsev, 2018). Some countries, like Rwanda and India's Swachh Bharat Mission, demonstrate that policy, institutional support, and community participation in environmental sanitation can significantly improve health outcomes (USAID, 2017; Chatterjee et al., 2017). Despite this, studies in Nigeria focus mainly on major cities, leaving a gap in evidence for semi-urban LGAs like Esan West. Empirical findings in Nigeria also identify poor waste management and poor water supply as factors that significantly enhance public health risks (Olorunfemi et al., 2014; Nnaji & Utsev, 2018). However, most available research has addressed large city centers such as Lagos, Ibadan, and Benin City, with relatively fewer systematic studies conducted in semi-urban settings. Despite descriptive measurement of sanitation in Edo State, evidence that specifically links waste collection, waste disposal, and water supply to disease prevention and public health status at the local government level is still lacking.

This study, therefore, investigates how waste collection, waste disposal, and water supply influence disease prevention and public health outcomes in Esan West. The findings aim to inform targeted policy and institutional practices to improve sanitation and health in semi-urban areas

Research Objectives

The objectives of the study are as follows.

- i. To examine the impact of waste collection on disease prevention in Esan West Local Government Area, Edo State.

- ii. To ascertain the impact of waste disposal on disease prevention in Esan West Local Government Area, Edo State.
- iii. To evaluate the impact of water supply on disease prevention in Esan West Local Government Area, Edo State.

Research Hypotheses

The following null hypotheses are tested in this study.

Ho₁: Waste collection has no significant impact on disease prevention in Esan West Local Government Area, Edo State.

Ho₂: Waste disposal has no significant impact on disease prevention in Esan West Local Government Area, Edo State

Ho₃: Water supply has no significant impact on disease prevention in Esan West Local Government Area, Edo State.

Literature Review

Conceptual Framework

This study is built on two major concepts: environmental sanitation and public health status. Environmental sanitation is the independent variable and is indicated by waste collection, waste disposal, and water supply, while the dependent variable is the public health status determined by disease prevention. These concepts is diagrammatically illustrated in figure 1 below

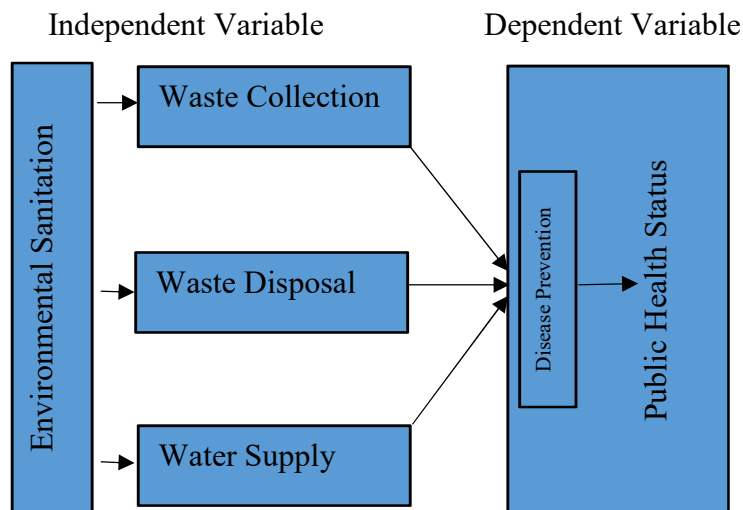


Figure 1 Conceptual Framework

The Concept of Environmental Sanitation

Environmental sanitation has been broadly conceptualized as the promotion of hygiene and the prevention of diseases through the control of environmental factors that may adversely affect human health Dobe et al. (2011). The World Health Organization (WHO, 2019) defines environmental sanitation as “the control of all those factors in the human environment which exercise, or may exercise, a deleterious effect on physical development, health, and survival.”

Eze, Nwankwo & Nwagu (2021) emphasize that environmental sanitation involves community-wide practices such as waste management, water supply, and drainage services. While the WHO definition emphasizes a broad ecological and health-focused approach, Ajayi (2020) and Eze et al. (2021) contextualise sanitation as a preventive health measure against common diseases in Nigeria such as malaria, cholera, and diarrhoea.

Thus, environmental sanitation encompasses all organized efforts to ensure a clean and healthy environment through waste management, water supply, and hygiene practices. This relationship is illustrated in Figure 2.1, which highlights the major components of environmental sanitation and their interconnection in promoting public health.

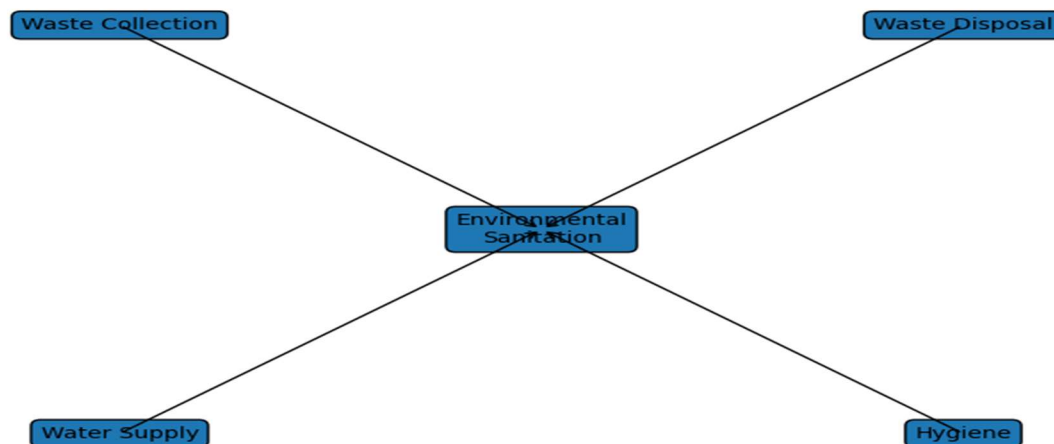


Figure 2: Components of Environmental Sanitation

Waste Collection

Waste collection refers to the systematic gathering and transportation of refuse from points of generation to designated disposal sites. Ogwueleka (2009) defines it as “the process of gathering, hauling, and transporting solid waste to places where it can be treated or safely disposed.” Alam & Ahmade (2013) describe it as a structured practice of organizing and maintaining waste-handling logistics to protect the environment and public health.

The importance of waste collection lies in its ability to prevent the accumulation of refuse, which serves as a breeding ground for disease vectors. Aluko et al. (2022) found that neighborhoods in Nigerian urban areas with irregular waste collection experienced higher prevalence of diarrhoeal and vector-borne diseases, underscoring the health impact of lapses in collection services. Adepoju & Adediran (2020) similarly observed that indiscriminate refuse heaps in Lagos and Ibadan were linked to malaria, cholera, and respiratory illnesses, as decaying organic waste attracts mosquitoes, flies, and rodents. Globally, Prüss-Ustün et al. (2019) have shown that improvements in waste collection, combined with safe disposal, significantly reduce the burden of water- and sanitation-related diseases.

Waste Disposal

Waste disposal involves transporting collected waste to final treatment or disposal sites, such as landfills or incineration plants. Dobeet et al. (2011) define it as the safe transfer of waste to designated sites to prevent the contamination of environment. Cointreau (2006), however,

emphasises that waste disposal should be sanitary and environmentally sound, as open dumping and poorly managed landfills may cause leachate pollution and foster disease vectors.

Proper waste disposal is essential for preventing the re-entry of harmful substances into the environment and reducing the risk of disease transmission. Improper disposal, such as open dumping, has been linked to outbreaks of cholera, diarrhoea, and typhoid due to contamination of nearby water sources (Ichipi & Senekane, 2023). In Edo State, Idogho, Olotu, & Dagona (2014) found that poor disposal systems were significantly associated with higher reports of waterborne diseases in rural and peri-urban communities. At the global level, Prüss-Ustün et al. (2019) emphasise that safe disposal of waste, alongside adequate water and sanitation services, is a proven intervention to reduce the burden of sanitation-related diseases.

Water Supply

Water supply is central to health and sanitation. The United Nations (2015) defines it as the provision of safe, potable water in sufficient quantities to meet household and community needs. It further stresses that universality and equity of supply are essential for the survival of the individual household. Nnaji and Utsev (2018), in a study of Nigerian communities, supported this argument when they affirmed that, beyond access, the reliability and safety of supply are equally important, as unreliable systems force households to rely on unsafe sources.

The importance of water supply lies in its role as a foundation for public health. Safe and regular water supply reduces the incidence of diarrhoea diseases, cholera, typhoid, and other waterborne infections. Adamu et al. (2022) noted that Nigerian households relying on unimproved or irregular water sources had significantly higher odds of reported cases of diarrhoea compared to those with improved and reliable water. Similarly, Idogho, Olotu & Dagona (2014) study showed that inadequate water supply in Edo State leads to the use of unsafe water and was a predictor of frequent outbreaks of sanitation-related illnesses.

Prüss-Ustün et al. (2019) have estimated that improved access to safe water and sanitation could prevent hundreds of thousands of deaths annually from diarrhoea disease. Beyond disease prevention, water supply has economic and social relevance. The WHO (2017) posited that inadequate water services increase the burden on women and children, who often bear responsibility for fetching water, thereby reducing time for education and productive activities. Thus, a reliable water supply is not only a basic service but also a critical determinant of community health outcomes.

The Concept of Public Health Status

Public health status refers to the measurable condition of health within a population, shaped by biological, social, and environmental factors. Edemekong and Tenny (2022) define public health broadly as the collective efforts of institutions and actors to improve group health through disease prevention, screening, treatment, and modification of environmental, social, economic, and political determinants. A critical review of the above definition shows that public health status is predominantly conceptualized in three perspectives:

Biomedical/Epidemiological Perspective

This view defines public health status primarily by the absence of disease and by measurable outcomes such as mortality, morbidity, and risk factor prevalence. It relies on vital statistics and disease surveillance to assess population health (Friesen et al., 2024). While useful for tracking trends and targeting interventions, it underrepresents social and subjective dimensions of health.

Social Determinants and Equity Perspective

This model positions public health status as a product of social, economic, and environmental conditions rather than clinical care alone. It emphasizes poverty, education, housing, and discrimination as key drivers of health disparities (Marmot & Bell, 2019). The focus shifts to reducing inequities and addressing structural causes of ill health.

Positive Health and Flourishing Perspective

Recent conceptualizations move beyond disease absence to include positive functioning, resilience, and quality of life. Human flourishing denotes the attainment of a state in which all aspects of life are good, encompassing vitality, adaptation, and self-management within a biopsychosocial framework (Frieden, 2020). This view captures health as a dynamic capacity rather than a static condition.

Critically, the biomedical model provides measurable indicators but is narrow; the social determinants model explains causation but is less direct for measurement; the flourishing model captures well-being but is complex to operationalize at the population scale. For this study, public health status is adopted from the social well-being and flourishing perspective. This aligns with evidence that strengthening public health systems reduces preventable mortality and morbidity, particularly among low-income and marginalized groups, and that improved population health enhances productivity, lowers healthcare costs, and builds human capital (Kruk et al., 2018). The concept thus integrates absence of disease, functional capacity, and social well-being as outcomes of public health action.

Conceptualization of Disease Prevention

The World Health Organization (WHO, 2018) describes disease prevention as “specific, population-based and individual-based interventions aimed at minimizing the burden of diseases and associated risk factors.” Disease prevention can be defined as organized community efforts to eliminate or minimize health hazards through sanitation, vaccination, and health education (Brownson et al., 2022)

Disease prevention is essential for reducing avoidable morbidity and mortality, thereby lowering the costs of treatment and burden on health systems. It is estimated that up to 70% of diarrhoea diseases could be prevented through safe water, sanitation, and hygiene interventions (Prüss-Ustün et al., 2019). Onwujekwe et al. (2019) stated that preventive measures such as sanitation improvements and health education campaigns significantly reduced malaria and diarrhoea prevalence in rural communities. Adogu et al (2015) reported that communities with stronger preventive practices, including regular waste removal and personal hygiene education, had better overall health outcomes than those relying solely on curative services. For this study, disease prevention is operationalized in its primary sense, reducing the incidence of sanitation-related illnesses through effective waste collection, removal, and reliable water supply.

Theoretical Framework

This study is anchored on the Germ Theory of Disease, which emerged in the mid to late 19th century through the pioneering work of Louis Pasteur (1822–1895) and Robert Koch (1843–1910). Pasteur’s experiments in the 1860s demonstrated that microorganisms caused fermentation and spoilage, while Koch’s postulates (developed in the 1880s) established systematic methods to link specific microbes to particular diseases (Blevins & Bronze, 2010). Together, their work revolutionized public health and medicine by proving that invisible pathogens, rather than miasmas or “bad air,” were the true causes of many diseases.

The Germ Theory assumes that diseases are caused by identifiable microorganisms such as bacteria, viruses, fungi, or parasites. According to this assumption, each disease has a specific pathogenic agent that can be isolated, studied, and linked directly to the illness it causes. This assumption revolutionized medicine and public health by replacing earlier beliefs that diseases were caused by “bad air” (miasma) or supernatural forces. It provided the scientific basis for sanitation, sterilization, vaccination, and antibiotic treatment. In the context of environmental sanitation, this assumption explains how pathogens found in contaminated water, refuse dumps, and poor waste disposal sites lead to diseases such as cholera, typhoid, and diarrhoea.

Empirical Review

Coker et al. (2009) assessed health-care waste (HCW) generation, segregation, storage, transportation, and disposal practices across a representative sample of primary, secondary, and tertiary health facilities in Ibadan using facility surveys, waste sampling and characterization, staff questionnaires, and observational audits. Data obtained via questionnaire were analysed descriptively using frequencies, proportions, and comparative summaries to evaluate waste management practices across facility types, and data sourced through observational method were analysed using systematic qualitative assessment of compliance with recommended HCW standards. The study found widespread inadequate segregation of infectious waste, poor storage, and unsafe disposal practices, which increased occupational and community exposure to infectious agents.

Olorunfemi et al. (2014) examined how environmental sanitation affected malaria prevalence in a rural community in South-Western Nigeria. Using multi-stage cluster sampling, they administered semi-structured questionnaires to 300 households and analyzed the data with descriptive statistics. Their results indicated a significant relationship between routine cleaning of the external environment and malaria prevalence (OR = 1.88, 95% CI = 2.61–54.13). However, respondents’ knowledge of environmental factors related to malaria (OR = 1.37, 95% CI = 0.92–2.05) and malaria transmission (OR = 0.70, 95% CI = 0.43–1.12) showed no significant association with malaria occurrence. The study concluded that maintaining clean surroundings was linked to malaria prevalence in rural Nigerian settings.

Ichipi and Senekane (2023) evaluated the environmental and public-health consequences of illegal dumping in Lagos State. The study found that illegal dumping correlates with contamination of soil and water, proliferation of vectors, and higher self-reported incidence of diarrhoea and vector-borne illnesses in adjacent communities. It was recommended that enforcement of disposal laws, provision of accessible legal disposal sites Mixed methods were explored using structured household surveys near dumping sites, environmental inspections, and health-risk appraisals., and public education are necessary to reduce health risks from illegal dumping.

Adamu et al. (2022) tested the association between drinking-water source type and household diarrhoea prevalence using nationally representative data. The study deplored secondary analysis of a nationally representative household health survey, multivariable logistic regression to control for confounders. The research revealed that households using unimproved or intermittent water sources had significantly higher odds of diarrhoea, while reliably improved sources were protective. The study concluded that expanding access to reliably improved water sources is critical to reduce diarrhoeal disease in Nigeria.

Ogundele et al. (2018) investigated the relationship between municipal waste disposal methods and community health outcomes using a quantitative, cross-sectional analytical approach. Data

were generated through community surveys and environmental assessments, and analyzed using descriptive and inferential statistical tools, including frequencies, percentages, and comparative statistical tests to examine differences in health outcomes across neighbourhoods with varying waste disposal practices. The statistical analysis enabled comparison of reported cases of diarrhoea and respiratory complaints among communities practicing open dumping and burning versus those with regular waste collection and sanitary disposal. The findings revealed that unsafe disposal methods were associated with poorer health outcomes. The study concluded that regular waste collection and disposal are linked to improved community health, and that policy intervention is required to curb harmful waste disposal practices.

Etim (2024) examined the role of waste management authorities in Lagos in improving Municipal Solid Waste (MSW) handling and public awareness. Policy analysis, stakeholder interviews, and surveys assessing awareness and compliance were used to collect data. The study showed that improved institutional programs and community awareness campaigns were associated with modest increases in collection rates, but challenges remain (plastic pollution, informal dumping). The study recommended that institutional reforms, public education, and financing innovations are essential to scale up effective MSW management.

Ezeudu et al. (2022) employed a systematic literature review and synthesized evidence from peer-reviewed journal articles, policy documents, and technical reports on healthcare waste management in Nigeria. Data were analyzed using qualitative thematic content analysis, which enabled the identification and synthesis of recurring patterns, challenges, and opportunities across the reviewed studies. The analysis revealed generally poor healthcare waste management practices, including inadequate waste segregation, absence of treatment facilities, regulatory weaknesses, and limited staff training, all of which heighten occupational and community infection risks.

Aluko et al. (2022) employed a cross-sectional mixed-methods approach to assess perceived health hazards among residents living near open dumpsites. The instruments for data analysis comprised structured household survey questionnaires and environmental observation checklists, which captured residents' health perceptions and observable environmental conditions. Data were analyzed using a combination of descriptive quantitative analysis (including frequencies and percentages) for survey responses and qualitative interpretative analysis of observational data. The analysis showed that residents living close to open dumpsites had higher incidences of gastrointestinal symptoms and vector-borne nuisances, and perceived open dumpsites as major local health hazards. The study concluded that closing or upgrading open dumpsites and ensuring regular waste collection would significantly reduce associated health risks.

Fakunle (2024) examined household disposal practices across diverse Nigerian communities and identified drivers of open dumping. Multi-site household surveys and qualitative interviews were used in analysing the collected data. The findings showed that open dumping persists due to irregular municipal collection, low awareness, and cultural practices; respondents often use water channels or vacant lots for dumping waste.

Olorunfemi (2024) employed a narrative review method, synthesising evidence from empirical studies and policy reports on the health consequences of improper waste disposal. The data analysis method involved qualitative thematic synthesis, through which key patterns, health impacts, and policy gaps were identified and critically examined. The study found that improper waste disposal contributes to the transmission of infectious diseases, such as respiratory disease, placing a downstream burden on health systems.

Research Methods

The following methods were utilised in this study.

Research Design

This study adopted a descriptive survey design. It involved gathering relevant information directly from respondents about their attitudes, beliefs, and experiences, in the case of this study, it was used in relation to waste collection, disposal, and water supply, and their influence on disease prevention (health status) in Esan West Local Government Area of Edo State.

The population of the study consists of residents of Esan West Local Government Area. It includes households, sanitary officers, and health workers. The projected population of Esan West Local Government Area in 2025 is approximated at 201, 423 people (Ilenre et al., 2025). Thus, the population of this study is taken as 201, 423 people which is the total number of people residing in Esan West Local Government Area, Edo State, Nigeria.

The sample size of the study is 400, and it was determined through Taro Yamane's formula. A multistage sampling technique was employed to select the respondents. In the first stage, Esan West LGA was stratified into 16 major communities namely: Eguare, Ebhakuala, Egoro Naoka, Emaudo, Emuhi, Idumebo, Ihumudumu, Iruekpen, Ogwa, Uhiele, Ujemen, Urohi, Ujiogba, Ujoelen, and Ukpenu. In the second stage, it was stratified and sampled into various households, and the third stage is the individual units where respondents were sampled randomly to pick the 400 respondents

A structured closed-ended questionnaire titled "Environmental Sanitation and Public Health Status in Esan West Local Government Area (ESPHSEWLGA) is the research instrument for this study and was validated via face and content validity methods. The drafted instrument was given to two experts in the field of public health and environmental sanitation, who validated the questionnaire based on the following criteria: checking the items for clarity of language, relevance, and appropriateness in relation to the identified variables in each section.

To ensure the reliability of the research instrument, a pilot test was conducted using 30 respondents who were not part of the main study sample. Cronbach's Alpha coefficient was used to measure the internal consistency of the questionnaire items. The Waste Collection Practices scale, with 5 items, yielded an alpha value of 0.82, while the overall instrument, with 15 items, yielded $\alpha = 0.85$. Based on Nunnally and Bernstein's (1994) benchmark of 0.70, the instrument was considered reliable for data collection.

Method of Data Collection

The questionnaire was administered face-to-face with the individual respondents in their homes and offices. The instrument was administered in the study area by the two researchers and three other trained research assistants. An enlightenment and awareness campaign on the questionnaire administration was carried out by the researchers a few weeks before the instrument was administered. This was aimed at achieving a high rate of participation and return of the questionnaire by the respondents, and it was realized

Data Analysis

Multiple Linear Regression was used to analyse the linearity between indicators of environmental sanitation (waste collection, waste disposal, and water supply) and public health status (disease prevention) in the Esan West Local Government Area of Edo State.

To employ the technique in this study, the following model was specified.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \mu$$

Where:

- Y = Public Health Status (measured by disease control efficiency/health outcomes)
- X_1 = Waste Collection Practices
- X_2 = Waste Disposal
- X_3 = Water Supply Adequacy
- β_0 = Constant (intercept)
- $\beta_1, \beta_2, \beta_3$ = Regression coefficients measuring the influence of each independent variable
- μ = Error term capturing unobserved factors

It is expected that β_1, β_2 , and $\beta_3 > 0$, indicating that environmental sanitation (waste collection, waste disposal, and water supply) positively influences disease prevention (public health status), and the significance of the independent variable is measured at the 0.05 level

Decision Rule: Reject the null hypothesis if the absolute value of the calculated t-statistic > the critical t-value at the 0.05 level of significance; otherwise, fail to reject the null hypothesis.

Table 1: Model Summary

Model	R	R Square	Adjusted R-Square	Std. Error of the Estimate	Durbin-Watson stat.
1	0.731	0.534	0.528	0.612	1.752

The model summary table shows that the correlation coefficient ($R = 0.731$) indicates a strong positive relationship between environmental sanitation and disease prevention (public health status). The R-square value of 0.534 implies that **53.4%** of the variation in disease prevention is explained by waste collection, waste disposal, and water supply, while the remaining 46.6% is explained by other factors not included in the model. The Durbin-Watson statistic of 1.752 indicates the absence of autocorrelation in the model **(Table 1)**.

Table 2: ANOVA (Overall Model Significance)

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	146.382	3	48.794	130.285	0.000
Residual	127.618	341	0.374		
Total	274.000	344			

The ANOVA table shows that the regression model is statistically significant ($F = 130.285$, $p = 0.000 < 0.05$) (Table 2). This indicates that the independent variables collectively have a significant effect on disease prevention (public health status) in Esan West Local Government Area.

Table 3: Regression Coefficients

Model	Unstandardized Coefficient (B)	Std. Error	Standardized Beta	T	Sig.
(Constant)	1.215	0.182		6.675	0.000
Waste Collection	0.352	0.054	0.348	6.519	0.000
Waste Disposal	0.281	0.061	0.265	4.607	0.000
Water Supply	0.318	0.058	0.301	5.483	0.000

The constant value of 1.215 indicates the baseline level of disease prevention when all the independent variables (waste collection, waste disposal, and water supply) are held constant. The value is statistically significant ($t = 6.675$, $p = 0.000$), suggesting that even without considering the explanatory variables, there is a base level of disease prevention (public health status) in the study area (Table 3). The result further shows that waste collection has a positive and statistically significant influence on disease prevention (public health status). The unstandardized coefficient ($B_1 = 0.352$) implies that a one-unit improvement in waste collection leads to a 0.352-unit increase in disease prevention (public health status). The standardized beta value ($\beta = 0.348$) indicates that waste collection contributes substantially to disease prevention (public health status). The t-value of 6.519 and p-value of 0.000 show that this effect is statistically significant. This means that improved waste collection significantly helps in reducing disease outbreaks in the study area. Similarly, waste disposal shows a positive and significant relationship with disease prevention (public health status). The coefficient ($B_2 = 0.281$) indicates that improved waste disposal increases disease prevention (public health status) by 0.281 units (Table 3). The standardized beta value ($\beta = 0.265$) suggests that waste disposal also contributes meaningfully to disease prevention (positive public health status), though slightly lower than waste collection. The t-value of 4.607 with $p = 0.000$ confirms that the effect is statistically significant.

Furthermore, water supply also has a positive and statistically significant effect on disease prevention. The unstandardized coefficient ($B_3 = 0.318$) indicates that a one-unit improvement in water supply increases disease prevention by 0.318 units. The standardized beta value ($\beta = 0.301$) shows that water supply is an important predictor of disease prevention (Table 3). The t-value of 5.483 and p-value of 0.000 confirm that this relationship is statistically significant. Overall, the results indicate that waste collection, waste disposal, and water supply all have significant positive impacts on disease prevention (public health status) in Esan West Local Government Area. Among the variables, waste collection has the strongest influence, followed by water supply, while waste disposal also contributes significantly. This suggests that strengthening sanitation plays a crucial role in enhancing public health status.

Discussion findings

The multiple linear regression results for hypothesis one revealed that waste collection had a significant impact on disease prevention. This implies that waste collection contribute significantly to avoiding the incidence of sanitation-related diseases, theGalleryreby enhancing public health status in the study area. This finding supports Olorunfemi et al. (2014), who found a significant association between regular cleaning of the outdoor environment and malaria prevalence among the households surveyed .It therefor implies that government policy aimed at improving public

health status should endeavour to prevent environmental sanitation related diseases through regular waste collection

The regression result of hypothesis two indicated that waste disposal had a significant effect on disease prevention. This finding suggests that waste disposal contributes significantly to preventing environmental disease, thereby enhancing public health in the study area. This finding aligns with Nnaji and Utsev (2018), who observed that improper waste disposal practices in many Nigerian communities contribute significantly to environmental pollution and the spread of diseases such as cholera, typhoid fever, and diarrhoea. In addition, the World Health Organization (2021) emphasizes that poorly managed waste disposal systems increase the likelihood of water contamination and environmental health hazards. These findings imply government policy targeted towards preventing environmentally associated diseases should be channeled towards proper and regular waste disposal

The multiple linear regression results of hypothesis three revealed that water supply had a significant effect on disease prevention. This indicates that access to safe and adequate water contributes significantly to reducing sanitation-related diseases and therefore enhances public health status. This finding is consistent with the World Health Organization (2019), which asserts that access to a safe and reliable water supply is fundamental to preventing waterborne diseases such as cholera, typhoid fever, and diarrhoea. Similarly, the World Health Organization (2021) notes that inadequate water supply limits proper hygiene, thereby increasing vulnerability to communicable diseases. The finding implies that policy aimed at improving public health in Nigeria should promote sustainable adequate supply of safe water, to control the outbreak and spread of environmentally related diseases such as malaria, cholera, typhoid fever, diarrhea, and other related diseases.

Conclusion/Recommendations

The results indicate that waste collection, waste disposal, and water supply have a significant impact on disease prevention in the study area. This implies that waste collection and disposal contribute to the prevention of sanitation-related diseases and improve the health status of people in the study area. Thus, it means that accumulation of refuse in residential areas, markets, and public spaces serves as breeding grounds for disease vectors such as mosquitoes, flies, and rodents that cause infection of communicable diseases such as malaria, cholera, and diarrhea, endangering the public health status.

Furthermore, the study found that water supply has a significant impact on disease prevention. This shows that the availability of safe water is a key determinant of public health status. This also implies that access to safe water is a good hygiene practice and contributes to disease prevention, which enhances public health status. This study concludes that environmental sanitation has a significant impact on health status in semi-urban areas in Nigeria, specifically in the study area. The study recommends the following strategies to enhance environmental sanitation and public health status in semi-urban areas in Nigeria.

- i. **Improvement on Waste Collection Systems:** The Local Government Authority should strengthen waste collection services by increasing the frequency of refuse collection and providing adequate waste collection equipment and vehicles. This will ensure that refuse does not accumulate in residential and public areas.
- ii. **Establishment of Proper Waste Disposal Facilities:** The local government should establish well-managed waste disposal sites and promote environmentally safe disposal methods,

- such as controlled landfills and waste recycling programs. This will reduce environmental pollution and limit the spread of sanitation-related diseases.
- iii. **Expansion of Safe Water Supply Infrastructure:** Government and relevant agencies should invest in the provision of safe and reliable water supply systems such as boreholes, water treatment plants, and public water schemes to ensure that residents have access to potable water.
 - iv. **Strengthening Sanitation Law Enforcement:** Sanitary officers should be empowered to enforce environmental sanitation regulations effectively. Regular environmental sanitation exercises and strict penalties for indiscriminate waste disposal should be implemented to encourage compliance.
 - v. **Community Awareness and Public Health Education:** Public health education campaigns should be intensified to sensitize residents on the importance of proper waste disposal, hygiene practices, and environmental cleanliness. This will enhance the public participation in sanitation practices to improve the public health status
 - vi. **Partnership with NGOs and Development Agencies:** Local authorities should collaborate with non-governmental organizations and development partners to implement sanitation improvement projects, promote community-led sanitation initiatives, and mobilize additional resources.
 - vii. **Regular Monitoring and Evaluation of Sanitation Programmes:** The local government should establish monitoring systems to evaluate sanitation programmes and ensure that environmental health policies are effectively implemented.

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