
**ENVIRONMENTAL FACTORS AS CORRELATES OF CHOLERA
PREVENTION PRACTICES AMONG ADOLESCENTS IN AKWA
IBOM NORTH-EAST SENATORIAL DISTRICT, NIGERIA**

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Doi: <https://doi-doi.org/101555/ijarp.9172>**ABSTRACT**

This study adopted a correlational research design to examine the relationship between environmental factors and cholera prevention practices among adolescents in Akwa Ibom North-East Senatorial District, Nigeria. The population comprised 19,260 Junior Secondary School Two (JS2) students in 89 public secondary schools, from which a sample of 963 students was selected using a multi-stage sampling procedure. Data were collected using researcher-developed instruments, namely the Environmental Factors Questionnaire (EFQ) and the Cholera Prevention Practices Questionnaire (CPPQ). Face validity was established by experts in Health Education and Educational Measurement and Evaluation, while reliability was determined using Cronbach's alpha, which yielded a coefficient of 0.809. Data were analysed using Pearson's Product Moment Correlation at the 0.05 level of significance. The findings revealed a very weak negative relationship between climate change and cholera prevention practices ($r = -0.084$, $p > 0.05$). Similarly, overpopulation demonstrated a very weak negative relationship with cholera prevention practices ($r = -0.079$, $p > 0.05$). Both relationships were statistically insignificant. The study concluded that climate change and overpopulation, although recognised environmental determinants of cholera outbreaks, were not significant predictors of cholera prevention practices among adolescents in the study area. It was therefore recommended among others, that government and relevant stakeholders strengthen school- and community-based health education programmes, improve access to Water, Sanitation and Hygiene (WASH) facilities, and intensify environmental sanitation interventions to enhance cholera prevention practices among adolescents.

KEYWORDS: Adolescents; Cholera prevention; Climate change; Environmental factors; Nigeria; Overpopulation; Water, sanitation and hygiene (WASH).

1. INTRODUCTION

Cholera is an acute diarrhoeal disease caused by toxigenic strains of *Vibrio cholerae* and transmitted primarily through the ingestion of food or water contaminated with the bacterium. Despite being both preventable and treatable, cholera continues to pose a substantial public health challenge, particularly in low- and middle-income countries where access to safe drinking water, improved sanitation and effective hygiene practices remains inadequate. The disease is characterised by profuse watery diarrhoea, vomiting and rapid dehydration, which may result in death within hours if prompt rehydration therapy is not administered. Consequently, cholera remains an important indicator of inequities in environmental health and access to essential public health services.

Globally, cholera continues to affect millions of people annually. The World Health Organization (WHO, 2024) estimates that between 1.3 and 4.0 million cholera cases occur worldwide each year, resulting in approximately 21,000–143,000 deaths. The increasing frequency of outbreaks in recent years reflects persistent deficiencies in water supply systems, sanitation infrastructure and environmental management, particularly in developing countries. According to the European Centre for Disease Prevention and Control (ECDC, 2025), more than 76,000 cholera cases and nearly one thousand deaths were reported globally during the first quarter of 2025 alone, highlighting the continuing global burden of the disease.

Sub-Saharan Africa bears a disproportionate share of the global cholera burden because of rapid urbanisation, population growth, inadequate sanitation infrastructure, climate variability and socioeconomic inequalities. Nigeria remains one of the countries most affected by recurrent cholera epidemics. National surveillance reports have documented repeated outbreaks across several states, with thousands of confirmed and suspected cases recorded annually. Eneh et al. (2024) reported that Nigeria experienced over 4,800 suspected cholera cases and 156 associated deaths across 35 states in 2024, while national surveillance data continue to identify cholera as one of the country's most persistent waterborne diseases. These recurring outbreaks continue to exert considerable pressure on an already overstretched healthcare system and contribute to avoidable morbidity, mortality and economic losses.

Environmental conditions play a central role in the epidemiology and transmission dynamics of cholera. The World Health Organization recognises environmental determinants—

including inadequate sanitation, unsafe drinking water, poor waste management, flooding and overcrowded living conditions, as major drivers of cholera transmission. These environmental factors influence the survival, proliferation and spread of *Vibrio cholerae*, particularly in communities where sanitation infrastructure is inadequate and public health services are limited. Consequently, effective cholera prevention requires not only behavioural interventions but also improvements in environmental conditions that reduce exposure to contaminated water and food sources.

Among the environmental factors increasingly associated with cholera transmission is climate change. Rising global temperatures, altered rainfall patterns, flooding, droughts and extreme weather events have profound implications for water quality and sanitation systems. Flooding frequently contaminates drinking water sources through sewage overflow, while prolonged droughts reduce access to safe water and compel communities to rely on unsafe sources. These climatic conditions facilitate the survival and dissemination of *Vibrio cholerae* and increase the likelihood of outbreaks. Ahmed et al. (2021) observed that climate variability significantly influences the occurrence of waterborne diseases by altering environmental conditions favourable for pathogen transmission. Similarly, Johnson (2018) emphasised that strengthening Water, Sanitation and Hygiene (WASH) systems remains one of the most effective strategies for mitigating the public health consequences of climate-related cholera outbreaks.

Another important environmental determinant is overpopulation. Rapid population growth, especially in urban and peri-urban settlements, places enormous pressure on existing water supply systems, sanitation facilities and waste management infrastructure. Overcrowded communities frequently experience inadequate sewage disposal, indiscriminate refuse dumping and contamination of surface and groundwater sources, thereby increasing the risk of cholera transmission. Agyarko et al. (2025) reported that population density contributes substantially to cholera vulnerability through environmental degradation and overstretched sanitation services. Likewise, Zerbo et al. (2020) argued that overcrowding limits access to clean water and sanitation, thereby increasing susceptibility to waterborne diseases.

Although environmental conditions create favourable circumstances for cholera transmission, the actual occurrence of disease also depends on individuals' preventive behaviours. Cholera prevention practices include the consumption of safe drinking water, proper hand hygiene, hygienic food preparation, appropriate waste disposal and prompt healthcare-seeking behaviour. These practices are influenced by health literacy, environmental awareness, accessibility of sanitation facilities and community health interventions. Adolescents

represent an important population group in this regard because they spend substantial time within school and community environments where environmental exposures and hygiene behaviours are shaped. Establishing healthy environmental practices during adolescence contributes to lifelong health behaviours and supports broader community disease prevention efforts.

Akwa Ibom State has experienced periodic cholera outbreaks in recent years, reflecting persistent environmental health challenges despite ongoing public health interventions. In January 2025, the Akwa Ibom State Government confirmed suspected cholera cases in several communities and subsequently intensified public awareness campaigns focusing on hand hygiene, safe drinking water, environmental sanitation and early treatment. These events underscore the continued vulnerability of communities within the state and the need to better understand the environmental determinants of cholera prevention among adolescents.

Previous studies have primarily examined cholera epidemiology, outbreak patterns, WASH interventions and clinical management across different populations. However, relatively few studies have specifically investigated how environmental factors relate to cholera prevention practices among adolescents within secondary school settings in southern Nigeria. Moreover, many existing studies have focused on household or community populations rather than school-aged adolescents, leaving an important gap in empirical evidence. Against this background, the present study investigated environmental factors as correlates of cholera prevention practices among adolescents in Akwa Ibom North-East Senatorial District, Nigeria. Specifically, the study examined the relationships between climate change, overpopulation and cholera prevention practices. The findings are expected to contribute to the growing body of evidence on environmental health, support school-based health promotion programmes and inform public health policies aimed at strengthening cholera prevention among adolescents in Nigeria and other resource-constrained settings.

2. STATEMENT OF THE PROBLEM

Cholera remains a significant public health concern globally despite substantial progress in disease prevention, surveillance and treatment. The disease continues to affect millions of people annually, particularly in developing countries where environmental conditions favour the transmission of *Vibrio cholerae*. In Nigeria, recurrent cholera outbreaks have been attributed to inadequate access to safe drinking water, poor sanitation facilities, indiscriminate waste disposal, flooding, overcrowding and other environmental challenges. These conditions increase the vulnerability of communities, especially adolescents, to

waterborne diseases and threaten efforts aimed at achieving sustainable public health outcomes.

Environmental factors have consistently been identified as important determinants of cholera transmission. Climate change has altered rainfall patterns, increased flooding and contributed to contamination of drinking water sources, while rapid population growth has intensified pressure on existing sanitation facilities and environmental resources. These environmental conditions may influence the ability of individuals and communities to adopt effective cholera prevention practices. Adolescents are particularly vulnerable because they spend considerable time in school and community environments where exposure to environmental health risks is common. Their preventive behaviours therefore have important implications for disease control within schools and communities.

Although previous studies have investigated the epidemiology, risk factors and prevention of cholera in different parts of Nigeria and other developing countries, most have concentrated on household sanitation, community outbreaks, clinical management or the general population. Few studies have specifically examined the relationship between environmental factors and cholera prevention practices among adolescents in secondary schools within Akwa Ibom North-East Senatorial District. Consequently, there is limited empirical evidence on whether environmental factors such as climate change and overpopulation significantly influence adolescents' cholera prevention practices in the study area.

Furthermore, despite sustained government efforts through environmental sanitation campaigns, health education programmes and Water, Sanitation and Hygiene (WASH) initiatives, cholera outbreaks continue to occur in many Nigerian communities. This persistent occurrence raises important questions regarding the extent to which environmental conditions influence preventive practices among adolescents. Addressing this knowledge gap is essential for developing evidence-based interventions that strengthen environmental health education and promote effective cholera prevention among young people. It is against this background that this study investigated environmental factors as correlates of cholera prevention practices among adolescents in Akwa Ibom North-East Senatorial District, Nigeria.

3. RESEARCH OBJECTIVES

The main objective of this study was to investigate environmental factors as correlates of cholera prevention practices among adolescents in Akwa Ibom North-East Senatorial District, Nigeria. Specifically, the study sought to:

1. Determine the relationship between climate change and cholera prevention practices among adolescents in Akwa Ibom North-East Senatorial District, Nigeria; and
2. Determine the relationship between overpopulation and cholera prevention practices among adolescents in Akwa Ibom North-East Senatorial District, Nigeria.

4. RESEARCH QUESTIONS

The following research questions guided the study:

1. What relationship exists between climate change and cholera prevention practices among adolescents in Akwa Ibom North-East Senatorial District, Nigeria?
2. What relationship exists between overpopulation and cholera prevention practices among adolescents in Akwa Ibom North-East Senatorial District, Nigeria?

5. RESEARCH HYPOTHESES

The following null hypotheses were formulated and tested at the 0.05 level of significance:

HO₁: There is no significant relationship between climate change and cholera prevention practices among adolescents in Akwa Ibom North-East Senatorial District, Nigeria.

HO₂: There is no significant relationship between overpopulation and cholera prevention practices among adolescents in Akwa Ibom North-East Senatorial District, Nigeria.

6. THEORETICAL FRAMEWORK

6.1 Health Belief Model (HBM)

The Health Belief Model (HBM) was originally developed by Hochbaum (1958) and later refined by Rosenstock (1966, 1974) and Becker (1974) to explain why individuals engage in or avoid preventive health behaviours. The model has become one of the most widely applied behavioural theories in public health and health promotion because it explains how people's beliefs influence their decisions to adopt behaviours that reduce disease risk. The theory posits that an individual's willingness to engage in preventive health practices depends largely on personal perceptions regarding a disease and the expected benefits of taking preventive action. According to the model, individuals are more likely to adopt healthy behaviours when they perceive themselves to be susceptible to a disease, believe that the disease has serious consequences, recognise that preventive measures are effective, perceive minimal barriers to taking action, receive cues that motivate action, and possess confidence in their ability to perform the recommended behaviours.

The major constructs of the Health Belief Model include

Perceived susceptibility, which refers to an individual's belief about the likelihood of contracting a disease.

Perceived severity, which describes beliefs regarding the seriousness of the disease and its potential health, social and economic consequences.

Perceived benefits, referring to the belief that adopting recommended preventive measures will reduce the likelihood or severity of infection.

Perceived barriers, representing factors that discourage or hinder the adoption of preventive behaviours.

Cues to action, which are internal or external stimuli that encourage individuals to initiate preventive behaviours.

Self-efficacy, defined as an individual's confidence in his or her ability to perform the recommended preventive practices successfully.

Within the context of cholera prevention, the Health Belief Model suggests that adolescents who perceive cholera as a serious disease and believe they are vulnerable to infection are more likely to adopt preventive behaviours such as drinking treated water, practising proper hand hygiene, maintaining clean surroundings and avoiding contaminated food and water. Conversely, adolescents who perceive cholera as a minor threat or who lack confidence in their ability to practise preventive measures may be less likely to adopt such behaviours. The model further suggests that effective health education campaigns can strengthen adolescents' awareness of cholera risks, increase their perception of the benefits of preventive practices and reduce perceived barriers to adopting healthy environmental behaviours. Consequently, the Health Belief Model provides an important behavioural explanation for variations in cholera prevention practices among adolescents.

Relevance of the Health Belief Model to the Study

The Health Belief Model is relevant to this study because cholera prevention depends not only on environmental conditions but also on adolescents' willingness to adopt appropriate preventive behaviours. Environmental factors such as flooding or overcrowding may increase exposure to cholera, but individuals' perceptions of risk largely determine whether they consistently practise recommended preventive measures. The theory therefore provides a useful framework for explaining how environmental risks may influence adolescents' cholera prevention practices through individual health beliefs and behavioural responses.

6.2 Social Ecological Model (SEM)

The Social Ecological Model (SEM) originated from the ecological systems theory developed by Bronfenbrenner (1979) and was subsequently adapted for public health promotion by McLeroy, Bibeau, Steckler and Glanz (1988). The model recognises that health behaviours are influenced by multiple interacting levels of environmental and social factors rather than by individual characteristics alone. According to the Social Ecological Model, disease prevention and health promotion are most effective when interventions simultaneously address factors operating at different levels of influence. These include the individual, interpersonal, organisational, community and policy levels. Consequently, the model emphasises that sustainable improvements in health behaviours require supportive environments in addition to individual knowledge and motivation.

The five major levels of the Social Ecological Model include

Individual level, which encompasses knowledge, attitudes, beliefs, skills and personal characteristics that influence health behaviours.

Interpersonal level, involving the influence of parents, peers, teachers and other significant social relationships.

Organisational level, referring to institutions such as schools and healthcare facilities that provide opportunities and resources for healthy behaviour.

Community level, which includes environmental sanitation, waste management, water supply systems, housing conditions and community norms.

Policy level, involving government legislation, environmental regulations, public health policies and investments in sanitation infrastructure.

The model recognises that environmental conditions such as climate change, flooding, population growth, poor drainage systems and inadequate waste management significantly affect opportunities for disease prevention. Even where individuals possess adequate knowledge of cholera prevention, poor environmental conditions may increase their exposure to contaminated water sources and other environmental hazards.

Relevance of the Social Ecological Model to the Study

The Social Ecological Model provides the principal theoretical basis for this study because the independent variables investigated, climate change and overpopulation, represent environmental factors operating primarily at the community and policy levels. Climate change influences flooding, rainfall variability and water quality, while overpopulation places

increasing pressure on sanitation infrastructure, waste management systems and potable water supplies. These environmental conditions may either facilitate or hinder adolescents' ability to practise effective cholera prevention behaviours. The theory therefore supports the central assumption of this study that environmental conditions influence health behaviours and that effective cholera prevention requires integrated interventions involving schools, communities, governments and public health institutions. It also reinforces the importance of improving environmental sanitation, expanding access to safe drinking water and strengthening community-based health education programmes to reduce the burden of cholera among adolescents.

6.3 Theoretical Implication for the Study

The Health Belief Model and the Social Ecological Model complement one another in explaining cholera prevention practices among adolescents. While the Health Belief Model focuses on individual perceptions, motivations and behavioural choices, the Social Ecological Model highlights the broader environmental conditions that shape those behaviours. Together, they suggest that effective cholera prevention requires both individual behavioural change and improvements in environmental conditions. Accordingly, this study hypothesises that environmental factors, operationalised through climate change and overpopulation, are associated with cholera prevention practices among adolescents in Akwa Ibom North-East Senatorial District, Nigeria. The theories therefore provide a sound conceptual foundation for interpreting the empirical findings of the study and for proposing interventions that combine behavioural education with environmental health improvements.

7. METHODOLOGY

This study adopted a correlational research design to examine the relationship between environmental factors and cholera prevention practices among adolescents in Akwa Ibom North-East Senatorial District, Nigeria. The study was conducted among Junior Secondary School Two (JS2) students enrolled in public secondary schools across the nine Local Government Areas of the Senatorial District. The target population comprised 19,260 students distributed across 89 public secondary schools. A sample of 963 respondents, representing approximately 5% of the study population, was selected using a multi-stage sampling procedure involving systematic random sampling, simple random sampling and the balloting technique. Data were collected using two researcher-developed instruments: the Environmental Factors Questionnaire (EFQ) and the Cholera Prevention Practices

Questionnaire (CPPQ). The Environmental Factors Questionnaire measured two dimensions of environmental factors, namely climate change and overpopulation, while the Cholera Prevention Practices Questionnaire assessed adolescents' preventive practices against cholera. The instruments consisted of 50 items measured on a four-point Likert scale ranging from Strongly Agree (4) to Strongly Disagree (1). Face and content validity were established by three experts in Health Education, Environmental Health and Educational Measurement and Evaluation from the University of Uyo. A pilot study involving 40 students outside the study area yielded a Cronbach's alpha reliability coefficient of 0.809, indicating satisfactory internal consistency of the instruments.

Permission to conduct the study was obtained from the relevant educational authorities and participating school administrators before data collection commenced. Respondents participated voluntarily after the objectives of the study had been explained to them, and anonymity and confidentiality were assured throughout the research process. Of the 963 questionnaires administered, 956 were correctly completed and returned, representing a 99.21% response rate. Data were coded and analysed using the Statistical Package for the Social Sciences (SPSS). The research questions were answered using the Pearson Product Moment Correlation (PPMC), while the null hypotheses were tested using the associated probability values at the 0.05 level of significance.

8. RESULTS

Research Question One

What relationship exists between climate change and cholera prevention practices among adolescents in Akwa Ibom North-East Senatorial District, Nigeria?

Table 1: Pearson Product Moment Correlation Analysis of Climate Change and Cholera Prevention Practices among Adolescents. (n=956)

Variables	N	ΣX	ΣY	ΣX^2	ΣXY	r	ΣY^2	Remark
Climate Change	956	8,972		93,345				
Cholera Prevention Practices	956		7,954		702,184	-0.084	85,961	Very Weak Negative Relationship

Source: Field Survey (2026)

Table 1 shows that the Pearson Product Moment Correlation coefficient between climate change and cholera prevention practices among adolescents is $r = -0.084$. This indicates a very weak negative relationship between the two variables. The finding suggests that

although climate change may create environmental conditions that increase the risk of cholera outbreaks, its relationship with adolescents' cholera prevention practices is minimal.

Research Question Two

What relationship exists between overpopulation and cholera prevention practices among adolescents in Akwa Ibom North-East Senatorial District, Nigeria?

Table 2: Pearson Product Moment Correlation Analysis of Overpopulation and Cholera Prevention Practices among Adolescents.(n=956)

Variables	N	ΣX	ΣY	ΣX^2	ΣXY	r	ΣY^2	Remark
Overpopulation	956	8,246		97,402				
Cholera Prevention Practices	956		7,954		720,153	-0.079	85,961	Very Weak Negative Relationship

Source: Field Survey (2026)

The result presented in Table 2 indicates that the correlation coefficient between overpopulation and cholera prevention practices is $r = -0.079$, representing a very weak negative relationship. This implies that increasing population density has only a minimal relationship with adolescents' cholera prevention practices within the study area.

Test of Hypotheses

Hypothesis One

HO₁: There is no significant relationship between climate change and cholera prevention practices among adolescents in Akwa Ibom North-East Senatorial District, Nigeria.

Table 3: Pearson Product Moment Correlation Analysis of Climate Change and Cholera Prevention Practices. (n=956)

Variables	n	df	r-cal	p-value	Decision
Climate Change	956				
Cholera Prevention Practices	956	954	-0.084	0.077	Not Significant (H ₀ Retained)

Source: Field Survey (2026)

Since the p-value (0.077) is greater than the 0.05 level of significance, the null hypothesis was retained. Therefore, there is no statistically significant relationship between climate change and cholera prevention practices among adolescents in Akwa Ibom North-East Senatorial District.

Hypothesis Two

HO₂: There is no significant relationship between overpopulation and cholera prevention practices among adolescents in Akwa Ibom North-East Senatorial District, Nigeria.

Table 4: Pearson Product Moment Correlation Analysis of Overpopulation and Cholera Prevention Practices. (n=956)

Variables	n	df	r-cal	p-value	Decision
Overpopulation	956				
Cholera Prevention Practices	956	954	-0.079	0.093	Not Significant (H ₀ Retained)

Source: Field Survey (2026)

Since the p-value (0.093) is greater than the 0.05 level of significance, the null hypothesis was retained. Thus, there is no statistically significant relationship between overpopulation and cholera prevention practices among adolescents in Akwa Ibom North-East Senatorial District.

9. FINDINGS

The study revealed the following findings:

1. There was a very weak negative relationship between climate change and cholera prevention practices among adolescents in Akwa Ibom North-East Senatorial District ($r = -0.084$). However, the relationship was not statistically significant ($p = 0.077$).
2. There was also a very weak negative relationship between overpopulation and cholera prevention practices among adolescents in Akwa Ibom North-East Senatorial District ($r = -0.079$). Similarly, the relationship was not statistically significant ($p = 0.093$).

10. DISCUSSION OF FINDINGS

Climate Change and Cholera Prevention Practices among Adolescents

The findings of this study revealed a very weak negative relationship between climate change and cholera prevention practices among adolescents in Akwa Ibom North-East Senatorial District. The relationship was not statistically significant, indicating that climate change did not significantly influence adolescents' cholera prevention practices within the study area. This finding suggests that although climate change contributes to environmental conditions such as flooding, heavy rainfall, rising temperatures and contamination of water sources that may increase the risk of cholera outbreaks, these environmental changes do not necessarily translate into differences in adolescents' preventive behaviours. The result implies that adolescents' adoption of cholera prevention practices may be influenced more by factors such

as health education, awareness, access to potable water, availability of sanitation facilities and school-based hygiene programmes than by climatic conditions alone.

The finding is consistent with the assumptions of the Health Belief Model developed by Hochbaum (1958) and later refined by Rosenstock (1966, 1974) and Becker (1974), which posits that health-related behaviours are largely influenced by individuals' perceptions of susceptibility, perceived severity of disease, perceived benefits of preventive action and self-efficacy. According to the theory, adolescents who recognise the risks associated with cholera and understand the benefits of practising good hygiene are more likely to adopt preventive behaviours irrespective of prevailing environmental conditions. Thus, behavioural factors may outweigh the direct influence of climate-related environmental changes on cholera prevention practices.

The finding is, however, at variance with the report of Ahmed et al. (2021), who observed that climate variability significantly contributes to the occurrence and spread of waterborne diseases through increased flooding, disruption of sanitation systems and contamination of drinking water sources. Similarly, Johnson (2018) maintained that climate-related environmental changes increase vulnerability to cholera, particularly in communities with inadequate Water, Sanitation and Hygiene (WASH) infrastructure. The apparent discrepancy between these studies and the present finding may be attributed to differences in study focus. While the previous studies examined the relationship between climate change and cholera outbreaks, the present study investigated the relationship between climate change and adolescents' cholera prevention practices. Environmental conditions may increase disease risk without necessarily determining whether individuals practise appropriate preventive behaviours. The finding further suggests that strengthening environmental health education, expanding access to safe drinking water and promoting sustainable hygiene practices among adolescents may produce greater improvements in cholera prevention than reliance on environmental conditions alone. Consequently, public health interventions should continue to emphasise behavioural change communication alongside climate adaptation strategies to reduce cholera vulnerability among school-aged populations.

Overpopulation and Cholera Prevention Practices among Adolescents

The study also revealed a very weak negative relationship between overpopulation and cholera prevention practices among adolescents, and the relationship was not statistically significant. This finding indicates that although population growth and overcrowding are widely recognised as environmental conditions that increase pressure on sanitation facilities,

water supply systems and waste management infrastructure, they did not significantly influence adolescents' cholera prevention practices within the study area.

The finding supports the Social Ecological Model proposed by Bronfenbrenner (1979) and adapted for public health by McLeroy, Bibeau, Steckler and Glanz (1988). The theory argues that health behaviours result from interactions among multiple levels of influence, including individual characteristics, interpersonal relationships, organisational support, community environments and public policies. Although overpopulation represents an important community-level environmental factor, adolescents' preventive behaviours are also shaped by parental guidance, school health programmes, peer influence, environmental health education and government interventions. Consequently, the absence of a significant relationship suggests that these behavioural and institutional influences may moderate the potential effects of population density on cholera prevention practices.

The finding partially disagrees with Zerbo et al. (2020), who reported that overcrowded communities experience increased vulnerability to cholera because of inadequate sanitation facilities, poor waste disposal systems and contamination of water sources. Likewise, Agyarko et al. (2025) found that rapid population growth contributes significantly to environmental degradation and increased transmission of waterborne diseases. The divergence between these findings and those of the present study may be explained by contextual differences in study populations, environmental conditions and outcome variables. Whereas previous investigations largely examined disease occurrence or outbreak patterns, the present study focused specifically on adolescents' preventive practices.

The finding nevertheless highlights the importance of maintaining investments in environmental sanitation infrastructure, improving waste management systems and ensuring equitable access to safe drinking water. While overpopulation may not directly determine adolescents' preventive behaviours, reducing environmental pressures associated with population growth remains essential for limiting opportunities for cholera transmission. Therefore, environmental improvement programmes should be integrated with school-based health education and community awareness campaigns to strengthen cholera prevention among adolescents.

11. CONCLUSION

This study investigated environmental factors as correlates of cholera prevention practices among adolescents in Akwa Ibom North-East Senatorial District, Nigeria, with particular emphasis on climate change and overpopulation. The findings demonstrated that both

variables exhibited very weak negative relationships with cholera prevention practices, and neither relationship was statistically significant. The study therefore concludes that climate change and overpopulation, although recognised environmental determinants of cholera transmission, do not independently influence adolescents' cholera prevention practices within the study area.

The findings suggest that adolescents' preventive behaviours are more strongly influenced by behavioural, educational and institutional factors than by environmental conditions alone. Consequently, effective cholera prevention requires integrated interventions that combine environmental management with continuous health education, improved access to Water, Sanitation and Hygiene (WASH) facilities, strengthened school health programmes and sustained community engagement. Such multidimensional approaches are likely to promote healthier behaviours and contribute more effectively to reducing the burden of cholera among adolescents.

12. RECOMMENDATIONS

Based on the findings of this study, the following recommendations are made:

1. The Akwa Ibom State Ministry of Health should intensify school and community-based health education programmes aimed at improving adolescents' knowledge and practice of cholera prevention through regular handwashing, safe drinking water consumption, hygienic food handling and environmental cleanliness.
2. The State Ministry of Education should strengthen the integration of environmental health and Water, Sanitation and Hygiene (WASH) education into the secondary school curriculum to promote sustainable cholera prevention practices among adolescents.
3. School administrators should ensure the continuous provision and maintenance of functional water supply systems, handwashing facilities, hygienic toilet facilities and effective waste management systems within school environments.
4. Government agencies responsible for environmental sanitation should strengthen policies on waste management, drainage maintenance and environmental sanitation to minimise conditions that favour the transmission of cholera and other waterborne diseases.
5. Parents, guardians and community leaders should encourage adolescents to adopt and sustain appropriate hygiene practices through regular supervision, environmental sanitation activities and participation in community health promotion programmes.
6. Future studies should investigate additional environmental determinants, such as access to potable water, drainage systems, waste disposal practices and environmental health

literacy, using broader geographical coverage and mixed-methods approaches to provide a more comprehensive understanding of factors influencing cholera prevention practices among adolescents.

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