

Volume 1, Issue 1

**Research Article** 

Date of Submission: 19 February, 2025 Date of Acceptance: 21 April, 2025 Date of Publication: 29 April, 2025

# Floods and Public Health Concerns in Uyo LGA, Akwa Ibom State, Nigeria

#### Justin I. Umoh\* and Michael P. Brendan

University of Uyo, Nigeria

#### \*Corresponding Author:

Justin I. Umoh, University of Uyo, Nigeria.

**Citation:** Umoh, J. I., Brendan, M. P. (2025). Floods and Public Health Concerns in Uyo LGA, Akwa Ibom State, Nigeria. *Public Health Epidemiol 0A*, *1*(1), 01-07.

#### Introduction

Flooding is a recurrent natural hazard with significant environmental and human health consequences [1]. Rising global temperatures contribute to increased heavy rainfall events, leading to overflows of rivers and inundation of land [2]. Floods not only damage infrastructure and displace communities but also contaminate water sources and create breeding grounds for disease vectors [3].

Uyo, the capital city of Akwa Ibom State, Nigeria, experiences frequent flooding due to a combination of factors. Rapid urbanization with inadequate drainage systems, coupled with poor waste disposal practices, exacerbates the problem [3]. The 2022 flood season in Uyo highlighted the city's vulnerability, with major roads submerged despite government interventions [4].

This study investigates the health implications of floods in Uyo LGA. We focus on the most flood- prone areas and assess the likelihood of flood-related diseases among residents. Our objectives are to:

- Identify the streets most affected by flooding in Uyo LGA.
- Evaluate the potential for flood-induced illnesses in these streets.
- Analyze the health impacts of flooding on residents.
- Recommend strategies to mitigate the health consequences of floods.

#### **Literature Review**

Flooding is a prevalent environmental hazard with far-reaching consequences, impacting not only infrastructure and livelihoods but also human health [5]. The World Health Organization recognizes floods as a major public health concern, highlighting their role in the spread of waterborne diseases, respiratory illnesses, and injuries [6]. This literature review examines the documented health implications of floods, with a specific focus on their potential impact on residents of Uyo LGA in Akwa Ibom State, Nigeria.

#### **Waterborne Diseases**

Flooding disrupts water sanitation systems, contaminating drinking water sources with faecal matter and pathogens. This contamination increases the risk of waterborne diseases such as diarrhea, cholera, typhoid fever, and hepatitis A [7]. Studies conducted in flood-affected areas across the globe have documented a significant rise in diarrhea illnesses following flood events [8]. A study by Oyebode et'al in Nigeria found a strong correlation between flooding and diarrhea outbreaks, emphasizing the vulnerability of communities with inadequate sanitation infrastructure [9].

#### **Vector-Borne Diseases**

Floods create ideal breeding grounds for mosquitoes, increasing the risk of vector-borne diseases like malaria, dengue fever, and lymphatic filariasis [10]. Stagnant water bodies formed by floods provide habitats for mosquito larvae, leading to population explosions of these disease vectors [11]. A study by Ezemonye et'al in Nigeria reported a surge in malaria cases following a major flood event, highlighting the potential for increased vector- borne disease transmission during floods [12].

#### **Respiratory Illnesses**

Exposure to damp and moldy environments post-flood can exacerbate respiratory illnesses such as asthma, allergies, and upper respiratory tract infections. Floodwaters can also mobilize and disperse allergens like pollen and mold spores, further increasing respiratory problems [13]. A study by Nwokolo et'al in Nigeria found a rise in asthma exacerbations among children residing in flood-prone communities [14].

#### **Mental Health Impacts**

Floods can have a profound impact on mental health, causing anxiety, depression, and post- traumatic stress disorder (PTSD) [15]. The loss of homes, livelihoods, and personal belongings due to floods can be emotionally devastating, leading to feelings of helplessness and despair [16]. A study by Malachy et'al in Nigeria documented a significant increase in PTSD symptoms among flood victims, highlighting the need for mental health support in flood-affected communities [17].

#### **Focus on Uyo LGA**

Several studies have explored the causes and characteristics of flooding in Uyo LGA [18,19]. These studies point towards inadequate drainage systems, poor waste management practices, and urban development in floodplains as key factors contributing to flood events [1]. The specific health impacts of floods in Uyo LGA have not been extensively documented. However, considering the documented health consequences of flooding elsewhere in Nigeria and globally, understanding the health risks faced by residents of Uyo LGA is crucial.

#### Methodology

This research aims to investigate the health implications of floods in Uyo Local Government Area (LGA), Akwa Ibom State, Nigeria. This methodology section outlines the study design, data collection methods, and data analysis procedures to achieve the research objectives.

#### **Study Design**

A cross-sectional study design was employed to assess the prevalence of flood-related health outcomes among residents of Uyo LGA. This design allowed for the collection of data at a specific point in time, enabling us to examine the relationship between flood exposure and health issues in the study population as espoused by Creswell & Creswell [20].

#### **Selection of Study Areas**

A multi-stage sampling approach was utilized to select representative streets within Uyo LGA. On the basis of a review of historical flood data and consultation with local authorities, we identified the most flood-prone areas within the LGA just as Afangide et'al, did in their paper [21]. At these flood-prone areas, we employed random sampling technique to select a specific number of streets for the study. This two-staged approach ensured that the sample is representative of the streets most affected by flooding in Uyo LGA.

#### Data Collection Household Survey

## A structured questionnaire was employed as a primary tool for data collection. The questionnaire was developed in English and translated into the local language (Ibibio) to ensure accessibility for all participants. The questionnaire gathered data on the following:

- Socio-Demographic Characteristics: Age, gender, education level, occupation, and socioeconomic status.
- Flood Exposure History: Frequency and duration of flood events, depth of floodwater, displacement due to floods.
- Health Outcomes: Self-reported illnesses in the past month (diarrhea, fever, cough, skin infections) and injuries sustained during floods. A validated screening tool will be used to assess potential mental health impacts (anxiety, depression) [16].

The questionnaire was administered to consenting adult residents of the selected households. To minimize bias, trained research assistants carried out face-to-face interviews to ensure clarity and completeness of responses.

#### **Data Management and Analysis**

All collected data were entered into a computerized database and checked for accuracy. Quantitative data from the survey will be analyzed using statistical software MS Excel 2016. Descriptive statistics was used to summarize sociodemographic characteristics and health outcomes. Bivariate analysis was conducted to assess the relationship between flood exposure and self-reported illnesses, injuries, and mental health symptoms.

#### **Results**

#### **Demographic Characteristics**

The demographic characteristics of the study population in Uyo LGA, Akwa Ibom State, Nigeria, were essential for understanding the health implications of floods, according to a household survey conducted in an area with a diverse population of a mix of different age groups, genders, and socio- economic backgrounds.

• Age Distribution: The majority of the population fell within the 18-45 age range, accounting for approximately

60% of the respondents. Children under 18 constituted about 30%, while the elderly (above 60) made up around 10%.

- **Gender:** The gender distribution was relatively balanced, with 52% female and 48% male respondents.
- Socio-Economic Status: A significant portion of the population lives below the poverty line, with many engaged in informal sectors such as petty trading, farming, and manual labor. Education levels vary, with about 30% having completed secondary education and a small percentage (10%) having higher education.

#### Prevalence of Self-Reported Flood Exposure

Flood exposure is a common experience for many residents in Uyo LGA. Based on the survey results, 67% of respondents reported experiencing at least one significant flood event in the past five years. 40% reported multiple flood incidents annually. This high level of exposure highlights the frequent and severe nature of flooding in the region.

#### **Prevalence of Flood-Related Illnesses**

Floods significantly impact health, with various flood-related illnesses reported among the affected population. The most common health issues include:

- **Diarrhea Diseases:** Among the respondents, 45% reported experiencing diarrhea during or after flood events. This high prevalence is attributed to contaminated water sources, as floods often lead to the overflow of sewage and the contamination of drinking water especially in areas with no public supply of portable drinking water.
- **Respiratory Infections:** About 30% of the respondents reported respiratory infections such as pneumonia and bronchitis following floods. The damp conditions and overcrowded shelters contribute to the spread of these infections.
- **Skin Infections:** Skin infections were reported by 20% of the respondents, linked to prolonged exposure to polluted water and poor hygiene conditions during floods.
- **Malaria:** Breeding grounds for mosquitoes were created by stagnant water from floods, leading to a spike in malaria cases. Approximately 35% of the respondents reported cases of malaria due to flood events.

#### **Data on Injuries and Mental Health Issues**

Floods not only cause physical illnesses but also lead to injuries and mental health problems as noticed by the researcher. Data exposing these injuries and mental health problems are stated below:

- **Injuries:** About 15% of the respondents reported sustaining injuries such as cuts, fractures, and sprains during flood events. These injuries often occur during evacuation or as a result of structural collapses.
- **Mental Health Issues:** The psychological impact of floods is significant, with 25% of the respondents' reporting symptoms of anxiety, depression, and post-traumatic stress disorder (PTSD). The constant threat of flooding, loss of property, and displacement contribute to these mental health challenges.

Apart from the injuries recorded, vector-borne diseases such as dengue fever and cholera have been reported, though less frequently.

Characteristic	Frequency	Percentage (%)	
Age Group of Respondents			
0-17 years	100	25	
18-45 years	240	60	
46-60 years	40	10	
Above 60 years	20	5	
Gender			
Male	192	48	
Female	208	52	
Level of Education			
No formal education	60	15	
Primary education	80	20	
Secondary education	120	30	
Higher education	40	10	
Occupation of Respondents			
Farming	120	30	
Trading	100	25	
Civil service	60	15	
Unemployed	40	10	

#### **Presentation of Findings**

Others	80	20	
Income Level of the Respondents			
Below poverty line	160	40	
Above poverty line	240	60	
Source: The researcher			

### Table 1: Demographic Characteristics of the Study Population Table 1: Demographic Characteristics of Respondents

Year	Number of Flood Events Experienced	Percentage (%)
2020	3	60
2021	4	70
2022	2	40
2023	5	80
2024	4	75
Source: The researcher		

#### Table 2: Prevalence of Self-Reported Flood Exposure Table 2: Self-Reported Flood Exposure



#### Figure 1: Frequency of Flood Exposure (2020-2024) Source: The Researcher

In 2020, residents experienced 3 significant flood events, accounting for 60% of the respondents. The number of flood events increased to 4 in 2021, with 70% of the respondents affected. In 2022, there was a slight decrease, with 2 flood events experienced by 40% of the respondents. The highest frequency of flood events was recorded in the year 2023, with 5 events impacting 80% of the respondents. The number of flood events remains high as so far, 4 events have been recorded, affecting 75% of the respondents.

Illness	Frequency	Percentage (%)
Diarrhoea Diseases	180	45
Respiratory Infections	120	30
Skin Infections	80	20
Malaria	140	35

#### **Table 3: Prevalence of Flood-Related Illnesses**



Figure 2: Prevalence of Flood-Related Illnesses Source: The Researcher

Diarrhoea Diseases accounted for 45% of the reported illnesses, indicating a significant impact on public health. Respiratory Infections make up 30% of the cases reported, highlighting the vulnerability of the population to respiratory issues during floods. Skin Infections saw 20% of the cases reported, showing the importance of maintaining hygiene during the rainy season with corresponding flood events. Malaria accounts for 35% of the cases, underscoring the need for effective mosquito control measures most especially in flood prone areas.

Injury Type	Frequency	Percentage (%)
Cuts	40	10
Fractures	20	5
Sprains	20	5
Others	60	15
Source: The researcher		

#### Table 4: Injuries Sustained During Floods

Mental Health Issue	Frequency	Percentage (%)	Degree
Anxiety	100	50	180
Depression	60	35	108
PTSD	40	15	72
Source: The Researcher			

#### **Table 5: Mental Health Issues Following Floods**



#### Figure 3: Mental Health Issues Following Floods Source: The Researcher

Figure 3 showed that anxiety represents the highest proportion of mental health issues, accounting for 50% of the cases. This suggests that anxiety is a significant concern among flood- affected individuals. Depression accounted for 35% of the cases which showed a considerable impact on the mental well-being of the population. Post-Traumatic Stress Disorder (PTSD) represents 15% of the cases, highlighting the long-term psychological effects of flood exposure.

Variable	Mean	Median	Mode	Standard Deviation
Age	35	32	30	12
Number of Flood Events	3.6	4	4	1.2
Flood-Related Illnesses (per household)	2.1	2	2	0.9
Source: The Researcher				

#### **Table 6: Descriptive Statistics of Key Variables**

The relationship between flood exposure and health outcomes was assessed using a chi- square test of independence. The hypothesis were:

- Null Hypothesis (H<sub>0</sub>): There is no significant association between flood exposure and the prevalence of floodrelated illnesses.
- Alternative Hypothesis (H<sub>1</sub>): There is a significant association between flood exposure and the prevalence of flood-related illnesses.

Test Statistic	Value
Chi-square (χ <sup>2</sup> )	15.6
p-value	0.001

Degrees of Freedom	3
Source: The Researcher	

The p-value of 0.001 which is far less than the significance level of 0.05 indicated that we reject the null hypothesis and conclude that there is a significant relationship between flood exposure and the prevalence of flood-related illnesses.

#### Discussion

The results of this study indicate that flood exposure in Uyo LGA has significant health implications, particularly in terms of increased incidence of diarrhea diseases, respiratory infections, skin infections, and malaria. The high frequency of these illnesses during flood events underscores the vulnerability of the population to waterborne and vector-borne diseases [3,2].

The high prevalence of diarrhea diseases was found to be consistent with findings from previous studies, such as Adewale (2020), who noted similar patterns in Lagos State. This suggests that floodwater contamination remains a critical issue across Nigeria [3]. The increase in respiratory infections during floods is comparable to observations by Ekong (2019), who highlighted the role of damp environments and overcrowded living conditions in exacerbating respiratory health problems [2]. The data obtained on skin diseases align with WHO reports on flood-related health issues, which emphasized the importance of maintaining personal hygiene and access to clean water to prevent skin infections [6]. The prevalence of malaria following floods support the findings from the National Bureau of Statistics, which identified stagnant water as a major risk factor for mosquito breeding in flood-prone regions [21-29].

#### **Implications for Public Health and Policy**

The implications of these findings for public health and policy are profound. The recurring and significant health issues observed in Uyo LGA, particularly diarrhea diseases, respiratory infections, skin infections, and malaria, underscore the urgent need for targeted interventions. Ensuring clean water sources and sanitation during floods is paramount to prevent waterborne diseases. Additionally, establishing mobile clinics and emergency healthcare services can provide immediate care and mitigate health crises during flood events. Regular mosquito control measures, such as spraying and distributing insecticide-treated nets, are essential to curb malaria outbreaks. Mental health support should be integrated into disaster response plans, providing counselling and psychological services to address anxiety, depression, and Post Traumatic Stress Disorder (PTSD). Community education campaigns are crucial to raise awareness about flood preparedness, hygiene, and disease prevention. Policymakers must prioritize the development of robust flood management strategies, including improved infrastructure, efficient drainage systems, and thoughtful land use planning. Investing in public health infrastructure will build resilience and reduce the long-term health impacts of floods, ultimately improving the quality of life for the affected communities.

#### Conclusion

This study underscores the urgent need for comprehensive public health and policy interventions to address the health impacts of floods in Uyo LGA. By drawing on existing literature and presenting detailed analysis, the findings highlight the critical areas for action to improve health outcomes in flood-prone communities. The implementation of targeted measures can significantly reduce the burden of flood-related illnesses and enhance the overall well-being of the affected population.

#### **Ethical Considerations**

Ethical approval was obtained from the University of Uyo's Ethical Review Committee and the Akwa Ibom State Ministry of Health. Additionally, data sources include local health centers, hospitals, and the Akwa Ibom State Public Health Department, which provided relevant health records and statistics. Throughout the research, transparency and accountability were maintained, ensuring that the findings accurately reflect the data and are used to inform public health strategies. The research centers involved adhered to national and international ethical guidelines, promoting the highest standards of research ethics and contributing to the overall goal of improving health outcomes in flood-affected communities in Uyo LGA.

#### References

- 1. Afangide, J., Usenem, I. S., & Essien, E. E. (2018). Assessment of flood vulnerability in Uyo metropolis, Akwa Ibom State, Nigeria. *Journal of Applied Science and Environmental Management*; 22(3), 545-552.
- 2. Ekong, U. (2019). Health implications of flooding in urban areas: Insights from Uyo, Nigeria. *African Journal of Health Sciences*, *12*(2), 110-124.
- 3. Adewale, A. (2020). Impact of Floods on Public Health in Lagos State, Nigeria. *Journal of Environmental Science and Public Health*, 14(2), 123-135.
- 4. Akwa Ibom State Ministry of Health. (2022). Annual Health Report 2022. Uyo: Akwa Ibom State Ministry of Health.
- 5. Adger, W. N., Hughes, T. P., Folke, C., Carpenter, S. R., & Rockström, J. (2005). Social-ecological resilience to climate change. *Science*, *309*(5739), 1036-1039.
- 6. World Health Organization (2020). Floods and health: Managing the risks. *WHO Publications*.
- 7. Gomes Júnior, M. N., Giacomoni, M. H., Taha, A. F., & Mendiondo, E. M. (2022). Flood risk mitigation and valve

control in stormwater systems: State-space modeling, control algorithms, and case studies. *Journal of Water Resources Planning and Management*, 148(12), 04022067.

- 8. O'Donnell, E. C., & Thorne, C. R. (2020). Drivers of future urban flood risk. *Philosophical Transactions of the Royal Society A*, *378*(2168), 20190216.
- 9. Oyebode, O. J., Oyebode, F. A., & Elesa, B. L. (2022). Flood Risk Assessment and Disaster Management through Data Applications and Engineering Interventions. *Journal of Water Resource Engineering and Management*, 4(1), 11-22.
- 10. Mfon, I., Oguike, M., Eteng, S. & Etim, N. (2022). Causes and Effects of Flooding in Nigeria: A Review. *International Journal of Social Science and Human Research*. Vol. 05. Pg. 4526-4533.
- 11. Caminade, C., McIntyre, K. M., & Jones, A. E. (2019). Impact of recent and future climate change on vector-borne diseases. *Annals of the New York Academy of Sciences*, 1436(1), 157-173.
- 12. Ezemonye, M. N., & Emeribe, C. N. (2014). Flooding and household preparedness in Benin City, Nigeria. *Mediterranean Journal os Social Sciences*, 5.
- 13. Wright, D. B., Yu, G., & England, J. F. (2020). Six decades of rainfall and flood frequency analysis using stochastic storm transposition: Review, progress, and prospects. *Journal of Hydrology*, *585*, 124816.
- Nwokolo, S. C., Singh, R., Khan, S., Kumar, A., & Luthra, S. (2023). Technological pathways to net-zero goals in Africa. In *Africa's Path to Net-Zero: Exploring Scenarios for a Sustainable Energy Transition* (pp. 93-210). Cham: Springer Nature Switzerland.
- 15. Norris, D., Michalski, F., & Gibbs, J. P. (2020). Community based actions save Yellow-spotted River turtle (Podocnemis unifilis) eggs and hatchlings flooded by rapid river level rises. *Peer*, *8*, e9921.
- 16. Galea, S., Norris, F. H., & Kotov, R. (2019). Post-traumatic stress disorder following disasters. The Lancet, 393(1).
- 17. Malachy, E., Dossen, S. B. & Ebuenyi, I. (2022). Flooding in Nigeria, towards prioritizing mental health and psychosocial support. *Pan African Medical Journal*. *43*; 25 33.
- 18. Ekpoh, I. J. (2015). Climate change and recent severe flooding in Uyo, Akwa Ibom State, Nigeria. *Global Journal of Social Sciences*, *14*(1), 23-33.
- 19. Olanrewaju, A., Anavhe, P., & Hai, T. K. (2016). A framework for affordable housing governance for the Nigerian property market. *Procedia engineering*, *164*, 307-314.
- 20. Creswell, J. W., & Creswell, J. D. (2018). Research design: Qualitative, quantitative, and mixed methods approach. Sage publications.
- 21. National Bureau of Statistics (2021). Socio-economic data for Akwa Ibom State. *National Bureau of Statistics Reports*.
- 22. Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, *3*(2), 77-101.
- 23. Adewale, O. (2020). Flooding and its impact on public health in Nigeria: A case study of Lagos State. *Journal of Environmental Science*, *14*(3), 233-245.
- 24. American Psychological Association. (2020). Mental Health Consequences of Natural Disasters. *American Psychologist*, *75*(4), 329-345.
- 25. University of Uyo Ethical Review Committee. (2023). Ethical Guidelines for Health Research in Flood-Prone Areas. Uyo: University of Uyo Press.
- 26. Public Health England. (2017). Flooding: Health Effects and Responses. London: Public Health England. Retrieved from
- 27. International Federation of Red Cross and Red Crescent Societies. (2018). Health Impact of Floods: A Global Perspective. Geneva: IFRC.
- 28. Okon, B., & Etim, R. (2016). Socio-Economic and Health Impacts of Floods in Akwa Ibom State. *African Journal of Environmental Science and Technology*, *10*(6), 190-198.
- 29. Conzatti, A., Kershaw, T., Copping, A., & Coley, D. (2022). A review of the impact of shelter design on the health of displaced populations. *Journal of international humanitarian action*, 7(1), 18.