ISRG Journal of Economics, Business & Management (ISRGJEBM)

ISRG PUBLISHERS

Abbreviated Key Title: Isrg J Econ Bus Manag

ISSN: 2584-0916 (Online)

Journal homepage: https://isrgpublishers.com/isrgjebm/

Volume – IV Issue - III (May-June) 2026

Frequency: Bimonthly

Impact of climate change on climate-shock-related mortality among Persons with Disabilities

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| **Received:** 16.05.2026 | **Accepted:** 25.05.2026 | **Published:** 31.05.2026

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Abstract

Climate change has intensified the frequency and severity of climate-related shocks, with disproportionate impacts on vulnerable populations, particularly Persons with Disabilities (PWDs). This study examines the impact of climate change on climate-shock-related mortality among PWDs in Nigeria using a mixed-methods approach. Quantitative data were collected from 372 respondents and analyzed using logistic regression, while qualitative insights were obtained through Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs). The findings reveal that climate variables, particularly temperature and rainfall variability, significantly increase mortality risks among PWDs. Disability severity was also found to be a strong predictor of mortality. Conversely, access to healthcare, early warning systems, and higher incomes significantly reduce mortality risk. Qualitative evidence highlights systemic barriers such as inaccessible infrastructure, limited information dissemination, and exclusion from disaster planning processes. The study concludes that climate change exacerbates existing vulnerabilities among PWDs, leading to higher mortality during climate shocks. It recommends the adoption of disability-inclusive climate adaptation strategies, improved access to healthcare and early warning systems, and stronger policy implementation frameworks. These findings contribute to the growing discourse on inclusive climate resilience and underscore the need to prioritize PWDs in climate and disaster risk reduction policies.

Keywords: *Climate Change; Climate Shocks; Mortality; Persons with Disabilities; Vulnerability; Adaptive Capacity; Nigeria; Disaster Risk Reduction*

1.0 Introduction

Climate change has become one of the greatest challenges of the 21st century due to its impact on human health, livelihoods and survival (Tanko et al., 2025). Climate shocks have significantly increased in frequency and intensity due to the increased temperature, irregularity of rainfall, rise in sea level and increased extreme weather events such as flooding, droughts and heatwaves (Abiola et al., 2025; Olusola et al., 2025). The exposure and sensitivity of vulnerable groups, such as Persons with Disabilities

DOI: 10.5281/zenodo.20473211

(PWDs) as well as their ability to adapt to climate risks, are often limited by social, economic and institutional barriers.

The number of climate-shock related mortalities those directly or indirectly caused by extreme weather events and environmental disruptions have been increasing all around the world. The World Health Organization (WHO) estimates that climate change will result in some 250,000 deaths annually by 2030-2050 from heat stress, malnutrition, malaria, and diarrheal disease (WHO, 2021). The projections, however, are often misleading as there are also inequalities among population groups, especially among PWDs, who are at a higher risk of death during climate shocks because of limited mobility, less access to information, lack of ability to protect themselves during conflict, poverty, and systemic exclusion from disaster preparedness and response processes (UNDRR, 2020; Zailani et al., 2025; Magaji et al., 2022).

Persons with Disabilities, who are over 15% of the world's population, are a very diverse group with different types of physical, sensory, intellectual and psychosocial disabilities (World Bank, 2020). The vulnerability of people with disabilities to climate-induced risks is exacerbated by their vulnerability to other factors such as poverty status, gender, age, and geographic location. In the event of flooding, people with disabilities may not be able to evacuate and during wildfire events, people with vision and hearing impairments are not able to hear warnings and receive the information they need in time (United Nations Office for Disaster Risk Reduction, 2019). As a result, the effects of climate shocks are likely to be greater among PWDs than for the general population.

Climate risks disproportionately impact PWDs, as seen in past disasters. During the Great East Japan Earthquake and Tsunami in 2011, it was identified that the mortality was higher among persons with disabilities than among people without disabilities, and that the needs of persons with disabilities for evacuation assistance were not being met, as well as emergency shelters being inaccessible (Stough & Kang, 2015). Additionally, in Europe and North America, during heatwaves people with disabilities and chronic diseases were at higher risk of death because they had less access to cooling facilities, health care and social services (Kovats & Hajat, 2008). In developing regions, especially in Sub-Saharan Africa, it is further aggravated by the existence of weak health systems, limited social protection and inadequate disaster risk governance which contribute to the increased vulnerability of PWDs to climate-induced mortality (IPCC, 2022).

The concept of vulnerability in relation to climate change can be explained through three interrelated aspects – exposure, sensitivity and adaptive capacity. Overall, PWDs tend to score higher in all three dimensions. They are more likely to live in contexts that are at risk from hazards (socio-economic marginalization, increased exposure) and have pre-existing health conditions that make them more sensitive to the effects of climate stressors (e.g., hypertension) and lack resources and services to help them cope and recover (e.g., reduced adaptive capacity) (Mitra et al., 2017; Imam-Binuyo et al., 2026). The compounded vulnerabilities highlight the importance of a more complex understanding of the impacts of climate change on mortality outcomes for PWDs.

While the number of systems in which the climate/health connection can be seen is growing, the literature lacks disability-inclusive climate research. Data on PWDs is not disaggregated in most Climate impact assessments and DRR plans, which reflects the lack of awareness towards the specific risks and needs of people with disabilities (United Nations, 2018). This is not just a lack of disaggregated data to make PWDs visible in the climate discourse, it is also a lack of disaggregated data to support targeted interventions to reduce the risk of mortality of PWDs.

Furthermore, international policy documents such as the Paris Agreement and the Sendai Framework for Disaster Risk Reduction have emphasised the need for inclusive and equitable climate action and disaster risk reduction. These are normally translated at the local or national level and this does not typically include the specific vulnerabilities of PWDs. It is also notable that, despite policy statements, there remains an action gap that calls for research that can contribute to disability-inclusive climate action.

Disability and climate change intersect and presents a development challenge for developing countries particularly for those in Sub Saharan Africa. Cyclical floods, desertification and heatwaves, among others, are extreme climate events that are becoming more frequent and more intense in Nigeria and other countries, threatening vulnerable groups. Under these conditions, PWD's are more vulnerable to increased risk of mortality during a climate event due to poverty, poor access to health services, and low infrastructure (Adelekan, 2010; Ologbonori et al., 2025).

This study, therefore, seeks to examine the impact of climate change on the death of PWDs as a result of climate shock occurrence. This project will combine knowledge and evidence from climate science, public health and disability studies to contribute to the emerging field of inclusive climate resilience. It particularly focuses on the essential question of what makes the climate induced hazard have different impacts on the mortality of PWDs and what policy actions need to be taken to lower those risks.

Last, the link between climate and disability has to be considered for the general agendas of sustainable development, such as the 'leave no one behind' principle in the Sustainable Development Goals (SDGs). Climate change affects PWDs in a disproportionate manner and it is not only a public health and environmental justice concern, it is a human rights concern.

2.0 Literature Review

2.1 Conceptual Definitions

2.1.1 Inequitable exposure to climate change and climate shocks.

Climate change refers to the long-term changes in the climate system, such as changes in temperature, rainfall and other climate parameters, driven mainly by human-induced emissions of greenhouse gases (GHGs) (IPCC, 2022). The impacts of these changes are the increasing frequency and intensity of climate risks (floods, drought, storms, heatwaves and other climate risks), which are collectively known as climate shocks (Magaji et al, 2024; Jafaru et al, 2025). Climate shocks are adverse environmental events that affect livelihoods, infrastructure and health systems and lead to loss of life and property as per the definition of the United Nations Office for Disaster Risk Reduction, 2020.

2.1.2 Climate-Shock-Related Mortality

Climate-shock related deaths refer to the direct death caused by the extreme weather events (e.g. drowning during flooding) and indirect death due to secondary impact of extreme weather events (e.g. outbreak of disease, malnutrition, disruption of health services) (World Health Organization, 2021). Understand the

DOI: 10.5281/zenodo.20473211

concept of indirect death when considering the impact of climate change on general health, as it is likely that there are more indirect deaths than direct deaths, particularly in low and middle-income countries.

2.1.3People with Disabilities (PWDs)

Persons with Disabilities are individuals who suffer from long-term physical, mental, intellectual or sensory impairment that makes it challenging for them to participate fully and effectively in society on an equal basis with other people, interacting with a variety of barriers (United Nations, 2018). The social model of disability is now accepted to mean that disability is not just a matter of impairment, but also is caused by society's barriers. These are issues related to inaccessibility of infrastructure, early warning systems and exclusion from disaster planning processes that come from the intersections of climate change.

2.1.4The vulnerability and adaptive capacity of the community.

The vulnerability of a climate study is the inclination or susceptibility to be negatively impacted by climate hazards. It is known in general terms to be a function of exposure, sensitivity, and adaptive capacity (IPCC 2022). PWDs are more vulnerable because of their level of exposure (e.g. living in areas vulnerable to hazard), level of sensitivity (e.g. health vulnerability prior to the hazard event) and level of adaptive capacity (e.g. limited access to resources and services) (Mitra et al., 2017). Adaptive capacity refers to the ability of people or systems to adjust to potential harm, capitalize on opportunities, or respond to impacts (Abubakar et al., 2025).

2.2 Theoretical Framework

2.2.1Social Model of Disability

The social model of disability has the focus that disability is not only an impairment but something that is caused by social factors which impact on participation and inclusion in society. This model also highlights the vulnerability of PWDs to climate shocks, especially where there is no access to infrastructure, policies are discriminatory, and there is no inclusive disaster planning. An example of this is the significant life-threatening risks which may occur if a person with mobility or sensory impairments is unable to leave an evacuation centre without a ramp, or an accessible method of communication with the staff. (Oliver, 1990) For this, one needs such a framework, which would help understand the mortality due to climate change among PWDs is not a natural occurrence but socially created and preventable.

2.2.2Vulnerability Theory

The vulnerability theory can be applied to consider the differing effects that environmental risks may have on different populations due to exposure, sensitivity, and adaptive capacity. This theory suggests that PWD would put PWDs at a higher risk of climate shocks because of compounded disadvantage, including poverty, marginalization and lack of access to health services (Adger, 2006). The theory highlights that structural inequalities need to be tackled to mitigate the vulnerability and build resilience.

2.2.3TAT Model

Health Belief Model is a theory of health-related behavior that outlines the perceived threat, danger, benefits and barriers of an action as seen by an individual. With regard to climate change, PWDs might lack information regarding climate risks, or they might find it difficult to implement protective actions (such as evacuating during disaster events), and thus be at higher risk to die (Rosenstock, 1974). The HBM can be useful in comprehending the behavioural characteristics of vulnerability and the impact of awareness and perception on people's reaction to climatic shock.

2.2.4Resilience Theory

In Resilience Theory, we are interested in how individuals and communities can resist, adapt and recover from shocks and stresses. Systemic inequalities and lack of inclusive supports can limit resilience for PWds. Social networks, access and policy can be strengthened to increase resilience and lower death risks though (Folke, 2006). This theory highlights the need for ensuring build-up of adaptive capacities in line with vulnerable group’s needs.

2.3 Empirical Evidence

Previous empirical studies have repeatedly found vulnerable groups, such as people with disabilities, to be more likely to die during climate shocks, as they are affected more than others by climate change.

Global Evidence

Worldwide there is evidence of high mortality for PWDs in disasters. For instance, in Japan in 2011, the study showed the mortality rate of PWDs was more than double that of the general population due to the lack of targeted support and challenges in evacuating PWDs (Stough & Kang, 2015). Similarly, studies from Europe have found that individuals with chronic diseases and disabilities are more vulnerable to mortality from heatwaves, because of their limited ability to move around and to have access to cooling facilities and systems (Kovats & Hajat, 2008).

Absence of representation of PWDs in DRR strategies puts them at a higher risk of dying and morbidity during disaster events (World Bank, 2020). In addition, the United Nations office for Disaster Risk Reduction (UNODRR) notes that there are two to four times more deaths among PWDs in disaster situations compared to non-disabled people.

How to find it and how to use it.Sources and application of evidence from Developing Countries.

Poor infrastructure, poverty, and low health services coupled with the impacts of climate change on PWDs are worsened in developing countries. In Bangladesh, however, the condition of people with disabilities was worse during the cyclone as the shelters were inaccessible and there was no early warning system, thus deaths occurred in large numbers (Mallick et al., 2017). Frequent dry spells and floods have been associated with higher death rates of vulnerable groups such as PWDs, as a consequence of reduced food security and access to healthcare services in Sub-Saharan Africa (IPCC, 2022).

This research was done in Nigeria and Sub-Saharan Africa and has evidence from these regions.

Climate change is causing floods and heatwaves to occur more often in Nigeria, particularly in the Niger Delta and Northern regions. Studies found that vulnerable groups like PWDs are adversely impacted due to inadequate provision and service (Adelekan 2010). In Nigeria, the loss of life has been reported as a result of flood, making PWDs worse off in evacuation and accessing relief services.

DOI: 10.5281/zenodo.20473211

International evidence from Sub Saharan Africa also indicates that disability is related to other vulnerabilities like gender and age which can further heighten the risk of death during climate shocks. For example, during disasters, women with disabilities are at higher risk of death, as they also suffer from lack of access to information and healthcare, which adds to their disadvantages (United Nations, 2018).

2.4 Gaps in the Literature

Although there is increasing evidence, there are still many gaps to be addressed in the literature. First, there is a lack of disaggregated data on disability in climate and disaster studies, making it difficult to understand mortality risks of PWDs. Second, most climate vulnerability assessments are conducted as a whole-of-society assessment and fail to focus on the pathways whereby it has been shown to increase death rates for PWDs. Third, little study exists on effectiveness of disability-inclusive adaptation measures in climate shocks to reduce mortality.

The findings from the literature reviewed here demonstrate the importance of the impact of climate change on climate shock related mortality and that, due to structural inequalities, limited adaptive capacity and systemic exclusion, Persons with Disabilities are at greater risk than others. Some explanation of this disparity can be gained from these theoretical models, such as the social model of disability, vulnerability theory and resilience theory. There are indications that the mortality rate among PWDs is increased during climate emergencies in developed and developing countries. But the gaps in data and studies call for greater depth and detail of study to shape policy and practice.

3.0 Methodology

3.1 Research Design

This study is a mixed method research which uses the quantitative and qualitative methods to comprehensively analyze the effect of climate change on climate shock induced deaths for Persons with Disabilities (PWDs). The quantitative component enables estimation of the climate variable(s) to mortality outcomes while the qualitative component provides information on lived experiences, vulnerabilities, and coping during a climate shock from the perspective of PWDs. This triangulation helps to enhance validity and strength of the results.

3.2 Study Area

The study is undertaken in the selected climate sensitive areas in Nigeria, with special focus on the flood prone, drought prone and heatwave prone zones in the North-East and North-Central parts of Nigeria, respectively, where recurrent flood, drought and heatwaves are experienced. These have been defined as having high exposure to the climate hazards, low adaptive infrastructure and large vulnerable groups like PWDs.

3.3 Population of the Study

The target population are:

Persons with Disabilities (PWDs) which include those with physical, sensory, intellectual and psychosocial disabilities; and

Families where there is a member with a disability;

Representatives of disability groups, disaster management agencies and healthcare providers.

Multiple categories of respondents allow a detailed view of the situation with regards to mortality risk and mortality causes.

Determine the sample size and sampling methods.Calculate the sample size and sampling methods.

Multi-stage sampling using:

Stage One (Selection of States/Regions): Purposive sampling is used to select states/regions that are climate vulnerable using historical records of climate shocks.

In Stage Two (Selection of Communities), random sampling is used to pick communities within the selected states.

Stage Three: Selection of Respondents: Stratified Sampling: Representation across Disability Categories.

The sample size calculation is done using Cochran's formula for large population:

$n=(Z^2\ p(1-p)/e^2$

Where:

n= sample size

Z= the standard normal deviation (1.96 at 95% confidence level)

p = Maximum possible variability of the proportion of PWDs affected by climate shocks (assumed value as 0.5).

e= margin of error (0.05)

This equates to a 'non-response adjusted' sample size of 384 respondents.

3.4 Sources of Data

a. Primary Data

Primary data are collected in the following ways:

Structured Questionnaires: Conducted to PWD and households to collect information on their exposure to climate shocks, health impacts and experiences with deaths.

Key Informant Interviews (KIIs): interviews with disaster management, health and disability sector officials.

Focus Group Discussions (FGD): Discussions with PWDs to discuss common experiences and coping strategies.

b. Secondary Data

Secondary data sources are:

Reports on World Health Organization, United Nations Office for Disaster Risk Reduction;

National organizations such as National Emergency Management Agency (NEMA); and

Peer-reviewed journals and climate data (such as temperature data, rainfall data and disaster occurrence data).

3.5 Measurement of Variables

Dependent Variable:

Mortality from climate shocks (number of deaths in households as a result of climate events).

Independent Variables:

DOI: 10.5281/zenodo.20473211

Climate indicators (changes in temperature and precipitation; extreme events); and

Disability status (type of disability and level of disability);

Socio-economic factors (income, education, health care);

Accessibility factors (access to the early warning systems, evacuation support and emergency services).

3.6 Model Specification

For estimating the effect of climate change on mortality among PWDs, the study uses a logistic regression model, as the outcome is binary (death = 1; no death = 0):

$$\text{Ln } P/(1-P) = \beta 0 + \beta 1\ Ci + \beta 2\ Di + \beta 3\ Xi + \epsilon i$$

Where:

P= probability of climate-shock related mortality

Ci = vector of climate variables

Di = disability-related variables

Xi = control variables (socioeconomic and demographic factors)

β0 = intercept

β1, β2, β3= coefficients

ϵi= error term

3.7 Methods of Data Analysis

Quantitative Data:

Descriptive statistics (mean, percentages, frequency distributions) and inferential statistics (logistic regression) are used to analyze data. The data is analysed with statistical software, SPSS or STATA.

Qualitative Data:

Thematic analysis (coding, categorizing, identifying themes) is used to analyze data gathered from KIIs and FGDs, which are collected and analyzed to identify patterns and themes to understand vulnerability, accessibility, and mortality risks.

3.8 Validity and Reliability

Validity: Content and construct validity of research tools are carried out by experts.

Reliability- A pilot study is carried out, and internal consistency of the items in the questionnaire is tested using Cronbach's alpha.

3.9 Ethical Considerations

The study follows ethical principles such as:

All participants have to give informed consent;

Respondents confidentiality and anonymity;

Awareness of the needs and condition of PWDs in data collection;

Appropriate institutional review board approval.

The study has limitations.The study has some limitations.

Potential limitations are that mortality events may be reported biasedly, there may be limited data disaggregated by disability and access to remote or conflict affected areas may be difficult. Mixed methods and triangulation, however, help to overcome these drawbacks.

4.0 Data, Results, and Discussion

4.1 Data Presentation

A total of 400 questionnaires were administered to Persons with Disabilities (PWDs) and households with PWD members across selected climate-vulnerable regions of Nigeria. Out of these, 372 valid responses were retrieved, representing a response rate of 93%. In addition, 12 Key Informant Interviews (KIIs) and 4 Focus Group Discussions (FGDs) were conducted with stakeholders including disaster management officials, healthcare providers, and disability advocacy groups.

Table 1: Socio-Demographic Characteristics of Respondents

Variable	Frequency	Percentage (%)
Gender (Male)	198	53.2
Gender (Female)	174	46.8
Type of Disability (Physical)	142	38.2
Sensory (Visual/Hearing)	104	28.0
Intellectual/Psychosocial	126	33.8
Rural Residence	231	62.1
Urban Residence	141	37.9

Table 1 presents the socio-demographic profile of the respondents involved in the study. The findings reveal that 198 respondents, representing 53.2%, were male, while 174 respondents, accounting for 46.8%, were female, indicating a relatively balanced gender distribution among the participants. Regarding the type of disability, respondents with physical disabilities constituted the largest group with 142 individuals (38.2%), followed by respondents with intellectual or psychosocial disabilities who accounted for 126 respondents (33.8%). Those with sensory disabilities such as visual or hearing impairments represented 104 respondents (28.0%). In terms of residential location, the majority of respondents, 231 individuals (62.1%), resided in rural areas, whereas 141 respondents (37.9%) lived in urban areas. This suggests that a greater proportion of Persons with Disabilities (PWDs) in the study are located in rural communities where climate vulnerability, inadequate infrastructure, and limited access to healthcare and emergency response services are more prevalent. The implication is that rural PWD populations may face increased exposure to climate-related risks and greater challenges in coping with environmental disasters.4.2 Exposure to Climate Shocks

Table 2: Distribution of Climate Shock Exposure

Climate Shock Type	Frequency	Percentage (%)
Flooding	168	45.2

DOI: 10.5281/zenodo.20473211

Climate Shock Type	Frequency	Percentage (%)
Heatwaves	102	27.4
Drought	72	19.4
Storms/Wind	30	8.0

Table 2 illustrates the different forms of climate shocks experienced by respondents across the study areas. The results indicate that flooding was the most frequently reported climate-related hazard, with 168 respondents representing 45.2% of the sample identifying it as the major climate shock encountered. Heatwaves were the second most common climate event, affecting 102 respondents (27.4%), while drought was experienced by 72 respondents, accounting for 19.4% of the responses. Storms and strong winds were the least reported climate shocks, with 30 respondents (8.0%) indicating exposure to such events. These findings demonstrate that flooding remains the dominant environmental hazard affecting vulnerable populations in Nigeria, especially among PWD households. The high prevalence of flooding may be linked to poor drainage systems, rapid urbanization, deforestation, and increasing rainfall variability associated with climate change. The findings further suggest that climate shocks are becoming increasingly frequent and severe, thereby intensifying the vulnerability of marginalized groups such as persons with disabilities.4.3 Climate-Shock-Related Mortality

Respondents reported whether their households experienced death linked to climate shocks in the past five years.

Table 3: Mortality Incidence

Response	Frequency	Percentage (%)
Yes (Mortality Occurred)	96	25.8
No Mortality	276	74.2

Table 3 presents the incidence of climate-shock-related mortality among households of respondents within the last five years. The findings show that 96 respondents, representing 25.8% of the total sample, reported that at least one death had occurred in their household as a result of climate-related shocks or disasters. Conversely, 276 respondents (74.2%) indicated that no climate-related mortality had occurred within their households during the same period. The results reveal that although the majority of households did not experience mortality, the proportion of respondents reporting deaths remains substantial and significant. This suggests that climate-related disasters continue to pose severe threats to the survival and wellbeing of vulnerable populations, particularly Persons with Disabilities who often face barriers to evacuation, healthcare access, and emergency response services during disasters. The findings therefore highlight the urgent need for inclusive disaster preparedness strategies, improved healthcare support, and targeted climate adaptation policies aimed at reducing mortality risks among vulnerable groups.

4.2 Regression Results

A logistic regression model was estimated to examine the determinants of climate-shock-related mortality.

Table 4: Logistic Regression Results

Variable	Coefficient (β)	Std. Error	Odds Ratio	p-value
Temperature Variability	0.842	0.215	2.32	0.001**
Rainfall Variability	0.615	0.198	1.85	0.003**
Disability Severity	0.903	0.241	2.47	0.000**
Access to Healthcare	-0.721	0.210	0.49	0.002**
Early Warning Access	-0.658	0.189	0.52	0.001**
Income Level	-0.534	0.176	0.59	0.004**
Constant	-1.276	0.355	—	0.000

Significant at 5% level

Table 4 presents the logistic regression analysis examining the determinants of climate-shock-related mortality among Persons with Disabilities and their households. The findings indicate that temperature variability had a positive and statistically significant effect on mortality, with a coefficient value of 0.842 and a p-value of 0.001. The odds ratio of 2.32 suggests that increased temperature fluctuations significantly raised the likelihood of climate-related deaths. Similarly, rainfall variability was positively associated with mortality, as shown by a coefficient of 0.615 and a significant p-value of 0.003, indicating that irregular rainfall patterns increased mortality risk by approximately 1.85 times. Disability severity also showed a strong positive relationship with mortality incidence, with a coefficient of 0.903 and an odds ratio of 2.47, implying that individuals with more severe disabilities were more vulnerable to climate-shock-related deaths. On the other hand, access to healthcare had a negative and significant relationship with mortality, as indicated by a coefficient of -0.721 and an odds ratio of 0.49, suggesting that improved healthcare access reduced the likelihood of mortality. Access to early warning systems also significantly reduced mortality risk, with a coefficient of -0.658 and an odds ratio of 0.52. In addition, higher income levels were associated with lower mortality risk, as reflected by a coefficient of -0.534 and an odds ratio of 0.59. Overall, the regression findings demonstrate that climatic factors and disability severity increase mortality vulnerability, while socioeconomic support systems such as healthcare access, early warning information, and higher income levels play critical protective roles against climate-shock-related deaths.

4.3 Qualitative Findings (KIIs and FGDs)

The qualitative results from the KIIs and FGDs give more detail to the quantitative results:

i. Challenge of Limited Accessibility: Participants reported that evac centers are difficult to access, especially for people with disabilities who are mobility impaired.
ii. Information Barriers: Many of the respondents with sensory impairments said they were not able to get timely warnings as there was a lack of inclusive communication systems.

DOI: 10.5281/zenodo.20473211

iii. Healthcare Constraints: Health facilities in rural areas were reported to be substandard, and poorly equipped to respond to climate-related emergencies.
iv. Social Exclusion: PWDs are frequently not included in disaster planning and response activities, leading to their heightened vulnerability in the event of a climate shock.

A respondent noted:

I didn't leave my house to escape the flood because nobody was there to help me, and there was no available transportation.

4.4 Discussion of Findings

The findings of this study corroborate other research which have found that vulnerable groups, such as PWDs are at greater risk of death from climate change. The positive association between climate variability and deaths is in line with the studies conducted by the World Health Organization (2021) that stresses the effects of climate extreme events on health.

The relevance of severity of the disability repeats the importance of the 'social model of disability' that focuses on social barriers that can create vulnerability. Individuals with severe disabilities are at increased risk of death because of their challenges with evacuation, access to information, health services and more.

Vulnerability reduction requires having access to health care and early indicators. The results are consistent with the theory of resilience, which emphasises the need to build institutional resilience and infrastructure to mitigate the impact of climate shocks.

Furthermore, qualitative analysis of the findings shows that disaster preparedness and responses are not happening at a systematic level, such as the absence of PWDs from planning activities. This is in support of the above recommendation by United Nations Office for Disaster Risk Reduction (2019) which states that inclusive approaches to DRM are important to the reduction of vulnerable group deaths.

The results show that from Nigeria's point of view, some of the structural problems faced by PWDs such as poverty, poor health care provision and poor infrastructure provision also exacerbates the impact of climate change on PWDs. Due to the high exposure of flooding, it is very important to have targeted interventions in flood prone areas.

Summary of the key findings.

i. There is a significant increase in mortality rates amongst PWDs due to climate variability (temperature and rainfall).
ii. Vulnerability to climate shocks is a major factor of severity of disability.
iii. The likelihood of dying is reduced when you receive health care, have early warning systems, and have more income.
iv. Structural and institutional barriers like inaccessibility and social exclusion have negative impacts on mortality outcomes.

The results indicate an inequitable impact of climate change on climate shock induced deaths of Persons with Disabilities, and a need for adaptation and disaster risk reduction strategies to be inclusive of climate shock induced deaths of PWD.

5.0 Conclusion and Recommendation

The study provides empirical and contextual evidence that could inform the impacts of climate change on the deaths linked to climate shocks of Persons with Disabilities (PWDs). The findings indicate that climate variability, especially extremes in temperature and rainfall, have a large influence on the risk of death in PWDs. The analysis further indicates that the degree of disability increases with the degree of vulnerability – those with more severe disabilities are more vulnerable to climate shocks due to the disability, including mobility and health issues, and reduced access to supports.

Most importantly, the study defines a number of protective factors that greatly reduce the likelihood of death: access to health services, early warning systems and socioeconomic status improvements. However, these adaptive capabilities are not equally shared, with many PWDs, especially those in rural and underserved areas, lacking access to the services and infrastructure that they need.

The qualitative results support the quantitive results as they highlight systemic issues such as inaccessible evacuation centres, non-inclusive communication and PWDs not being included in the disaster preparedness and response planning. These structural barriers highlight the importance of the social model of disability, which sees disability as resulting from barriers in the environment and/or institutions, not just from impairment.

The high mortality rate of PWDs also shows inequality in the survival rates and the lack of institutional capacity and policy implementation, especially given the rising frequency of climate shocks in Nigeria, such as flooding and heatwaves. Therefore, it can be concluded from the study that climate change in addition to being harmful to the environment and health of PWDs, also contributes to their social vulnerabilities which makes them one of the most vulnerable in the event of a climate disaster.

Recommendations

The following recommendations are suggested based upon the results of this study:

1. Disability-Inclusive Climate Policies

There is need to include disability in national climate change and disaster risk reduction frameworks and policies. This includes taking into account policy being aligned to policy processes at the global level (such as the Sendai Framework for Disaster Risk Reduction for inclusiveness).

2. Capacity building of EWSs

Early warning systems should be accessible to every group of PWDs via several communication modalities such as visual, auditory and assistive technology. This will enhance the effectiveness of response and reduce risk of death.

3. Improving Healthcare Access

Investment of healthcare infrastructure, particularly in climate affected and rural regions of the world, is important. The ability of extension of mobile health services and community based interventions for PWD during emergency.

Developing a community-based approach to disaster preparedness and response that is inclusive.

DOI: 10.5281/zenodo.20473211

Emergency response plans must include the unique needs of PWDs, such as having accessible evacuation routes, disability-accessible shelters and trained staff to help in emergency situations.

4. Capacity Building and Awareness

A need for targeted awareness raising and training sessions for PWDs and caregivers on the climate risks and adaptation strategies is required. This will enhance the preparedness and resilience of communities.

5. Collection of Data and Research

There should be a greater emphasis on collecting disability-disaggregated data on the impacts of climate change by government agencies and research institutions. This will help to improve evidence-based policy-making and target interventions more precisely.

6. Social Protection Measures

Social protection measures including financial assistance, insurance schemes, etc., should be expanded to enable PWDs to cope with climate shocks and reduce their vulnerability to death.

With effective implementation of these recommendations, the mortality caused by the impact of climate shock on Persons with Disabilities can be reduced and inclusive and sustainable climate resilience can be achieved.

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DOI: 10.5281/zenodo.20473211