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Investigating the Role of Behavioral Communication in Navigating Climate Change Impact on Lassa Fever in Benue State

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Abstract

This study investigates the role of behavioral communication in shaping adaptive responses to climate-sensitive health risks, focusing on Lassa fever in Benue State, Nigeria. Using a mixed-methods design, quantitative data were collected from 374 respondents across four Local Government Areas in Benue State, complemented by Focus Group Discussions (FGDs) involving seven participants per community. Findings revealed that 56% of respondents perceived a link between climate change and Lassa fever, while 80% expressed a willingness to act. However, only 39% reported active community involvement. FGDs highlighted the importance of environmental hygiene practices such as bush clearing and the use of pets for rodent control, alongside trust in radio, health workers, and traditional rulers as credible communication channels. Anchored in the Health Belief Model, the study underscores the need for culturally grounded, multi-channel behavioral communication strategies that promote community engagement, validate indigenous practices, and strengthen cues to action in climate-vulnerable settings.

Keywords: Adaptation Strategies*; Behavioral Communication; Climate Change; Lassa Fever; Public Health*

Introduction

The urgency of our time is unmistakable: climate change is no longer a distant environmental concern but a growing public health threat, reshaping how diseases emerge, spread, and impact vulnerable populations. Among the climate-sensitive diseases confronting Nigeria, Lassa fever remains a persistent public health challenge, particularly in the central region of the country.

Climate change has emerged as one of the most pressing global issues, characterized by significant and lasting alterations in statistical weather patterns over periods ranging from decades to millennia. As global temperatures rise and weather patterns become increasingly unpredictable, the impacts of climate change are becoming more evident, especially in the realm of public health [1]. The Intergovernmental Panel on Climate Change (IPCC) has affirmed that warming of the climate system is unequivocal, with many observed changes since the 1950s being unprecedented [2].

The health impacts of climate change are complex and multifaceted, varying across geographical locations, age groups, gender, socioeconomic status, and other factors [3]. Elevated temperatures can intensify heat-related illnesses and mortality, while changes in precipitation influence the distribution and incidence of waterborne diseases. Climate change also threatens food security and nutrition, particularly in developing countries, by disrupting agricultural productivity and increasing food prices [4].

In Nigeria, the epidemiology of Lassa fever has shown a troubling trend, with Benue State emerging as a hotspot due to its unique climatic and socio-economic conditions. Recent data indicate a rise in confirmed cases and fatalities, especially in urban centres like Makurdi. The transmission dynamics of Lassa fever are increasingly influenced by climate variables: rising temperatures and erratic rainfall patterns affect the population ecology of Mastomys natalensis, the primary rodent reservoir. Warmer, drier conditions promote rodent breeding and migration into human settlements, while seasonal rainfall fluctuations alter habitat suitability, increasing human exposure and spillover risk. These climate-sensitive mechanisms underscore the urgency of addressing Lassa fever not only as a biomedical issue but as a climate-driven health threat.

In response, the role of behavioural communication in mitigating and adapting to the health impacts of climate change has gained significant attention. Effective communication about climate change and its health implications can motivate individuals and communities to act, influence policy decisions, and foster resilience [4]. This study investigates the role of behavioral communication in navigating the impact of climate change on Lassa fever transmission in Benue State. It aims to explore how climate-sensitive risk awareness influences behavioral responses to Lassa fever prevention across urban and suburban communities, focusing on adaptive practices and public health engagement. It also examines

the role of cultural information sources and traditional leadership in shaping public perceptions and community participation in climate-related health risk mitigation.

Although climate change is increasingly recognized as a driver of infectious disease dynamics, including Lassa fever, there remains a critical gap in understanding how behavioral communication can be effectively utilized to influence public awareness, encourage preventive actions, and foster community resilience in climate-vulnerable settings. Existing studies often emphasize environmental or clinical interventions, with limited attention to how communication strategies shape individual and collective responses to climate-sensitive health risks. This study addresses that gap by investigating how behavioural communication can be systematically applied to reduce Lassa fever transmission through targeted messaging, culturally relevant engagement, and context-specific health promotion.

Climate change, characterized by long-term shifts in temperature and precipitation patterns, poses significant risks to public health [2]. Rising global temperatures and increasingly erratic weather patterns have been linked to a surge in climate-sensitive diseases, including heat-related illnesses, waterborne infections, and vector-borne diseases such as malaria and dengue fever [1,6]. These impacts are particularly severe in developing countries, where climate change exacerbates food insecurity and malnutrition due to declining agricultural productivity [4]. Vulnerable populations—such as children, the elderly, and those with pre-existing health conditions—are disproportionately affected [3].

Lassa Fever and Climate dynamics in Nigeria

Lassa fever, a viral haemorrhagic illness endemic to West Africa, has shown increasing prevalence in Nigeria, with Benue State emerging as a hotspot. The disease is primarily transmitted through contact with Mastomys natalensis, a rodent species whose population dynamics are sensitive to climate variables. Rising temperatures and erratic rainfall patterns promote rodent breeding and migration into human settlements, increasing the risk of spillover events. Seasonal fluctuations in rainfall also influence habitat suitability, further intensifying human exposure.These mechanistic connections between climate change and Lassa fever transmission underscore the need for integrated public health responses that address both environmental and behavioral factors.

Theoretical Framework: Health Belief Model (HBM)

The Health Belief Model (HBM) offers a valuable framework for understanding how individuals perceive and respond to health threats, including those exacerbated by climate change. The model includes the following notable constructs: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy [7]. In the context of this study:

I. ***Perceived Susceptibility/Severity***: Survey data show that 56% of respondents believe in a link between climate change and Lassa fever, indicating moderate awareness of susceptibility and severity.
II. ***Perceived Benefits/Barriers***: While 80% of respondents expressed strong willingness to act, 61% reported limited community involvement, highlighting barriers such as lack of access to information or resources.
III. ***Cues to Action***: Behavioral communication strategies—such as targeted messaging, community engagement, and culturally relevant education—serve as critical triggers for adaptive behavior.
IV. ***Self-Efficacy***: Empowering communities through participatory communication enhances confidence in their ability to respond effectively to climate-related health threat

Behavioural Communication as a Strategic Tool for Climate Health Adaptation

Behavioural communication serves as a strategic tool in mitigating and adapting to the health impacts of climate change. It enhances public awareness by deepening understanding of the connections between climate change and health outcomes [8] Through targeted messaging, it encourages individuals and communities to adopt adaptive behaviours—such as reducing carbon footprints and preparing for climate-related health risks [9].

Importantly, behavioural communication fosters resilience by supporting communities in developing and implementing locally relevant adaptation strategies [10]. Framing climate change as a public health issue has proven effective in increasing engagement and urgency [8]. Leveraging social norms can further promote sustainable behaviours by aligning individual actions with perceived community standards [9].

Strategic Approaches to Behavioural Communication for Enhancing Climate Resilience

Tailoring communication strategies to specific populations is essential for cultural relevance and impact [13] Additionally, addressing cognitive biases and heuristics that may hinder adaptive responses is critical for informed decision-making [14]

Climate change poses significant risks to public health, including increased mortality and morbidity [3]. Rising global temperatures and unpredictable weather patterns contribute to heat-related illnesses, waterborne and vector-borne diseases, and food insecurity [1]. Understanding these dynamics is vital for developing effective behavioural communication strategies that support both mitigation and adaptation efforts.

Empirical Review

In their study, [15] conducted a meta-analysis of 11 empirical studies and established a significant link between rising temperatures and increased Lassa fever transmission, reinforcing the need for climate-responsive communication strategies. In another related study, [16], using a quasi-experimental design involving 340 participants in Ebonyi State, found that "behavior change communication significantly improved public knowledge and preventive practices." In another study, [17] conducted a cross-sectional survey with 1,173

respondents in Bauchi State and revealed that radio broadcasts, health workers, and printed materials were effective in shaping community responses to Lassa fever outbreaks. In their study, [18] implemented a community-directed intervention among nursing mothers in Ibadan and reported measurable improvements in attitudes and behaviors toward disease prevention following targeted health education. Taken together, these empirical studies underscore the importance of incorporating behavioral communication into public health strategies, particularly within climate-sensitive regions such as Benue State, where context-specific messaging can significantly enhance disease prevention efforts and strengthen community resilience.

Materials and Methods

This study employed a mixed-methods design, integrating both quantitative and qualitative approaches to provide a comprehensive understanding of behavioral communication and climate-sensitive health risks, with a specific focus on Lassa fever in Benue State, Nigeria. The mixed-methods approach was selected to triangulate findings, enhance validity, and capture both statistical trends and contextual insights.

The quantitative phase involved administering structured questionnaires to assess various dimensions of behavioral communication, including awareness of climate change, perceived links to Lassa fever, adoption of preventive behavior, and levels of community involvement. The instrument also explored preferred communication channels and cues to action, incorporating both formal sources (radio, health workers) and informal networks (religious leaders, peer groups).

To ensure clarity and cultural relevance, the questionnaire was reviewed by subject matter experts and pre-tested in a neighboring community not included in the final sample. The Local Government Areas (LGAs) selected Ado, Otukpo, Makurdi, and Gboko were chosen for their demographic diversity and relevance to the research objectives.

According to the Benue State Bureau of Statistics (2022), the combined population of these LGAs was approximately 1,730,214. Using Taro Yamane's formula with a 95% confidence level and a 5% margin of error, a sample size of 400 respondents was determined. Proportional allocation was applied to ensure fair representation across the LGAs: Ado (66), Otukpo (96), Makurdi (108), and Gboko (130).

To complement the survey data, one Focus Group Discussion (FGD) was conducted in each LGA, comprising seven purposively selected participants per group. These discussions were designed to capture diverse perspectives on climate change, Lassa fever, and communication practices, providing qualitative insights into cultural influences, indigenous prevention strategies, and community-level engagement.

The questionnaire was developed based on constructs from the Health Belief Model (HBM) and prior climate-health research. Content validity was ensured through both internal and external expert reviews, and reliability testing using Cronbach's alpha yielded a coefficient of 0.82, indicating high internal consistency.

Data collection was conducted through face-to-face interviews by trained field researchers to ensure accuracy and completeness. Follow-up interviews and direct observations were employed where necessary. A total of 374 complete questionnaires were retrieved for analysis. Quantitative data were analyzed using SPSS version 26. Descriptive statistics (frequencies, percentages, and means) were used to summarize response patterns. Chi-square tests of independence were conducted to assess associations between urban and suburban residence and key variables, including climate-health perception, willingness to act, and community involvement. A significance level of $p < 0.05$ was adopted for all inferential analyses.

Ethical approval was obtained from the relevant institutional review board, and informed consent was secured from all participants. Participation was voluntary, and confidentiality was maintained throughout the study. Security challenges in some areas were mitigated through local partnerships and flexible scheduling to ensure safe and inclusive data collection.

Result and Analysis

Survey Tables: Climate Change and Lassa fever Transmission

Table 1: Climate sensitive Risk awareness and Behavioral Responses (Activities Increasing the Transmission of Lassa Fever)

Variable	Urban (%)	Suburban (%)	Total F (%)
Flooding	50 (15.8)	166 (52.5)	316 (84)
Rise in temperature	122 (42.5)	165 (57.5)	287 (77)
Extreme Precipitation	100 (41.7)	140 (58.3)	240 (64)
Drought	98 (47.1)	110 (52.9)	208 (56)

Source: Survey 2025

Willingness to Mitigate the impact of Climate Change

Variable	Urban (%)	Suburban (%)	Total F (%)
Very willing	161(83)	140(78)	301(80)
Somewhat willing	33(17.0)	20(11)	53(14.0)
Not very willing	-	7(4.0)	7(2.0)
Not at all willing	-	13(7.0)	13(4.0)

Source: Survey 2025

Actions Against Climate Change impact on Lassa Fever Transmission

Variable	Urban (%)	Suburban (%)	Total F (%)
Pets for rodent control	191(98)	178(99)	369(99)
Proper waste	179(92)	165(92)	344(92)
Regular handwash	159(82)	154(86)	313(84)
Avoid infected blood	193(99)	155(86)	348(93)

Source: Survey 2025

Common Practices of Lassa fever Prevention (Major Clean-Up Routine)

Practice Frequency	Urban (%)	Suburban (%)	Total F (%)
Monthly	140(72)	140(78)	280(75)
Quarterly	40(21)	20(11)	60(16)
Bi-annually	10(5.0)	10(6.0)	20(5.0)
Not sure	4(2.0)	10(6.0)	14(4.0)

Source: Survey 2025

Table 2 Cultural Influence and Information sources

Credible Sources of Information on Climate Change and Lassa Fever Transmission

Source	Urban (%)	Suburban (%)	Total F (%)
Opinion leader	52(27)	63(35)	115(31)
Radio	78(40)	63(11)	141(38)
Television	20(10)	19(11)	39(10)
Health Care Providers	44(23)	35(19)	79(21)

Source: Survey 2025

Respondents Perception of Traditional Rulers influence on Climate change and Lassa Fever Awareness

Response Option	Urban (%)	Suburban (%)	Total F (%)
Strongly agree	100(52)	163(91)	263(70)
Agreed	81(42)	13(7.0)	94(25)
Partially agreed	13(7.0)	4(2.0)	17(5.0)
Do not agree	-	43(24)	43(11)

Source: Survey 2025

Analysis of Survey Tables Table 1: Climate-Sensitive Risk Awareness and Behavioral Responses The data show high awareness of climate-related risks among respondents, with flooding (84%), temperature rise (77%), and extreme precipitation (64%) identified as key contributors to Lassa fever transmission. Suburban respondents consistently reported higher exposure. Behavioral responses were strong, with 80% very willing to mitigate climate impacts. Preventive practices were widely adopted, including pet use for rodent control (99%), proper waste disposal (92%), and regular handwashing (84%). Monthly clean-up routines were most common (75%), indicating proactive hygiene behaviours.

Table 2: Cultural Influence and Information Sources Radio (38%) and opinion leaders (31%) were the most trusted sources of information. Suburban respondents relied more on traditional figures, highlighting the importance of culturally embedded communication. A significant majority (70%) strongly agreed that traditional rulers influence public attitudes, with suburban respondents showing higher agreement (91%) than urban (52%). This underscores the role of cultural leadership in shaping health perceptions and response

Table 3: Chi-Square Test Analysis

Variable	χ^2 Value	df	P-value	Significant
Activities Increasing Transmission	30.80	3	0.0000	Yes
Willingness to Mitigate	24.16	3	0.0000	Yes
Preventive Actions	1.70	3	0.6380	No
Clean-Up Practices Credible	8.73	3	0.0332	Yes
Sources of Information	3.18	3	0.3648	No
Views on Traditional Rulers	110.57	3	0.0000	Yes

Analysis and Interpretation

The Chi-square test results presented in Table 3 reveal significant differences between urban and suburban respondents across several variables related to climate-sensitive risk awareness, behavioral responses, and cultural influence on Lassa fever transmission. Specifically, activities increasing transmission ($\chi^2 = 30.80$, $p < 0.001$), willingness to mitigate climate change ($\chi^2 = 24.16$, $p < 0.001$), clean-up practices ($\chi^2 = 8.73$, $p = 0.0332$), and views on traditional rulers ($\chi^2 = 110.57$, $p < 0.001$) all show statistically significant associations. These findings suggest that location plays a critical role in shaping both awareness and behavioral engagement with climate-related health risks. Conversely, preventive actions ($\chi^2 = 1.70$, $p = 0.6380$) and credible sources of information ($\chi^2 = 3.18$, $p = 0.3648$) did not show significant variation, indicating consistency in these areas across urban and suburban communities. Overall, the results underscore the importance of tailoring behavioral communication strategies to local contexts, particularly in enhancing community engagement and leveraging cultural leadership to address Lassa fever in the face of climate change.

FGDs Findings

This summary presents findings from FGDs conducted in Benue State communities, aligned with the study titled 'Investigating the Role of Behavioral Communication in Navigating Climate Change Impact on Lassa Fever in Benue State'. Participants demonstrated awareness of climate change. All participants were familiar with the concept of climate and consistently reported observable changes in rainfall patterns and increased hot weather conditions over the past decade. These environmental changes were commonly linked to declining crop yields, increased illnesses, and livestock mortality. Heat has been reported to have make some of them moved out of their rooms at night, Participants shared their understanding and experiences with Lassa fever, describing it as a serious and often fatal illness. They identified rodents, particularly rats, as the primary carriers of the disease which to some is consider a good delicacy. Preventive measures discussed included storing food in sealed containers and maintaining clean environments. Despite this knowledge, some traditional practices, such as drying food in open spaces, persist due to limited alternatives. The disruption of traditional seasonal calendars due to unpredictable rainfall was also linked to increased rodent activity and sanitation challenges, which may worsen the risk of Lassa fever outbreaks. Behavioral responses to Lassa fever included the use of traditional remedies and seeking care from herbalist participants reported adapting their agricultural and hygiene practices in response to climate variability and disease risk. These adaptations reflect the role of behavioral communication in shaping community responses to health threats associated with climate change. Information about Lassa fever and climate change was primarily obtained through radio broadcasts, community health workers, and religious leaders. These sources were generally trusted, although participants expressed a need for more localized and culturally relevant messaging to improve understanding and encourage appropriate health behaviours. Participants identified several challenges, including poor access to healthcare, inadequate sanitation, and limited alternatives to traditional practices. Security concerns in certain areas were also mentioned as barriers to effective health communication and outreach. Recommendations included increased government support, improved infrastructure, and targeted behavioral communication strategies to help communities adapt to climate change and reduce the risk of Lassa fever.

The FGDs highlighted a clear link between climate change and increased vulnerability to Lassa fever in Benue communities. Behavioral communication emerged as a vital tool in shaping community awareness, adaptation, and response strategies. Participants recommended increased government support, improved infrastructure, and community education programs to enhance resilience and response to climate-sensitive diseases like Lassa fever

Discussion of Findings

Findings from the quantitative survey were enriched through Focus Group Discussions (FGDs) conducted across four Local Government Areas in Benue State. These discussions provided deeper insights into community-level practices, perceptions, and cultural influences related to climate-sensitive health risks and Lassa fever prevention.

Participants emphasized the importance of environmental hygiene, particularly bush clearing and the use of pets for rodent control. These practices were widely recognized as effective preventive measures. One participant noted, "We always clear the bushes around our homes, especially during the dry season when rats come to our storage barn."

FGDs also revealed strong trust in formal communication channels such as radio and health workers. Radio was cited as a reliable source of timely health information, while health workers were valued for their direct engagement. As one respondent shared, "When the nurses and the doctors come to talk to us, we listen because they explain things in our Tiv language. The radio also reminds us to keep our surroundings clean by cutting the grasses and using mosquito nets."

Respect for traditional rulers emerged as a significant cultural factor influencing health behavior. Participants acknowledged their traditional rulers, local influencers, and other opinion leaders for mobilizing community action and reinforcing preventive practices. A participant remarked, "If our local chief says we should clean the compound or attend a health talk, everyone will do it. We trust him to guide us, and he can never mislead us." The study explored the role of behavioural communication in shaping adaptive responses to climate-sensitive health risks, particularly Lassa fever. Findings are interpreted using constructs of the Health Belief Model (HBM) and supported by relevant literature. Perceived susceptibility and severity were evident, with 56% of respondents perceiving a link between climate change and Lassa fever, while 29% were unsure.

This uncertainty may stem from educational disparities and limited access to reliable health information, especially in suburban areas. Urban respondents with higher education levels were more likely to perceive the link, aligning with studies that show education and media exposure influence climate-health awareness [19,20].

Despite 80% expressing willingness to act, only 39% reported active community involvement, highlighting perceived barriers such as lack of platforms, resources, and leadership. This reflects findings from Nigerian health campaigns where cultural resistance and weak systems hinder engagement [20]. Behavioural communication must therefore address structural constraints and promote inclusive participation.

The widespread use of pets for rodent control reflects local knowledge and perceived benefits, consistent with HBM constructs [21]. Validating such indigenous practices through communication can enhance ownership and self-efficacy.

Cues to action varied across settings. Urban communities responded better to formal channels like radio and health workers, while suburban communities relied on informal networks. This supports the need for context-specific, multi-channel communication strategies that combine mass media with interpersonal approaches [22,23]

Conclusion

This study explored the link between climate change and Lassa fever transmission in Benue State, emphasizing the role of behavioral communication in shaping adaptive responses. While 56% of respondents recognized a climate-health connection, 29% were unsure, indicating awareness gaps. Although 80% expressed willingness to act, only 39% reported active community involvement, revealing behavioral barriers. The use of pets for rodent control emerged as a culturally grounded preventive practice.

Chi-square analysis showed significant associations between urban/suburban residence and community involvement, with urban respondents more engaged. A strong link was also found between information sources and cultural perceptions particularly the influence of traditional rulers highlighting the importance of culturally trusted messengers in shaping public attitudes.

These findings underscore the need for tailored, context-sensitive communication strategies that align with local realities and leverage both formal and informal networks to promote inclusive engagement and sustainable behavior change.

Recommendations

Urban Areas: Leverage radio, mobile platforms, and school-based initiatives to disseminate science-based messages. Collaborate with health professionals and civil society actors to reinforce communication. Emphasize scientific reasoning and apply data-driven storytelling to contextualize climate-health linkages.

Suburban Areas: Engage religious and traditional leaders as credible communicators. Utilize local languages, visual tools, and community dialogues to enhance message clarity. Promote culturally accepted practices, such as pet use for rodent control, and strengthen community capacity through peer-led training.

Both Settings: Support adaptive behaviours by linking them to tangible health benefits. Ensure consistent cues to action and address both cognitive and structural barriers through participatory communication and sustained community engagement to foster long-term resilience**.**

Limitations

This study employed a mixed methods approach and used Chi-square tests to explore associations between key variables. However, several limitations should be noted. First, the cross-sectional design captures data at a single point in time, which limits the ability to determine cause-and-effect relationships. Second, the use of self-reported data may introduce biases such as recall errors or social desirability bias. Third, security challenges in some study areas affected access to certain communities, potentially limiting the representativeness of the sample. Future research should consider longitudinal designs, broader and more diverse sampling, and strategies to mitigate security-related constraints to enhance the depth and generalizability of findings on behavioral responses to climate-sensitive diseases.

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