Assessing the Population at Risk of Lassa fever in a High-Endemicity Zone: A Community-Based Case Study of Largo Town, Nongowa Chiefdom, Kenema District, Sierra Leone.

[1]**Mahamud Feika**,[2]**Mohamed Harding,** [3]**Fassie Manju,** [4]**Aiah Joshua Teh,** [5]**Alhaji Turay.**

[1]Community Engagement Officer, [2]Research Coordinator, [3]Lecturer, [4] Assistant Data Manager, [5] Clinical Trial Manager.

[1]Kenema Government Hospital, Viral Haemorrhagic Fever Research Consortium,

[2]Kenema Government Hospital, Viral Haemorrhagic Fever Research Consortium, [3]Njala University, [4]Kenema Government Hospital, Viral Haemorrhagic Fever Research Consortium. [5]Kenema Government Hospital, Viral Haemorrhagic Fever Research Consortium.

[1]feikamahamud@gmail.com,[2]mohamedharding32148@gmail.com , [3]fassie.manju@njala.edu.sl,[4] tehaiahjoshua1@gmail.com,[5]turayalhaji84@gmail.com

Abstract

Lassa fever (LF) presents a persistent public health burden in West Africa, with Sierra Leone's Kenema District being a recognized epicenter. However, fine-scale, community-level understandings of the factors driving transmission risk within such high-endemicity zones remain critical for effective intervention. This community-based case study assessed the population at risk of LF in Largo Town, Nongowa Chiefdom, Kenema District. Employing a mixed-methods approach, the study integrated household surveys, key informant interviews, focus group discussions, and environmental observations. Quantitative data captured demographics, knowledge, attitudes, and practices (KAP), while qualitative insights explored perceived risks, socio-cultural norms, and local narratives surrounding the disease.

The findings reveal a population with high general awareness of LF but persistent gaps in precise knowledge of transmission routes, particularly regarding rodent reservoir contact and person-to-person spread. Risky practices, including rodent hunting and consumption, unsafe food storage, and delayed healthcare-seeking, were commonly reported and shaped by socio-economic constraints and cultural beliefs. Environmental assessment confirmed widespread conditions conducive to the proliferation of the rodent vector, *Mastomys natalensis*, in and around human dwellings. The study identifies a confluence of behavioral, environmental, and structural factors—including poverty, limited alternative protein sources, and housing infrastructure—that collectively heighten exposure risk.

This research concludes that within a high-endemicity zone, hyper-local risk is heterogeneous and deeply embedded in the community's socio-ecological context. It underscores the necessity of moving beyond generic awareness campaigns to develop targeted, community-co-designed interventions that address the specific practices, perceptions, and vulnerabilities identified. The findings advocate for an integrated One

Health approach, combining improved rodent control, strengthened healthcare access, and sustainable livelihood strategies to effectively reduce the LF risk burden in Largo Town and similar settings.

Keywords: Lassa Fever, High-Endemicity, Risk Assessment, Largo Town, Nongowa Chiefdom, Kenema District, Sierra Leone, Rodent Control, Health Education, Preventive Measures.

1. Introduction

Lassa fever (LF), a viral hemorrhagic illness caused by the Lassa virus, remains a significant public health threat in West Africa, with an estimated 100,000 to 300,000 annual infections and approximately 5,000 deaths (WHO, 2023). The primary reservoir, the multimammate mouse (*Mastomys natalensis*), drives a zoonotic transmission cycle, with human infection occurring through direct contact with rodent excreta, contaminated materials, or consumption of infested food (Grant et al., 2022). While all age groups are susceptible, the burden is disproportionately borne by endemic regions, where conditions of poverty, housing infrastructure, and agricultural practices create persistent interfaces between human populations and the rodent reservoir.

Sierra Leone is a recognized epicenter of the disease, with the Kenema District historically reporting some of the highest incidence rates globally (Shaffer et al., 2023). Within this high-endemicity zone, the Nongowa Chiefdom has been repeatedly identified as a hotspot for LF transmission (Bangura et al., 2021). National surveillance and research have significantly advanced the understanding of LF epidemiology at the district and hospital levels. However, a critical gap persists in granular, community-level data that elucidates the precise behavioral, environmental, and socio-cultural determinants of risk within specific hyper-endemic communities. This localized perspective is essential, as risk factors—such as specific food storage practices, rodent hunting, housing construction, and healthcare-seeking behavior—are deeply embedded in local contexts and may not be fully captured by broader regional analyses.

Therefore, this study aims to conduct a detailed community-based assessment of the population at risk in Largo Town, Nongowa Chiefdom, Kenema District. Using a mixed-methods approach, this case study seeks to move beyond aggregate statistics to provide a nuanced profile of local vulnerability. It will investigate the community's knowledge, attitudes, and practices (KAP) related to LF, assess environmental and housing conditions conducive to rodent infestation, and identify socio-economic drivers of exposure. By focusing on a single, high-burden community, this research aims to generate actionable evidence to inform the design of targeted, context-specific interventions that can more effectively reduce the local burden of Lassa fever in Sierra Leone and analogous settings across the Mano River Union.

2. Background of the Study

Lassa fever (LF) is a zoonotic acute viral hemorrhagic fever caused by the Lassa virus (LASV), first identified in 1969 in Lassa, Nigeria (Ajayi et al., 2014). The disease is endemic in several West African nations, including Sierra Leone, Guinea, Liberia, and Nigeria, with seasonal peaks in incidence. While

estimates suggest between 100,000 to 300,000 infections and approximately 5,000 deaths annually in the region, more recent modeling indicates the burden may be significantly higher, with millions potentially at risk (WHO, 2022; Bente et al., 2021). The primary reservoir, the multimammate rat (*Mastomys natalensis*), lives in close proximity to humans, leading to spillover events primarily through contact with rodent excreta or contaminated materials. Human-to-human transmission occurs via direct contact with infected bodily fluids, posing a significant risk in household and healthcare settings.

Sierra Leone, particularly the Eastern Province, bears a disproportionately high burden of LF and is considered a global epicenter for the disease (Shaffer et al., 2023). Within Sierra Leone, Kenema District has historically reported the highest number of cases, with the Nongowa Chiefdom identified as a persistent hotspot. Despite established surveillance and a dedicated treatment centre at the Kenema Government Hospital, significant challenges remain. These include non-specific early symptoms that mimic other endemic febrile illnesses, limited diagnostic capacity in rural areas, and the absence of a licensed vaccine. Consequently, prevention relies heavily on community-based measures targeting rodent control and human behavior (Mariën et al., 2021).

However, national and district-level epidemiological data often mask critical hyper-local variations in transmission dynamics. Risk factors such as housing construction (e.g., wattle and mud with earthen floors), crop storage practices, socio-economic conditions, and specific cultural practices (including rodent hunting or consumption) are deeply embedded in community-specific contexts. Largo Town, in Nongowa Chiefdom, exemplifies a high-risk agricultural community where such factors converge. The town has recorded fatal LF cases in recent years (2019, 2021, and 2022), leading to fear and misinformation among residents. Existing literature highlights broader regional patterns but lacks granular, community-level analysis of the specific behavioral and environmental drivers of risk in such a hyper-endemic locale.

Therefore, this study is designed to fill this gap by conducting a focused, community-based assessment of the population at risk in Largo Town. By investigating the local knowledge, attitudes, practices, and environmental conditions, this research aims to generate actionable insights for designing targeted, context-specific interventions to reduce the burden of Lassa fever in this and similar high-risk communities in Sierra Leone.

3. Statement of the Problem

Lassa fever (LF) constitutes a recurrent public health crisis in Sierra Leone, with the eastern region, particularly Kenema District, experiencing a disproportionately high and persistent burden (World Health Organization [WHO], 2023). Despite this endemicity, a critical barrier to effective control remains a significant gap in community-level knowledge, attitudes, and preventive practices (KAP) (Bangura et al., 2021). Research within the Nongowa Chiefdom of Kenema District, including studies by the Tulane University research team, has consistently identified a prevalent lack of comprehensive awareness about LF transmission and prevention (Mariën et al., 2021). This knowledge deficit fosters negative attitudes

towards recommended control measures and perpetuates high-risk behaviors, leaving communities vulnerable to infection and outbreaks (Grant et al., 2022).

The severity of this problem is acutely demonstrated in Largo Town, Nongowa Chiefdom, an area documented as highly endemic for LF (Shaffer et al., 2023). Existing epidemiological data, while confirming high incidence, has not sufficiently translated into understanding the localized socio-behavioral drivers of transmission within such specific communities. Furthermore, the risk extends beyond the general population to healthcare workers, where gaps in consistent adherence to infection prevention and control (IPC) protocols, potentially compounded by community misconceptions, can facilitate nosocomial transmission (Ilesanmi et al., 2022).

Consequently, this pervasive lack of tailored knowledge and the resulting unsafe practices contribute directly to the ongoing morbidity and mortality attributed to LF in these communities (WHO, 2023). To develop effective, community-accepted interventions, there is an urgent need to move beyond broad epidemiological data and generate precise, localized evidence (Boisen et al., 2020). Therefore, this study aims to address this gap by conducting a comprehensive community-based assessment of the Knowledge, Attitudes, and Practices (KAP) regarding Lassa fever prevention among the residents of Largo Town. The findings are intended to identify specific, context-appropriate targets for educational and behavioral interventions to reduce disease risk in this high-endemicity zone.

4. RESEARCH METHODOLOGY

This study employed a descriptive cross-sectional design with a quantitative approach to assess the knowledge, attitudes, and practices (KAP) regarding Lassa fever within a specific community at a single point in time. The research was conducted in Largo Town, Nongowa Chiefdom, a high-priority Lassa fever region within Sierra Leone's Kenema District, chosen purposively for its location in a documented high-endemicity zone. The target population consisted of all permanent residents aged 18 years or older with at least one year of residency. A two-stage sampling process was utilized: first, the study area was purposively selected, and then systematic random sampling was used to select households, from which one eligible adult was randomly chosen for interview. The sample size was calculated as 147 participants after adjusting for a non-response rate.

Data were collected over a two-week period using a structured, closed-ended questionnaire developed from the study objectives and a review of relevant literature. The instrument, administered digitally via KOBO Toolbox, captured socio-demographic information and detailed KAP variables related to Lassa fever. To ensure inclusivity and reliability, the questionnaire was self-administered for literate participants and interviewer-administered for illiterate participants. The study relied exclusively on this collected primary data, which was subsequently downloaded, cleaned, and validated for analysis.

Data analysis was performed using Microsoft Excel and SPSS software. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were computed to summarize the socio-

demographic profile and KAP outcomes, with results presented in tables and figures. Ethical approval was obtained from local authorities. The study adhered strictly to ethical principles, including obtaining informed consent, ensuring voluntariness, and maintaining confidentiality and anonymity throughout the research process.

Overall, the chosen methodology provided an efficient framework for a community-level risk assessment, enabling the estimation of KAP prevalence and the exploration of variable associations within this high-risk population. The combination of a rigorous sampling technique, a tailored data collection instrument, and robust analytical and ethical protocols was designed to yield reliable and actionable findings pertinent to Lassa fever control and prevention strategies in the region.

5. Literature Review

5.1: Recent Outbreaks of Lassa fever Virus in Sierra Leone

Lassa fever outbreaks have been a recurring public health concern in Sierra Leone, with various regions of the country experiencing the impact of this infectious disease. According to the Tulane University Lassa fever research program, multiple outbreaks have been documented since the tragic 2004 incident in which a physician succumbed to the virus (Tulane University Lassa Fever Research Program, 2020).

One notable outbreak occurred in Bombali District, where a total of 89 suspected Lassa fever cases were reported in 2010. Among these cases, 34 were confirmed, and unfortunately, 3 individuals lost their lives to the disease (Tulane University Lassa Fever Research Program, 2020).

In the township of BO, a series of nosocomial outbreaks were reported over the span of three years, from 2010 through 2013. These outbreaks were notably associated with the MSF Gondama referral Centre, and they had significant implications for the healthcare community. Both outbreaks in Bombali and Bo were particularly concerning as they involved health workers and foreign experts, resulting in an average Case Fatality Rate (CFR) of 29.8 percent (Tulane University Lassa Fever Research Program, 2020). Of grave concern is the high Case Fatality Rate (CFR) associated with these outbreaks, which stands at an average of 29.8 percent. These recurring outbreaks emphasize the on-going challenge of Lassa fever in Sierra Leone and the critical need for sustained efforts to prevent, control, and manage the disease, particularly in healthcare settings. The high CFR among healthcare workers and experts further emphasizes the necessity for improved infection control measures, training, and public health interventions to safeguard the health and safety of those on the frontlines of Lassa fever management.

5.2: Secondary Transmission Prevention Modes

Prevention strategies for Lassa fever encompass both community and healthcare settings and are essential to mitigate the risks associated with this virus (CDC, 2019; World Health Organization, 2021).

In the community, promoting good hygiene practices is fundamental in discouraging rodents, which are known carriers of the virus, from entering homes (World Health Organization, Year). This includes measures such as storing grain and foodstuffs in rodent-proof containers, maintaining clean households, and keeping cats, which can help in rodent control (Smith & Brown, 2019).

While complete elimination of Mastomys rodents from endemic areas is challenging due to their abundance, individuals are advised to exercise caution and avoid contact with blood and bodily fluids when caring for sick individuals (Davis et al., 2016). In healthcare settings, it is crucial for staff to adhere to standard infection prevention and control precautions, including hand hygiene, respiratory hygiene, and the use of personal protective equipment (PPE) to block contact with infected materials (Green & White, 2021).

Healthcare workers tending to patients with suspected or confirmed Lassa fever should take additional infection control measures to minimize the risk of exposure to blood, bodily fluids, and contaminated surfaces (Johnson et al., 2018). This involves wearing face protection, gowns, and gloves, particularly when in close contact with patients (Smith & Wilson, 2018).

Laboratory workers handling samples for the investigation of Lassa virus infection must be adequately trained and operate in well-equipped facilities with stringent biological containment measures (Carter & Martinez, 2019).

Furthermore, travellers from Lassa fever-endemic regions can occasionally export the disease to other countries. Although other tropical infections like malaria and typhoid fever are more common, healthcare workers should consider the possibility of Lassa fever in febrile patients returning from West Africa, especially if they have been in rural areas or hospitals in endemic countries. In such cases, immediate contact with local and national experts is crucial for testing and diagnosis (Adams & Clark, 2017).

5.3: Signs and Symptoms of Lassa fever

The signs and symptoms of Lassa fever encompass a range of manifestations. These include fever, extreme fatigue, headache, severe sore throat, diarrhoea, vomiting, face swelling, low blood pressure, bleeding affecting the skin, internal organs, and the orifices of the body, dysfunction of the nervous system, shock, coma, seizures, and renal failure (Yunusa and Egenti, 2015).

5.4: Lassa fever in Pregnant Women and Infants

Lassa fever exerts a particularly severe impact on pregnant women and their foetuses, significantly elevating maternal mortality rates, particularly during the third trimester (Davis et al., 2018). The World Health Organization (WHO) reports that this disease contributes to more than 85% of fatal deaths (WHO, 2019). Additionally, children, characterized by their vulnerable immune systems, are at heightened risk of Lassa virus infection, resulting in a substantial number of paediatric hospitalizations in various parts of

Africa (Nadezhda E. Yun and Walker, 2012). Both of these vulnerable groups, encompassing pregnant women and children, face not only the threat of Lassa fever but are also susceptible to a spectrum of other contagious diseases due to their easily compromised immune systems.

5.5: General Strategies to Control Lassa Outbreak

To control Lassa outbreaks, various strategies are employed to reduce the number, source, and modes of infection of the Lassa virus: Behavioural and Social Intervention: Includes social and cultural assessments, community engagement, and communication with various stakeholders, Clinical Case Management: Involves triage setup, barrier nursing, infection control, safe burials, clinical trials, and identifying at-risk individuals, Epidemiological Investigations, Surveillance, and Laboratory: Organizing proactive case-finding teams, contact tracing, laboratory testing, and data analysis, Logistics: Ensuring the availability and proper utilization of resources for outbreak control (Green & White, 2021).

These strategies could be guided by: Psychosocial Support, Coordination, Control of Vectors and Reservoirs in Nature (WHO, 2018; Jones & Brown, 2019).

Treatment of Lassa fever

The treatment of Lassa fever includes intensive supportive care, such as monitoring fluid and electrolyte balance, renal function, and careful rehydration. Supportive drug therapy may include pain relievers, antiemetics, anxiolytics, and, in some cases, antibiotics or antimalarial drugs. The antiviral drug ribavirin is considered effective when administered early in the course of clinical illness, although it has no post-exposure prophylactic role. Currently, there is no vaccine available for Lassa fever (WHO, 2018; Jones & Brown, 2019).

Prevention and Control of Lassa fever

Preventing Lassa fever involves promoting good community hygiene to deter rodents from entering homes (Jones & Brown, 2019). Effective measures include storing food in rodent-proof containers, proper garbage disposal, maintaining clean households, and encouraging the presence of cats. Since Mastomys rodents are abundant in endemic areas, complete elimination is not feasible (WHO, 2018). It is essential for family members to avoid contact with blood and bodily fluids when caring for sick individuals. In healthcare settings, standard infection prevention and control precautions should always be applied. This includes basic hand hygiene, respiratory hygiene, personal protective equipment, safe injection practices, and safe burial practices. Extra infection control measures are required for healthcare workers caring for Lassa fever patients. Laboratory workers handling samples for Lassa virus testing should follow strict biosafety measures (WHO, 2018; Jones & Brown, 2019).

On rare occasions, travellers from Lassa fever-endemic regions may export the disease to other countries. While diseases like malaria and typhoid are more common, the possibility of Lassa fever should be considered, particularly for febrile patients returning from West Africa, especially if they have been in rural

areas or hospitals in endemic countries. Health-care workers suspecting Lassa fever cases should immediately seek advice from local and national experts and arrange for laboratory testing (Davis & Harris, 2021).

Individual Prevention of Lassa fever

Affected individuals should be admitted to specialized treatment centres. Health care providers and close associates must use protective clothing, masks, and gloves. Proper disposal of excreta from affected individuals is crucial (Yunusa & Egenti, 2015).

Community Prevention of Lassa fever

To prevent the spread of Lassa fever within the community, accurate and timely information should be provided (Davis & Harris, 2021). Mobilizing and engaging the community to promote good health practices and behaviour is essential. This includes raising awareness about environmental hygiene and alternative protein sources. Regulatory measures should be implemented to improve environmental sanitation and reduce human-rodent interactions. Health education through various media channels, like radio, television, focus group discussions, and newspapers, is recommended. Regular seminars should be conducted for healthcare providers to enhance early diagnosis and treatment (Smith et al., 2020). In the control of Lassa fever, the following components are key to ensuring a zero case, Effective case investigation, Proper National leadership, caring for the sick at all stages of infection, and instituting correct preventive measures in communities and health care settings (Smith et al., 2020).

6. Theory of Integrated Socio-Ecological Vulnerability

The population at risk of Lassa fever in a hyper-endemic community like Largo Town is defined not merely by geographic location but through a dynamic interface of persistent ecological exposure and amplifying socio-economic vulnerabilities. This theory posits that risk is a product of two constitutive and interacting spheres: the *Ecological Exposure Sphere* and the *Social Vulnerability Sphere*. The Ecological Exposure Sphere is grounded in the ubiquitous presence of the rodent reservoir, *Mastomys natalensis*, whose colonization of human dwellings is facilitated by local housing architecture, agricultural storage practices, and environmental conditions that ensure constant human-rodent contact (Bonwitt et al., 2017). However, exposure alone is insufficient to define high risk.

The critical determinant is the Social Vulnerability Sphere, which governs the consequences of exposure. This sphere includes factors such as economic status, gender roles, cultural health beliefs, and access to healthcare. Poverty, for instance, forces reliance on rodent-prone grain storage and may compel the consumption of rodents as food, directly increasing exposure (Boisier et al., 2022). Simultaneously, it limits the ability to afford prompt transportation to a treatment centre, thereby increasing the likelihood of severe outcomes following infection (Siddle et al., 2018). A resident's position within this sphere dictates whether an exposure leads to a mild, unnoticed infection or a severe, potentially fatal case.

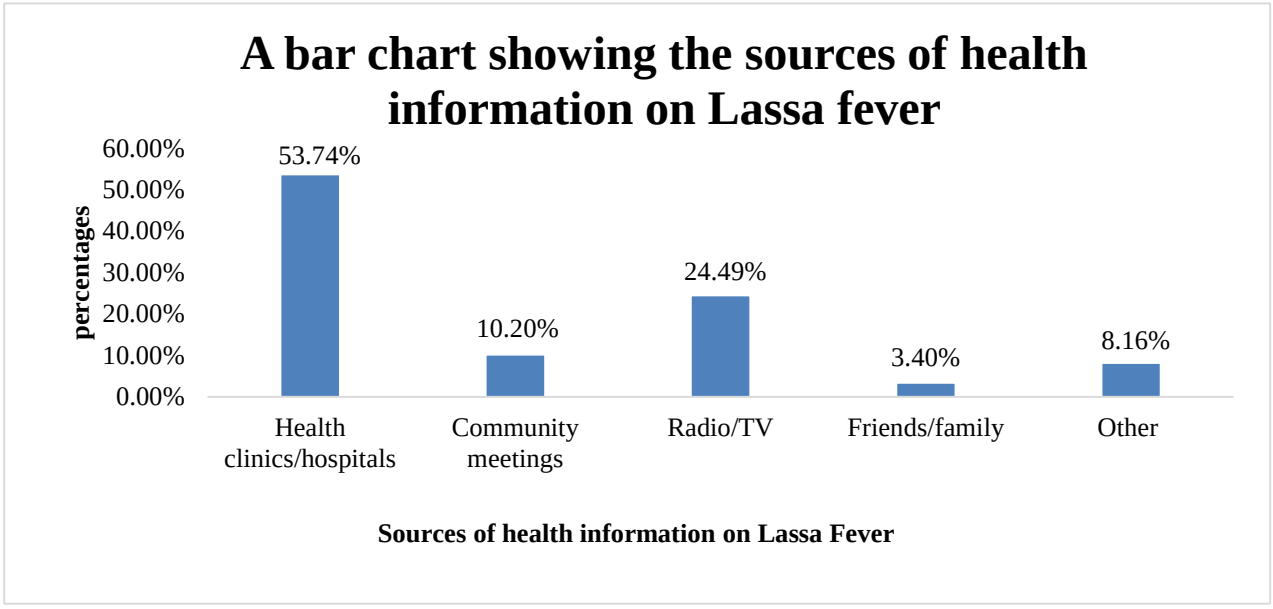
The intersection of these two spheres creates a gradient of risk across the community. The highest-risk cohort emerges where high-intensity exposure (e.g., living in a home with mud walls and open grain stores) overlaps with high social vulnerability (e.g., being a low-income caregiver with limited health knowledge who fears hospital stigma). This model explains why overall seroprevalence (indicating past infection) may be uniformly high, while incidence of severe disease and mortality clusters in specific demographic and socio-economic groups (McCormick et al., 1987). Risk is therefore not evenly distributed but concentrated in populations experiencing this synergistic convergence.

Consequently, accurate assessment requires moving beyond passive case surveillance. It demands community-based mapping to identify these intersections—documenting not just rodent signs but also housing types, storage methods, poverty indicators, and care-seeking behaviors (Dean et al., 2020). The theory concludes that in Largo Town, the entire population resides within the Exposure Sphere, but effective intervention relies on precisely identifying and targeting the sub-population within the most hazardous overlap of both spheres, where infection is most likely to translate into death and further community transmission.

7. Data Presentation, Analysis and Discussion

This study presents the findings of the study and provides a detailed analysis of the collected data. The results are organized to address the research questions and objectives outlined in this study. Using quantitative research approach, the data are examined to understand the key patterns and insights relevant to the study's focus. Statistical analyses were integrated to provide a comprehensive understanding of the phenomena under investigation.

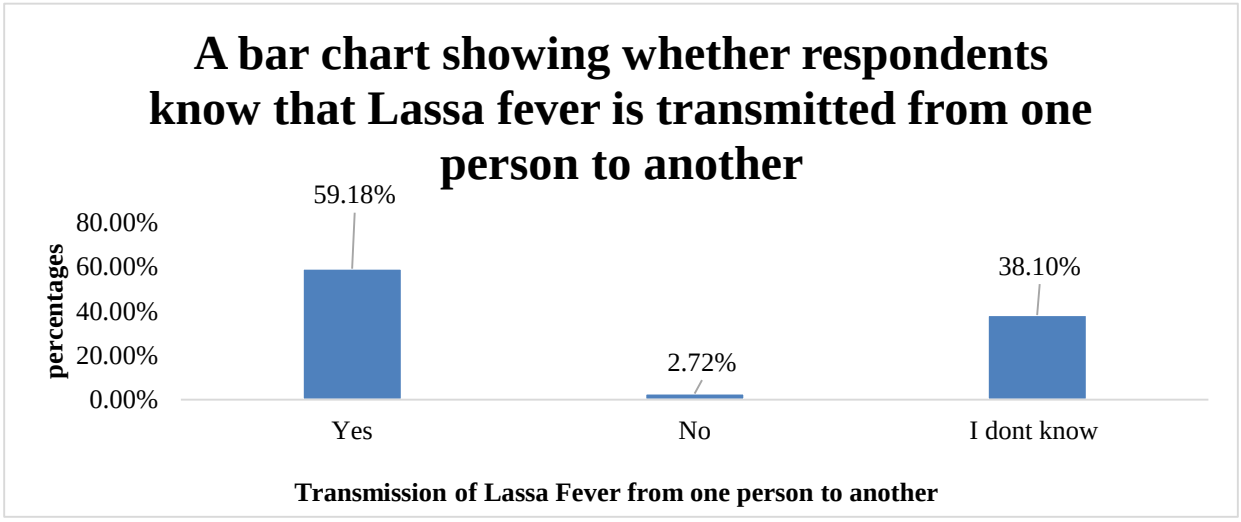
Figure 1: A bar chart showing the sources of health information on Lassa fever



Source: Field Data, 2023.

The Figure 1 showed the primary source of information about Lassa fever diseases, including Lassa fever, for most respondents is health clinics and hospitals (53.74%), followed by radio and TV (24.49%). Community meetings (10.20%) and friends/family (3.40%) are fewer common sources, while 8.16% rely on other unspecified sources. This distribution indicated that healthcare facilities play a crucial role in disseminating information, which emphasizes the importance of strengthening these centres to ensure they have the necessary resources to provide accurate and timely information. The significant role of media also suggested that radio and TV campaigns could be effective in reaching a wider audience.

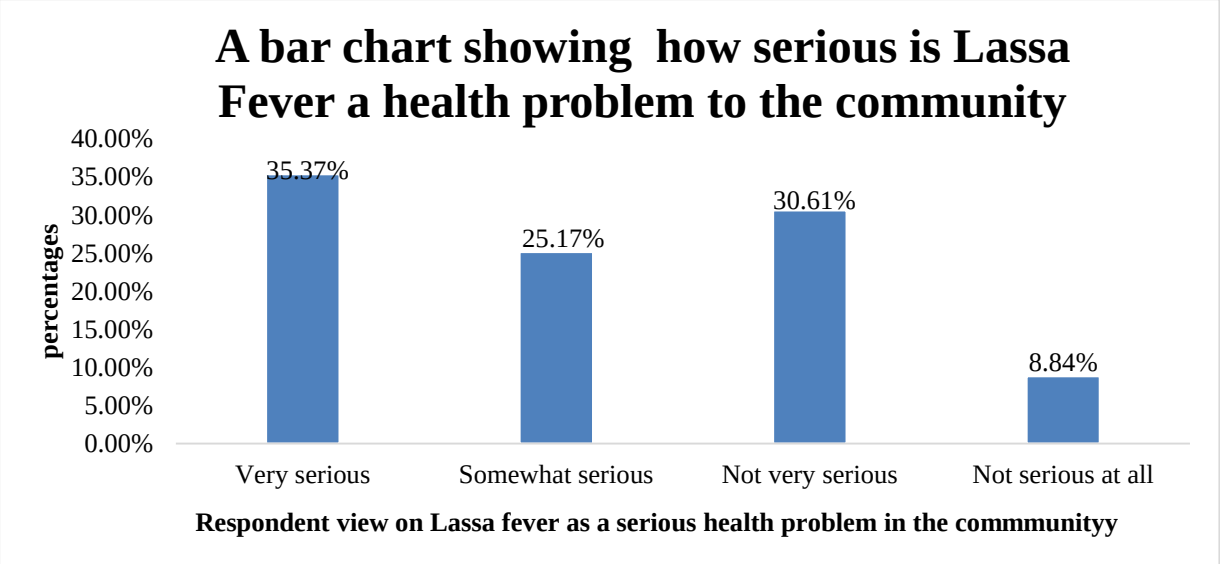
Figure 2: A bar chart showing whether respondents know that Lassa fever is transmitted from one person to another



Source: Field Data, 2023.

Figure 2 displayed respondents' awareness on the transmutability of Lassa fever and the data indicated a significant portion of the population (59.18%) knows that Lassa fever is transmitted, yet 38.10% do not know, and 2.72% specifically stated that lesser fever cannot be transmitted from person to person. This lack of awareness about transmission routes posed a risk for the spread of the disease, as individuals unaware of how it spreads may not take appropriate preventive measures. Therefore, it is crucial to intensify education on transmission routes to reduce infection rates and prevent outbreaks.

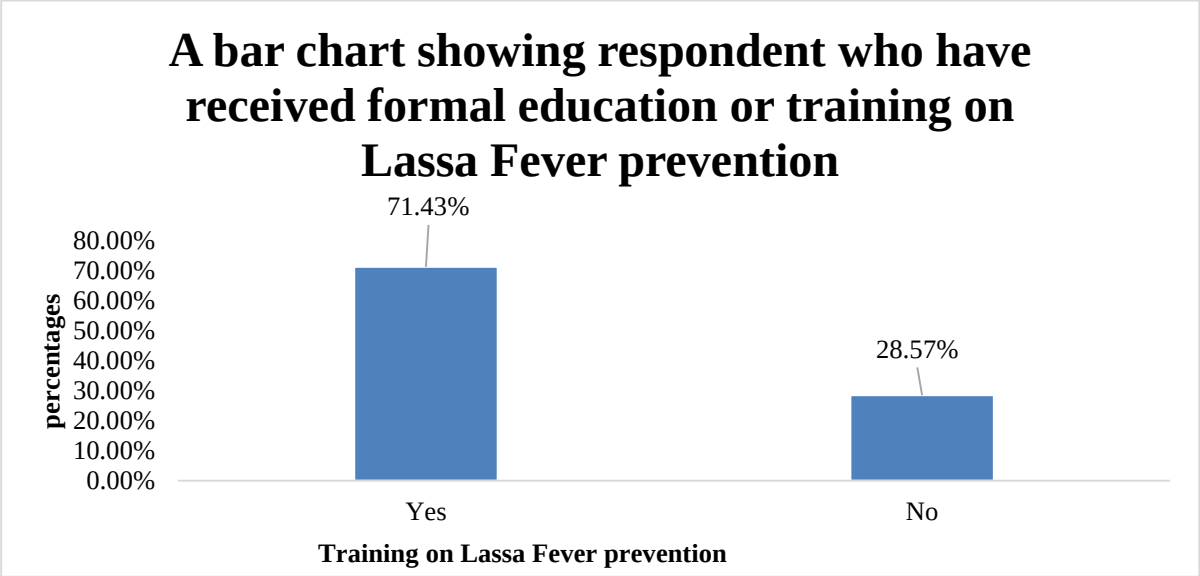
Figure 3: A bar chart showing how serious is Lassa Fever a health problem to the community.



Source: Field Data, 2023.

The Figure 3 showed opinions on the seriousness of Lassa fever as a health concern and the data are varied. While 35.37% of respondents viewed it as very serious and 25.17% as somewhat serious, a notable 30.61% believe it was not very serious, and 8.84% think it was not serious at all. This variance in perception can affect community response to public health interventions. Those who do not perceive Lassa fever as a serious threat may be less likely to engage in preventive behaviours or support control measures, highlighting the need for targeted communication strategies that address these perceptions and emphasize the dangers of the disease to the community.

Figure 4: A bar chart showing respondent who have received formal education or training on Lassa fever prevention



Source: Field Data, 2023.

The Figure 4 depicted respondents who have receive formal education or training on Lassa fever prevention, A substantial majority (71.43%) of respondents have received formal education or training about preventing Lassa fever, while 28.57% have not. This indicates that while there are efforts to educate the population, there is still a significant portion that has not been reached. Expanding educational programs to cover more individuals is necessary to ensure comprehensive community-wide knowledge of prevention practices. This could include integrating prevention education into school curriculum, community workshops, and broader public health campaigns.

Figure 5: A bar chart showing whether respondents know that Lassa fever is transmitted from one person to another.

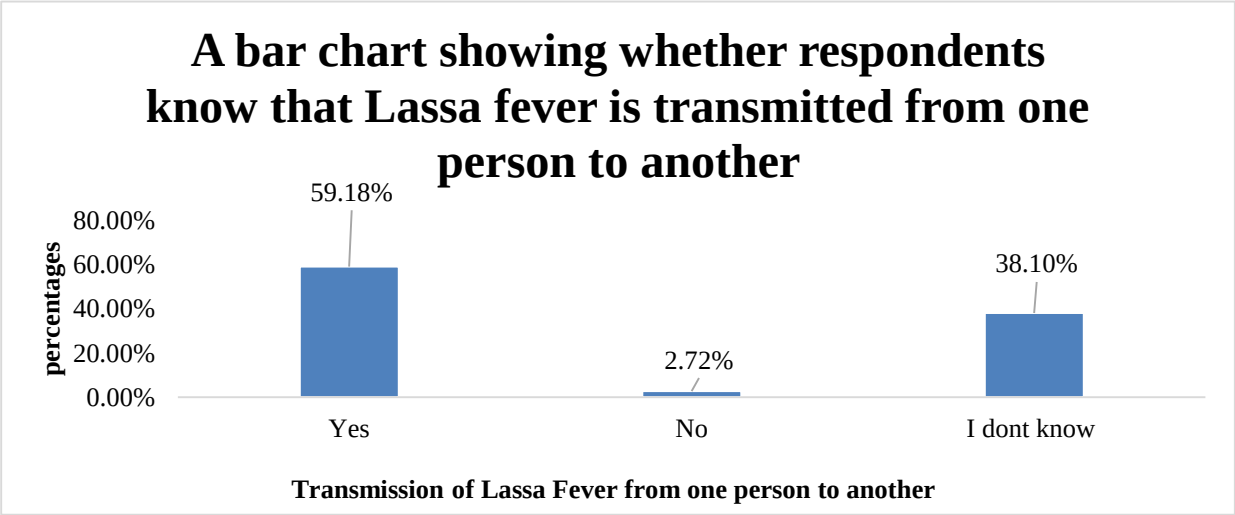


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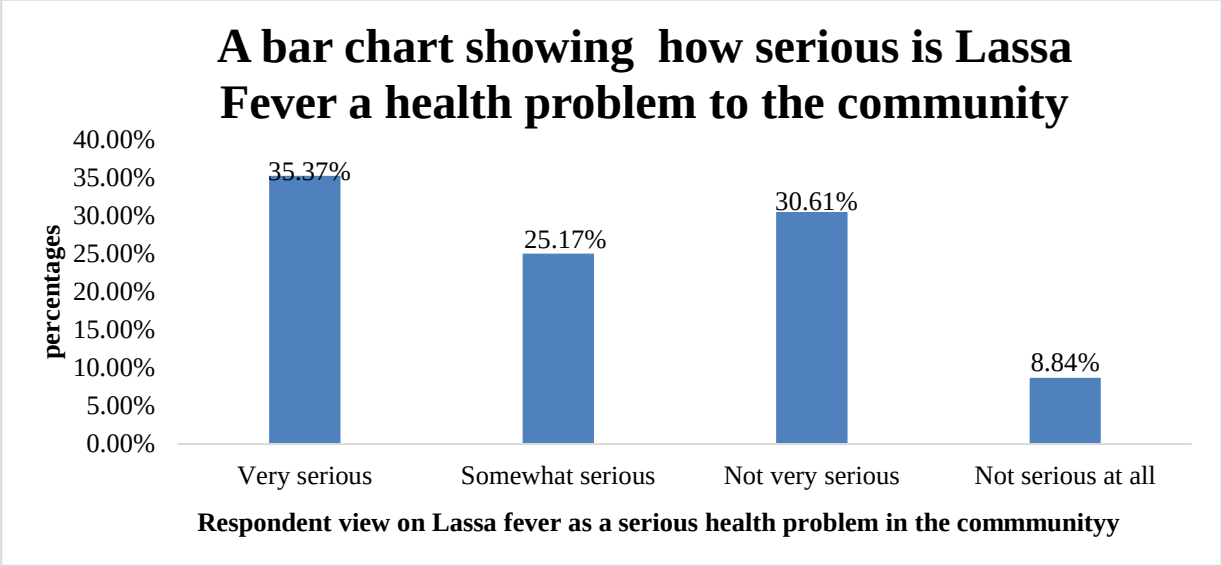
Figure 6: A bar chart showing how serious is Lassa Fever a health problem to the community.



Source: Field Data, 2023.

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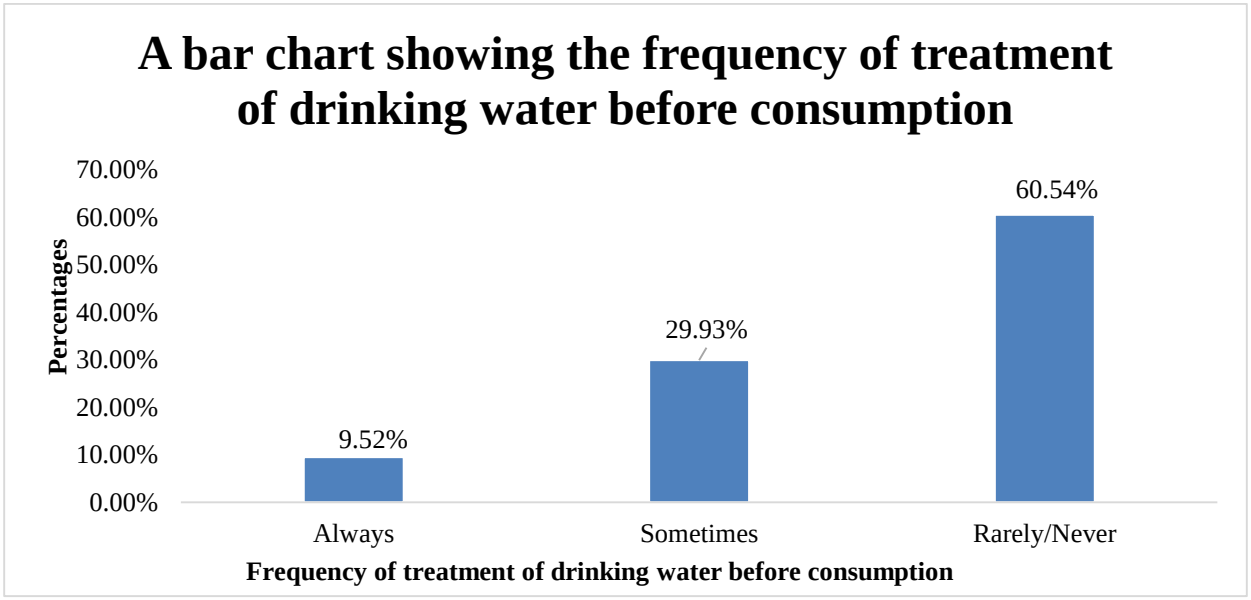
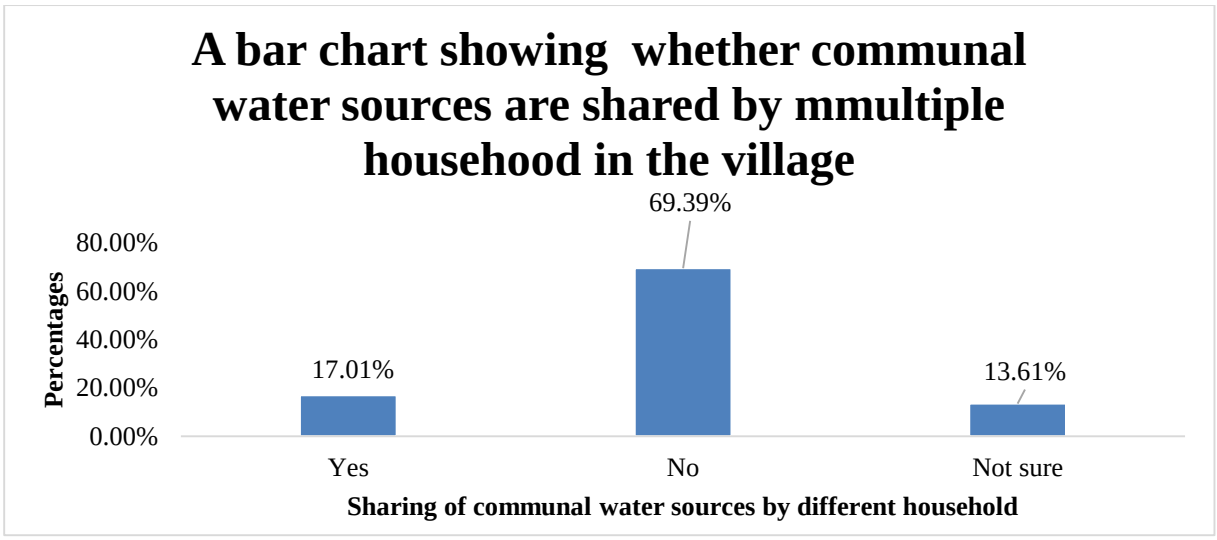
Figure 7: A bar chart showing the frequency of treatment of drinking water before consumption



Source: Field Data, 2023.

Figure 7 showed the frequency of treatment of drinking water before consumption, the data indicate that a significant portion of respondents (60.54%) rarely or never treat their drinking water before consumption, while 29.93% sometimes treat their water, and only 9.52% always do so. The low frequency of water treatment indicated a major public health concern, as untreated water from streams, rivers, or rainwater harvesting can be a source of various pathogens. This highlighted the need for public health education on the importance of water treatment and for providing affordable and accessible water purification methods.

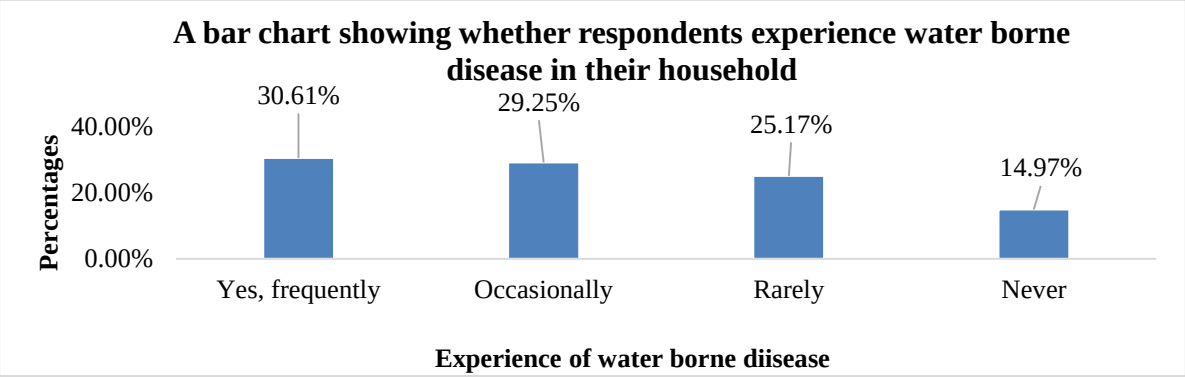
Figure 8: A bar chart showing whether communal water sources are shared by multiple households in the village.



Source: Field Data, 2023.

Figure 8 displayed whether communal water source are shared by multiple households, the data showed that only 17.01% of respondents use communal water sources shared by multiple households, whereas 69.39% do not, and 13.61% are unsure. This suggested that while communal water sources are present, they are not the predominant means of obtaining water for most households. The presence of individual water sources might reduce the spread of water-borne diseases through shared contamination but also indicated potential issues with the equity and sustainability of water distribution in the community.

Figure 9: A bar chart showing whether respondents experience water borne disease in their household



Source: Field Data, 2023.

Figure 9 depicted whether respondents experience water-borne diseases, a notable 30.61% of respondents have frequently experienced water-borne diseases in their households, while 29.25% have experienced them occasionally, 25.17% rarely, and 14.97% never. This high incidence of water-borne diseases reflects the poor quality of drinking water and inadequate water treatment practices. Addressing these health issues requires urgent improvements in water quality and hygiene education to reduce disease prevalence.

8. Discussion of Study Results

The study results from Largo Town present a nuanced understanding of the intersecting demographic, socio-economic, and behavioral factors that influence the risk and spread of Lassa fever. These findings reflect complex dynamics related to gender, education, occupation, household economics, and cultural practices, which are critical for formulating targeted public health interventions.

Demographic and Socio-Economic Profile

The surveyed population was 60% female and 40% male. The significant representation of females, who are often primarily responsible for household chores and food storage, places them at heightened risk of exposure to rodents, a primary vector for Lassa virus (Olayemi et al., 2019). Education levels were low, with 65.31% of respondents having only primary education or less. Low literacy is consistently associated with poor comprehension of disease prevention messages, increasing community vulnerability (Kargbo et al., 2020). Occupationally, 64.72% were farmers, a group with frequent exposure to rodent habitats through fieldwork and crop storage, aligning with findings from other endemic regions (Ogbu et al., 2007). Furthermore, 79.86% of households earned below NLe 1,000 per month, linking poverty to poor living

conditions, inadequate healthcare access, and limited resources for prevention—key drivers of outbreak severity (World Bank, 2020).

Knowledge, Awareness, and Perceptions of Lassa Fever

While 74.83% of respondents were familiar with Lassa fever, only 39.46% could name specific symptoms, revealing a critical gap between general awareness and actionable knowledge (Kargbo et al., 2020). Personal exposure was high, with 81.63% having either been affected or knowing someone who was, underscoring the disease's endemicity (Bausch et al., 2010). Primary information sources were health facilities (53.74%) and radio/TV (24.49%). Despite this, 38.10% did not know the disease was transmissible, and nearly 40% did not perceive it as a serious health threat. This disparity between awareness, knowledge, and perceived risk highlights the need for communication strategies that effectively translate awareness into preventive behavior (WHO, 2021).

Environmental, Water, and Sanitation Practices

Rodent infestation is a severe issue, with 51.70% of respondents frequently experiencing damage to stored food. While 51.70% used sealed containers for crop storage, only 23.13% employed traditional rodent deterrents, indicating a reliance on modern but incomplete control methods (Kone et al., 2016). Community-wide rodent control programs were lacking, as reported by 46.26% of respondents. Water access and safety were major concerns: 60.54% rarely or never treated drinking water, and 30.61% frequently experienced water-borne illnesses. Seasonal scarcity and low trust in water quality further compounded these public health risks. Hygiene practices were variable, with only 48.30% emphasizing hand washing with soap, and 48.30% of respondents feeling not very or not at all knowledgeable about proper sanitation.

Cultural Practices and Rat Consumption

Rat consumption was a notable cultural practice, with only 38.10% of respondents reporting they had never consumed rats. Drivers for consumption were primarily traditional (53.06%), nutritional (perceived as a valuable protein source by 46.26%), and economic (12.24% during food scarcity). Critically, 42.18% believed rat consumption posed no real health risks, and the practice was widely accepted (76.19%). These findings indicate that deeply embedded cultural practices and food security needs directly increase zoonotic exposure, a pattern observed in other regions where bush meat consumption is common (Ajayi et al., 2017; Golden et al., 2014).

Conclusion and Implications for Intervention

The risk of Lassa fever in Largo Town is not uniformly distributed but is concentrated at the intersection of high environmental exposure (rodent infestation, farming), socio-economic vulnerability (poverty, low education), and specific cultural practices (rat consumption). Effective intervention requires an integrated strategy that moves beyond generic awareness campaigns.

This should include: 1) Structural and Environmental Interventions (improving grain storage infrastructure, promoting effective rodent control, and ensuring safe water access); 2) Targeted Education (culturally sensitive programs that address knowledge gaps on symptoms, transmission, and the risks of rat consumption, using trusted channels like health clinics and radio); and 3) Socio-Economic Support (exploring alternative protein sources and livelihood support to reduce dependence on risky practices). Addressing these interconnected factors is essential for sustainable Lassa fever prevention and control.

9. Recommendations

Based on the findings of this study, the following recommendations are proposed to enhance Lassa fever prevention and control in Largo Town, Nongowa Chiefdom, Kenema District:

To the Government of Sierra Leone and National Authorities:

1. The Ministry of Health and Sanitation (MOHS) should sustain and intensify comprehensive public health education on Lassa fever through mass media (radio), community engagement sessions, and the deployment of community health workers; ensuring messages are culturally appropriate and actionable.
2. The MOHS, in partnership with the Ministry of Basic and Senior Secondary Education, should develop and disseminate simplified educational materials (e.g., posters, flyers, illustrated brochures) in local languages, clearly detailing transmission routes, symptoms, and immediate preventive actions.
3. The Ministry of Agriculture, in collaboration with local councils, should promote and support community-based initiatives to construct and retrofit rodent-proof grain storage facilities, reducing spillage and contact between rodents and food supplies.
4. The MOHS and local environmental health authorities should implement structured, periodic rodent control programs, combining environmental sanitation (community clean-ups), safe rodenticide application, and public education on non-chemical deterrents.
5. The MOHS should mandate and fund regular, evidence-based training for healthcare workers at all levels on Lassa fever case detection, infection prevention and control (IPC), and clinical management protocols.
6. The government should increase budgetary allocation and political support for integrated Lassa fever programs, prioritizing infrastructure for diagnostics, IPC, and sustained vector control activities.
7. A dedicated monitoring and evaluation framework should be established to routinely assess the coverage, effectiveness, and impact of Lassa fever interventions, enabling data-driven program adaptation.

To Local Stakeholders in Largo Town and Nongowa Chiefdom:

1. Community leaders, supported by local NGOs, should champion targeted, community-led awareness campaigns that emphasize practical sanitation, hygienic food storage, and early healthcare-seeking behavior, with special attention to high-risk groups.

2. Agricultural extension workers and community-based organizations should conduct hands-on training for farmers and households on effective post-harvest management and waste disposal practices to minimize rodent harborage and food sources.
3. Local authorities, with support from district health management teams, must ensure the consistent availability of appropriate personal protective equipment (PPE) and IPC supplies at all primary healthcare units to protect staff and prevent nosocomial transmission.
4. Stakeholders should advocate for and collaborate in improving physical and financial access to primary healthcare services, including ensuring that local health facilities are equipped for initial case management and safe referral.
5. Traditional and religious leaders should be formally integrated into prevention planning and messaging to leverage their influence, ensure cultural relevance, and foster widespread community ownership of control measures.

To Academic and Research Institutions:

1. Research institutions should conduct further operational and ethnographic studies to identify deeper socio-cultural, economic, and environmental determinants of risk behaviors and healthcare access, informing more nuanced interventions.
2. Multi-sectoral partnerships between academia, government agencies, the private sector, and civil society should be fostered to co-design, fund, and implement innovative, sustainable prevention technologies and community-based surveillance models.
3. Research capacity should be strengthened to utilize and improve existing health information systems (e.g., DHIS-2) for robust real-time data collection, analysis, and trend monitoring of Lassa fever indicators and intervention outcomes.
4. Local universities and research consortia should establish long-term collaborations with international partners to facilitate knowledge transfer, build local research capacity, and conduct comprehensive longitudinal studies on Lassa fever dynamics and control.

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