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ORIGINAL ARTICLE

A SCOPING REVIEW ON LASSA FEVER IN NIGERIA AND THE IMPLICATION FOR DISABLING HEARING LOSS

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KEYWORDS

Global Health,

Lassa Fever,

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ABSTRACT

Background: Lassa fever (LF) affects thousands of Nigerians yearly, yet its long-term complications, particularly sensorineural hearing loss (SNHL), remain underrecognized. This scoping review collated current knowledge, socioeconomic consequences, and preventive strategies of LF-induced hearing loss in Nigeria.

Methods: We followed the Arksey and O'Malley framework and reported per PRISMA-ScR guidelines. PubMed, Google Scholar, Scopus, African Journals Online, NCDC reports, and WHO fact sheets were searched for records (January 2000–June 2025) using terms including "Lassa fever" and "hearing loss." Eligible sources included English peer-reviewed studies, surveillance reports, and policy/economic analyses. Two reviewers independently screened and extracted data, resolving disagreements by consensus. Thirty-six records were included. Formal risk of bias assessment was not conducted, consistent with scoping review methodology; methodological features were appraised narratively where relevant.

Results: Seven Nigerian and Sierra Leonean studies reported LF-associated hearing loss across 250 survivors and acute cases. Prevalence of self-reported and audiometrically confirmed SNHL ranged from 12.5–30.0% and 13.5–29.0%, respectively. Hearing loss was independent of acute-disease severity and persisted in 64.0% of cases. NCDC recorded 1,309 confirmed cases and 214 deaths in 2024, with spread across 34 of Nigeria's 36 states between 2018 and 2023. Global hearing-aid production meets only 3.0% of demand in low- and middle-income countries.

Conclusion: LF-induced SNHL is common but underrecognized. Scarce audiometric follow-up and limited long-term economic data remain critical gaps. Routine audiological screening within survivor care and investment in affordable hearing rehabilitation are urgent priorities.

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INTRODUCTION

Lassa fever (LF) is a rodent-borne viral hemorrhagic disease first described in Nigeria in 1969 and now endemic across much of West Africa, including Benin, Ghana, Guinea, Liberia, Mali, Sierra Leone, and Nigeria.^{1,2} Recent epidemiological syntheses estimate 100,000–300,000 infections and approximately 5,000 deaths annually across the region, though surveillance gaps render these figures conservative.^{3,4} Nigeria alone recorded 1,309 confirmed cases and 214 deaths (case fatality rate 16.3%) in 2024 and a further 674 confirmed cases and 127 deaths in just the first 14 weeks of 2025.^{5,6} The disease has also expanded from 20 to 34 of Nigeria's 37 states between 2018 and 2023, signaling a widening, rather than receding, public-health threat.⁷ Clinically, LF is frequently mistaken for malaria or yellow fever and is asymptomatic or mild in about 80% of infections, hampering early detection.⁸ No licensed vaccine is yet available.⁹

Beyond acute mortality, LF leaves a disproportionate legacy of long-term disability, the most prominent of which is sudden-onset sensorineural hearing loss (SNHL). First documented in 1972 when 4 of 23 LF patients in Northern Nigeria developed residual deafness, SNHL is now reported in 13.5–29.0% of survivors by audiometry (mean $\approx$ 22%) and in 12.5–30.0% by self-report (mean $\approx$ 18.0%), with hearing loss persisting in roughly two-thirds of cases, followed up and being bilateral in 30.0–50.0%.^{10–12} Critically, SNHL occurs independently of the severity of the acute illness, a feature that distinguishes LF from most other viral infections with aural complications.¹² Despite these numbers, LF-induced SNHL remains absent from the WHO hearing-loss prevention agenda, is not routinely screened for during survivor follow-up in Nigeria, and is seldom mentioned in national LF response plans—an oversight magnified by the fact that Nigeria already carries a disproportionate share of the global hearing-loss burden concentrated in low- and middle-income countries.¹³ The proposed pathophysiology (direct viral cochlear invasion, immune-mediated cochleitis, molecular mimicry, vascular compromise) remains poorly understood.^{14,15}

From a global-health perspective, disabling hearing loss is projected to affect more than 700 million

people by 2050, the majority of whom reside in low- and middle-income countries, and already costs the global economy an estimated US\$980 billion annually in healthcare, educational support, and lost productivity.¹³ In Nigeria, where more than 70.0% of healthcare financing is paid out-of-pocket, lifelong needs for audiological assessment, hearing aids, and rehabilitation can push already vulnerable households into catastrophic expenditure and poverty.¹⁶ Hearing loss from LF in children further disrupts speech, education, and later economic participation, while survivors commonly experience a “double stigma”—the social fear attached to a highly infectious disease compounded by the discrimination associated with disability.^{14,12,17} Taken together, the combination of widening LF endemicity, a one-in-five risk of permanent SNHL among survivors, and a grossly under-resourced hearing-care system constitutes a compelling and time-sensitive public-health problem that is not adequately addressed in the existing literature. The overall goal of this scoping review is to synthesize current evidence on Lassa fever-associated sensorineural hearing loss (SNHL) in Nigeria and neighboring West African countries, assessing its burden and consequences, and identifying gaps to guide future research, policy and survivor care. By integrating epidemiology, proposed pathophysiology, survivorship needs, and health-system response in a single synthesis, the review addresses a critical gap left by prior single-theme reports and informs a concrete agenda for research, policy, and clinical practice.^{3,18}

METHODS

STUDY DESIGN.

A scoping review was conducted following the five-stage framework of Arksey and O'Malley with methodological refinements proposed by Levac et al. and reported in accordance with the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews) 20-item checklist.^{19,20}

REVIEW QUESTION

“What is the current evidence on the epidemiology, clinical burden, long-term hearing sequelae, socioeconomic impact, and preventive and survivor care strategies specifically related to Lassa fever-associated sensorineural hearing loss in Nigeria?”

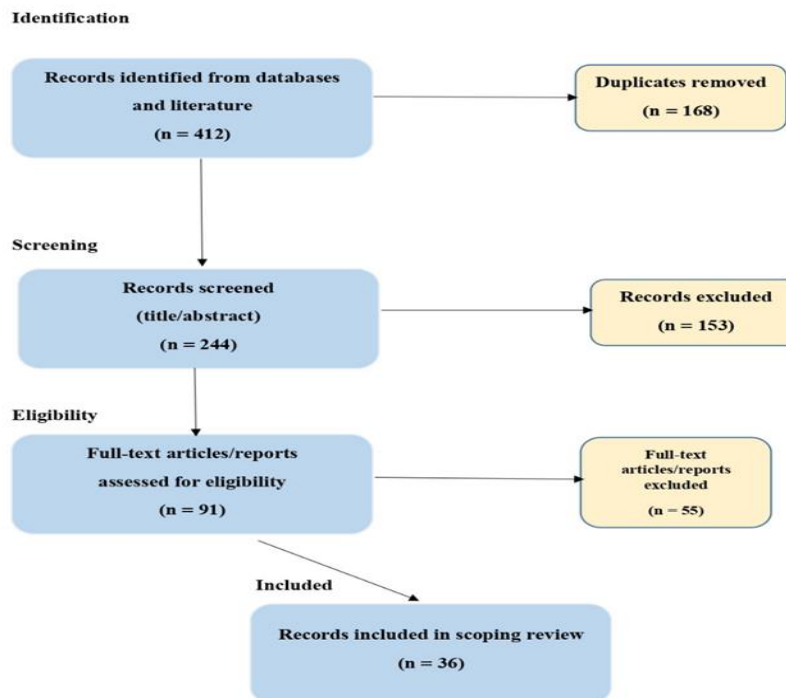


Figure 1. PRISMA-ScR flow diagram of identification, screening, eligibility, and inclusion of records in the scoping review of Lassa fever in Nigeria and disabling hearing loss among survivors.

INFORMATION SOURCES AND SEARCH STRATEGY.

PubMed, Google Scholar, Scopus, and African Journals Online (AJOL) were searched systematically for records published between 1 January 2000 and 30 June 2025. Grey literature was retrieved from the Nigeria Centre for Disease Control (NCDC) situation reports, World Health Organization (WHO) fact sheets and bulletins, and the Gavi Vaccine Alliance repository. Search strings combined the MeSH and free-text terms “Lassa fever,” “Lassa virus,” “hearing loss,” “sensorineural hearing loss,” “deafness,” “Nigeria,” “West Africa,” “public health impact,” “stigma,” and “economic burden,” linked with Boolean operators (AND/OR).

Reference lists of included records were hand-searched for additional citations.

ELIGIBILITY CRITERIA.

Records were included if they were (i) peer-reviewed original research, reviews, surveillance reports, or policy/economic analyses; (ii) published in English; and (iii) reported on LF epidemiology, clinical outcomes, pathophysiology, long-term sequelae (including hearing outcomes), socioeconomic impact, or preventive strategies in Nigeria or West Africa. Commentaries without primary data, conference abstracts without full text, duplicate publications, and non-English sources were excluded.

A five-year review of LF cases in Nigeria (2020 to 2024)

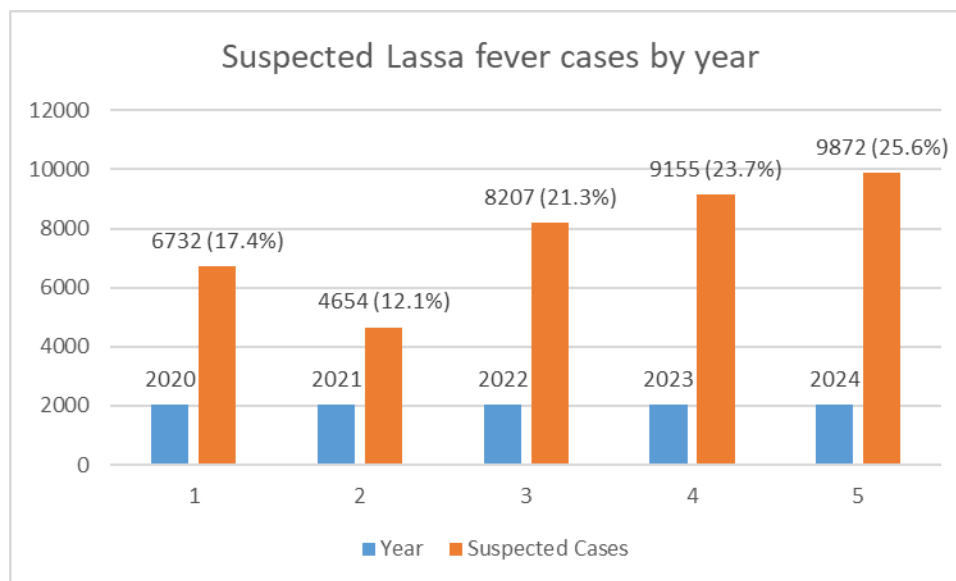


Figure 2. Suspected Lassa fever cases in Nigeria, 2020-2024

STUDY SELECTION.

All retrieved records were imported into Rayyan for deduplication. Two reviewers (MAA and EOE) independently screened titles and abstracts against the eligibility criteria, followed by an independent full-text review of potentially eligible records. Discrepancies were resolved by discussion with a third reviewer (KJS). A PRISMA-ScR flow diagram summarizing the number of records identified, screened, excluded, and included is provided as Figure 1 (n = 36 records retained for synthesis).

DATA CHARTING AND SYNTHESIS.

A standardized charting form, piloted on 5 records and iteratively refined, was used to extract author(s), year, country, study design, sample size, case definitions, key epidemiological or audiological findings, and health-system implications. Data were synthesized narratively and thematically into four domains focused on Lassa fever-associated SNHL in Nigeria: epidemiology and geographic spread; clinical burden and pathophysiology; socioeconomic impact and stigma and prevention, early diagnosis, and survivor care. Consistent with PRISMA-ScR guidance, no formal risk-of-bias or meta-analytic pooling was undertaken; however, the methodological quality

of primary audiometric studies was appraised narratively.

RESULTS

The search yielded 412 records, of which 168 were duplicates. After title and abstract screening of 244 records, 91 full texts were assessed for eligibility, and 36 records met the inclusion criteria and were retained for synthesis (Figure 1). Included sources comprised 19 peer-reviewed primary studies and reviews, 8 surveillance/situation reports (NCDC, WHO, Gavi), 5 policy or economic analyses, and 4 methodological or pathophysiological papers.

Across the included literature, the evidence consistently showed that Lassa fever remains an expanding public health problem in Nigeria and that disabling hearing loss is an important long-term sequela among survivors. Seven primary studies specifically reported audiometric or self-reported hearing outcomes in LF survivors (combined sample $\approx$ of 250 participants from Nigeria and Sierra Leone). Across these studies, audiometrically confirmed SNHL ranged from 13.5% to 29.0% (mean $\approx$ 22.0%), while self-reported hearing loss ranged from 12.5% to 30.0% (mean $\approx$ 18.0%), and hearing loss was persistent at follow-up in 64.0% of affected survivors and was bilateral in 30.0–50.0% of cases.

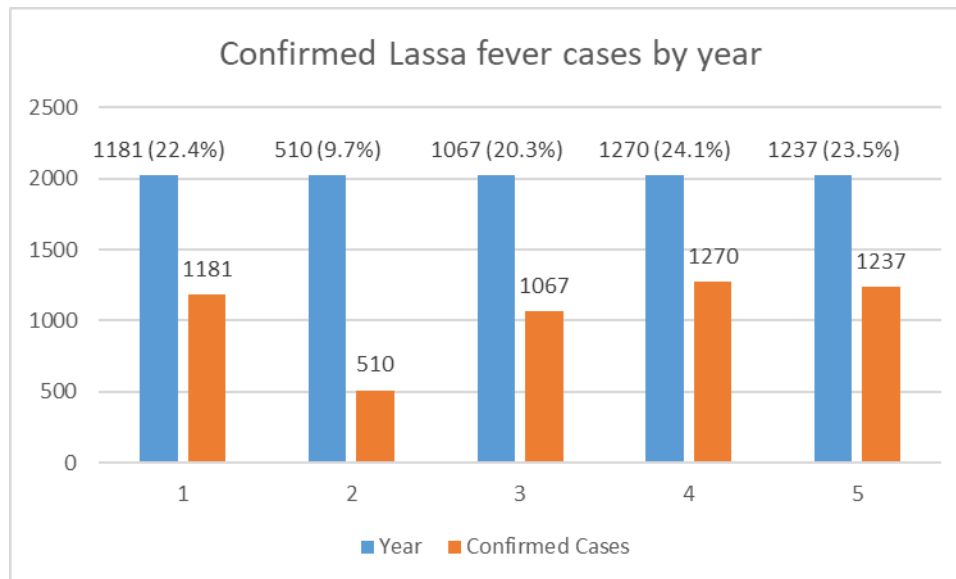


Figure 3. Confirmed Lassa fever cases in Nigeria, 2020-2024

Surveillance data from NCDC further showed that the national burden of Lassa fever remains high and geographically widespread, with 1,309 confirmed cases and 214 deaths reported in 2024, and 674 confirmed cases and 127 deaths reported within the first 14 weeks of 2025. Figure 2 to 4 illustrate five-year trends in suspected cases, confirmed cases, and confirmed deaths (2020-2024), all of which show persistently high and rising numbers over time. Figure 5 shows that case fatality ratios remained between 17.0% and 22.0% in this period, indicating that the risk of death among confirmed cases has not fallen substantially despite increased awareness and response efforts. National analyses also indicated expansion of Lassa fever transmission from 20 to 34 states between 2018 and 2023, suggesting that the population at risk of long-term sequelae, including disabling hearing loss, is increasing.

The included evidence shows that the rise in Lassa fever cases in Nigeria has important implications beyond acute morbidity and mortality, particularly because a substantial proportion of survivors may develop persistent hearing impairment. Findings from all 36 records were therefore synthesized to show both the increasing burden of Lassa fever in Nigeria and the need for greater attention to disabling hearing loss as a neglected survivor

outcome requiring clinical, public health, and policy action.

DISCUSSION

This scoping review brings together epidemiological, clinical, pathophysiological, socioeconomic, and system-level evidence on Lassa fever and its hearing sequelae. The evidence suggests that Lassa fever remains an expanding regional threat, that disabling hearing loss is a common and often persistent complication among survivors, and that its social and economic consequences fall most heavily on already vulnerable populations. Surveillance data from Nigeria show that both the number of confirmed cases and the number of affected states has increased in recent years, and that case fatality remains substantial despite heightened awareness and response efforts. Against this background, SNHL emerges as one of the most chronic complications of Lassa fever and appears to occur regardless of the severity of the acute illness, as shown in Nigerian audiometric series.^{5,6, 11,12,21,22}

The wider regional evidence supports this concern. West African syntheses point to a high but incompletely captured incidence of Lassa fever and document geographic expansion of transmission within Nigeria and across neighboring countries, including recent outbreaks in Ghana.

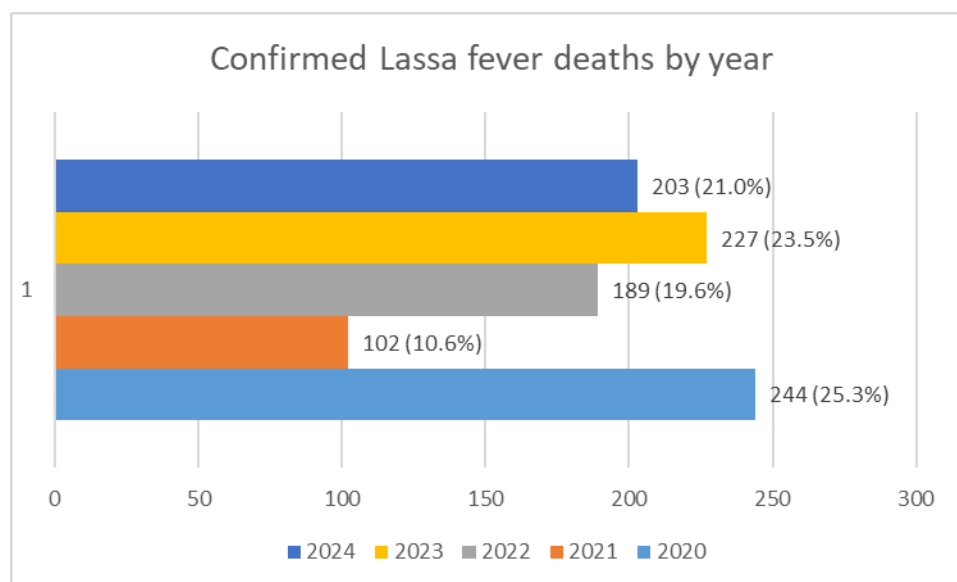


Figure 4. Confirmed Lassa fever deaths in Nigeria, 2020-2024

These patterns suggest that the pool of survivors at risk of permanent disabling hearing loss is likely to grow unless prevention, early treatment, and survivor care are strengthened.^{3,4,7,11,23} The biological basis of hearing loss in Lassa fever remains uncertain, but the available literature suggests several possible pathways, including direct injury to the inner ear, immune-mediated cochleitis driven by host inflammatory responses, molecular mimicry triggering autoimmune inner-ear disease, and vascular compromise with hypoxic and ischemia-reperfusion injury to cochlear tissues.^{15,24-29}

Secondary cochlear neuritis from viral replication in auditory neural tissue or systemic inflammation is also plausible.³⁰ Emerging spatial and modelling studies implicate climate variables, land use, housing quality, and population density as significant predictors of LF occurrence, suggesting that climate change may shift future risk zones and seasonality.³¹ Elucidating these mechanisms is critical both for targeted LF therapeutics and for the broader family of virus-induced hearing-loss conditions.

SOCIOECONOMIC IMPACT AND STIGMA.

The social consequences of LF-induced SNHL are profound. In many Nigerian communities, hearing impairment of any cause is associated with misconceptions, social exclusion, and

discrimination.¹⁷ When deafness follows LF, survivors experience a “double stigma”: societal fear of a highly fatal infectious disease layered onto the everyday discrimination attached to disability, producing avoidance by community members, withdrawal of family support, and even overt workplace discrimination.¹⁴ Our review further identified that self-stigma drives affected individuals towards self-medication and unorthodox therapies (traditional and spiritual healing), delaying presentation to formal care and worsening prognosis.³² These findings indicate that clinical interventions alone will not suffice; community-level awareness, culturally sensitive messaging, and structured social-support programmes are indispensable components of any effective LF survivor-care pathway.

ECONOMIC AND HEALTH-SYSTEM BURDEN.

Beyond the US\$980 billion annual global cost of unaddressed hearing loss already highlighted in the Introduction, the evidence reviewed here shows a distinctly Nigerian pattern of catastrophic household expenditure: out-of-pocket payments dominate healthcare financing for more than 70% of the population, and WHO/SDG 3.8.2 monitoring confirms Nigeria as one of the countries where financial protection against health costs is weakest.^{13, 16,33,34}



Figure 5. Case fatality ratio (%) among confirmed Lassa fever cases in %

Applied to LF-induced SNHL, these system-level vulnerabilities translate into concrete survivor-level harm. Recent Nigerian economic analyses quantify substantial outbreak-related costs extending well beyond acute care into long-term disability management.⁷ Lifelong audiological assessment, hearing aids (at a time when global hearing-aid production meets just 3% of the need in low- and middle-income countries), and rehabilitation can plunge vulnerable households into poverty.¹³ Paediatric SNHL from LF further disrupts speech and language development, formal and informal education, and subsequent labour-market participation, with consequences for national human-capital formation.¹²

PREVENTION, EARLY DIAGNOSIS, AND SURVIVOR CARE.

Synthesizing the evidence base, three strategic levers emerge to reduce the burden of LF-induced SNHL. First, community-level primary prevention: reviewed NCDC and WHO advisories converge on rodent-exclusion housing practices, rodent-proof food storage, proper waste disposal, and culturally attuned risk communication around bush-meat consumption as the most consistently effective measures in endemic states, yet reviewed studies show uneven implementation and limited impact evaluation.^{8,35} Our findings suggest that the main challenge is not a lack of recommended interventions, but rather a persistent implementation gap. In endemic Nigerian communities, existing guidance on rodent control, safe food storage, waste management, and risk communication is not yet being applied

consistently enough to reduce risk at scale. Earlier case detection and timely treatment also remain crucial. The non-specific early clinical picture remains the primary barrier to timely diagnosis, but emerging AI-assisted diagnostic algorithms applied to Nigerian clinical records show improved accuracy and may compress the interval between symptom onset and ribavirin initiation, with potential downstream reductions in SNHL incidence.^{8,36} Infection prevention and control (IPC) within health facilities is another important area of concern. Evidence from outbreaks repeatedly highlights nosocomial transmission to healthcare workers as a critical amplifier of outbreaks; strict hand hygiene, personal protective equipment, case isolation, and safe waste disposal remain the cornerstone, but frontline reports describe persistent IPC resource shortages in endemic Nigerian facilities.^{8, 37} Critically, none of the primary studies reviewed described a systematic, protocolised audiological follow-up pathway for LF survivors. Integrating routine audiometric screening into post-discharge care—together with survivor, family and community education about SNHL as a known sequela—represents perhaps the highest-yield, lowest-cost addition to current LF response plans.¹⁸ Multidisciplinary survivor care—linking otolaryngologists with infectious-disease specialists, neurologists, rehabilitation services, and community health workers—is repeatedly flagged as essential but rarely operationalized.³⁸ While vaccine development remains the single most transformative pipeline intervention, the more immediate priorities are to strengthen public-health

infrastructure, expand access to affordable hearing care, and secure dedicated survivor-care financing consistent with Nigeria's broader commitments on universal health coverage.^{7,8,34}

This review is limited by restrictions to English-language records, the absence of formal meta-analytic pooling, and heterogeneity in hearing-loss case definitions across primary studies, the small number of audiometric series, and reliance on surveillance data of variable completeness. These limitations, however, also illuminate priorities for future research, including the need for standardized audiological outcomes, prospective cohorts, and more structured survivor follow-up. At the same time, the strengths of the review include integration of data from clinical, epidemiological, economic and stigma sources, and is, to our knowledge, the first synthesis to bring together national surveillance trends with detailed evidence on disabling hearing loss among Lassa fever survivors in Nigeria and neighbouring West African settings.

CONCLUSION

The impact of Lassa fever extends far beyond acute mortality: approximately one in five survivors' lives with permanent SNHL, and the attendant stigma and catastrophic healthcare costs disproportionately affect Nigerian households already constrained by out-of-pocket financing. With climate change and regional connectivity poised to widen LF transmission zones, concerted action—integrated surveillance, early diagnosis, protocolised survivor care including audiology, and sustained investment in vaccines and infrastructure—is both an urgent national public-health priority for Nigeria and a matter of global health security. Priority actions include integrating routine audiological screening into national Lassa fever survivor-care protocols, providing financial support for hearing rehabilitation to protect households from catastrophic expenditure, strengthening community-based prevention and infection control in endemic states, and supporting prospective research on the mechanisms, progression, and treatment of Lassa fever-associated hearing loss alongside continued investment in vaccine development and improved early diagnostic tools. Based on the synthesized evidence we recommend that: the NCDC and the Federal Ministry of Health add routine audiological screening (baseline at recovery and at

3, 6, and 12 months) to the national LF survivor-care protocol; LF-dedicated budget lines include subsidized hearing aids and rehabilitation services to avert catastrophic household expenditure; endemic-state governments scale up community-based rodent-control and risk-communication programmes with embedded impact evaluation; health-worker IPC capacity in hotspot facilities be strengthened through dedicated funding and training; funders prioritize prospective multicentre cohort studies on LF-SNHL pathophysiology, progression, and treatment response; and continued investment in vaccine development and AI-assisted early diagnosis be sustained as complementary long-term strategies.

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AUTHOR CONTRIBUTIONS:

MAA: Conceptualization, methodology, literature search, writing—original draft preparation, data analysis, supervision.

EOE: Literature search, supervision, writing—original draft preparation, writing—review and editing, critical revision of the manuscript.

KJS: Literature search, writing—original draft preparation, writing—review and editing, critical revision of the manuscript.

VCD: Literature search, writing—original draft preparation, data analysis.

CJE: Supervision, project administration, data analysis.

ETHICAL STATEMENT

Ethical approval was not required for this research as it involved analysis of publicly available published literature and reports.

No primary data collection involving human participants was conducted.

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COMPETING INTERESTS

The authors declare no completing interests

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