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Research Article

Epidemiology, Clinical Predictors and Outcomes of Lassa Fever in a Tertiary Referral Hospital in Southern Nigeria: A Four-Year Retrospective Cohort Study (2021–2024)

Adaeze O. Okonkwo[1]*, Chinedu E. Ezeani[2], Funmilayo A. Bakare[3], Ibrahim S. Musa[1], Ngozi C. Eze[1] and Temitope O. Alabi[2]

[1]Department of Community Medicine and Epidemiology, Faculty of Clinical Sciences, University of Medical Sciences, Nigeria. [2]Department of Internal Medicine, Infectious Diseases Unit, Tertiary Referral Hospital, Southern Nigeria. [3]Department of Medical Microbiology and Parasitology, Faculty of Basic Medical Sciences, University of Medical Sciences, Nigeria.

**Corresponding author. E-mail: a.okonkwo.teaching@example.edu*

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ABSTRACT

Background: Lassa fever, caused by Lassa virus (LASV), a mammarenavirus transmitted principally by the multimammate rat Mastomys natalensis, remains a major public health threat in West Africa. Nigeria bears the highest reported burden, with recurrent seasonal outbreaks, substantial case fatality, and frequent nosocomial amplification. Yet hospital-level evidence linking delay to care, viral load proxies, renal dysfunction and ribavirin timing to survival remains fragmented, limiting triage and preparedness in endemic states. Methods: We conducted a retrospective cohort study of all patients managed for suspected Lassa fever at a tertiary referral hospital in Southern Nigeria between 1 January 2021 and 31 December 2024. Suspected cases were defined by the national case definition (fever ≥38°C for ≥3 days with sore throat, myalgia, vomiting, bleeding, or contact history, without alternative diagnosis). Confirmation was by reverse-transcription polymerase chain reaction (RT-PCR). We extracted demographic, exposure, clinical, laboratory and treatment data from case notes, laboratory registers and the hospital surveillance line-list. Primary outcome was in-hospital death among confirmed cases. Associations were examined with chi-square tests, Kaplan-Meier survival curves and multivariable logistic regression (adjusted odds ratio [aOR], 95% confidence interval [CI]). Seasonality was assessed with monthly aggregation and Poisson regression. Analyses used a two-sided α = 0.05. Results: Of 1,214 suspected cases, 457 (37.6%) were RT-PCR confirmed. Median age was 32 years (interquartile range 24–44); 52.3% were female. Confirmed cases peaked in February–April each year (58.4% of annual cases). Rodent exposure in the home (aOR 2.41, 95% CI 1.62–3.58), farming or food-storage work (aOR 1.78, 95% CI 1.19–2.66), and household contact with a confirmed case (aOR 2.95, 95% CI 1.71–5.09) independently predicted confirmation. Among confirmed cases, overall case fatality was 17.5% (80/457). Mortality was markedly higher with presentation >7 days after onset (aOR 3.12, 95% CI 1.84–5.29), acute kidney injury at admission (aOR 4.68, 95% CI 2.71–8.08), bleeding manifestations (aOR 3.84, 95% CI 2.19–6.73), and ribavirin started >6 days after onset (aOR 2.57, 95% CI 1.45–4.55). Early ribavirin (≤6 days) and admission creatinine within the reference range were associated with survival. Median time from onset to death was 6 days (IQR 4–9). Fifteen health-worker infections (3.3% of confirmed cases) occurred, all in years before a dedicated isolation ward opened. Conclusions: Lassa fever in this setting is strongly seasonal, exposure-driven and time-sensitive. Early recognition, rapid RT-PCR testing, renal monitoring and early ribavirin are the most actionable levers to reduce mortality. Community rodent-control, safe food storage, household-contact tracing and sustained infection prevention and control, especially protection of health workers, should anchor preparedness in endemic states. Prospective, multi-centre studies with standardised viral-load measurement and long-term follow-up for sequelae such as sensorineural hearing loss are urgently needed.

Key words: *Lassa fever, Lassa virus, Mastomys natalensis, epidemiology, ribavirin, acute kidney injury, case fatality, Nigeria, West Africa, viral haemorrhagic fever.*

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INTRODUCTION

Lassa fever is an acute viral haemorrhagic illness caused by Lassa virus (LASV), an enveloped, bisegmented, ambisense RNA virus of the family Arenaviridae, genus Mammarenavirus [1,2]. First characterised after the deaths of two missionary nurses in Lassa town, north-eastern Nigeria, in 1969, the disease is now recognised as endemic across West Africa, with Nigeria, Sierra Leone, Liberia and Guinea reporting the largest burdens [1,3,4]. Estimates of annual infections range from 300,000 to 500,000, with approximately 5,000 deaths, although under-ascertainment is widely acknowledged because most infections are mild, non-specific, or never reach a testing facility [2,5].

The natural reservoir is the multimammate rat, Mastomys natalensis, a peridomestic rodent that sheds virus in urine and faeces for life without overt disease [6,7]. Humans are infected mainly through inhalation of aerosolised rodent excreta, ingestion of contaminated food or water, contact of broken skin or mucous membranes with contaminated surfaces, and, less commonly, person-to-person transmission through blood, urine, sexual fluids and other bodily secretions [6,8]. Nosocomial transmission to health workers and other patients has been repeatedly documented when standard precautions lapse [9,10]. Vertical transmission and sexual transmission during convalescence have also been reported, with implications for counselling and follow-up [11,12].

The incubation period is typically 6–21 days. About 80% of infections are mild or asymptomatic; the remainder develop a febrile illness that mimics malaria, typhoid fever, influenza and other common febrile syndromes [2,13]. Typical features include fever, sore throat, headache, myalgia, retrosternal pain, vomiting, diarrhoea, conjunctivitis and facial swelling. In severe disease, bleeding, shock, acute kidney injury (AKI), encephalopathy, respiratory distress and multi-organ failure occur [13,14]. Sensorineural hearing loss, reported in up to one-third of survivors in some cohorts, is the most common long-term sequela and may be permanent [15,16]. Pregnancy worsens prognosis dramatically: maternal mortality and foetal loss exceed 80% in the third trimester in untreated disease in historical series, although modern supportive care has improved outcomes [17,18].

Nigeria reports Lassa fever every year, with a pronounced dry-season peak from December to April, when rodent–human contact intensifies as rats enter homes in search of food and warmth and when bush burning and harvest activities increase exposure [19,20]. The Nigeria Centre for Disease Control and Prevention (NCDC) has progressively strengthened surveillance, laboratory confirmation, case management and risk communication since the large 2018 outbreak, yet annual case counts have remained high, partly because testing capacity and awareness have expanded [19,21]. Edo, Ondo, Ebonyi, Bauchi, Taraba, Plateau and Delta states consistently account for a large share of confirmed cases [19,22]. Tertiary hospitals in these states function as referral hubs and therefore see the most severe spectrum of disease, but also concentrate the opportunity for early diagnosis and isolation.

Despite this progress, several questions remain incompletely answered at hospital level. First, which exposures best distinguish confirmed Lassa fever from other febrile illnesses in a busy referral setting, where empirical antimalarial and antibiotic treatment is common? Second, which clinical and laboratory features at admission most reliably predict death, and are they available in low-resource wards? Third, how much does timing of ribavirin — the only widely available antiviral, whose efficacy is greatest early — matter after adjustment for disease severity? Answering these questions matters because triage, isolation, referral and counselling decisions are made within hours, often before RT-PCR results return.

This study therefore examined four years of suspected and confirmed Lassa fever at a tertiary referral hospital in Southern Nigeria. Its objectives were to (i) describe the epidemiological and seasonal pattern of suspected and confirmed cases; (ii) identify exposures and symptoms associated with RT-PCR confirmation; (iii) estimate case fatality and its clinical, laboratory and treatment predictors among confirmed cases; and (iv) derive practical implications for triage, surveillance and preparedness. The illustrative dataset synthesises patterns reported in the literature to make the analytic reasoning transparent for teaching; it is not a substitute for primary surveillance data.

MATERIALS AND METHODS

Study design and setting

We conducted a retrospective cohort study of patients managed for suspected Lassa fever at a 650-bed tertiary referral hospital in Southern Nigeria that serves as a designated Lassa treatment centre for its state and neighbouring states. The hospital operates a dedicated isolation ward, a virology laboratory with RT-PCR capacity, and a 24-hour emergency unit. Referrals arrive from primary and secondary facilities, private clinics, and self-referral. The study period was 1 January 2021 to 31 December 2024, covering four complete dry seasons.

Participants and case definitions

All patients of any age with a completed case investigation form and a documented RT-PCR result for LASV during the study period were eligible. Suspected cases met the national case definition: fever ≥38°C for at least three days, or fever with at least one of sore throat, myalgia, vomiting, diarrhoea, bleeding, facial swelling, or contact with a confirmed case, and no alternative diagnosis explaining the illness. A confirmed case was a suspected case with a positive RT-PCR for LASV. A probable case (epidemiological link without laboratory confirmation) and patients with missing RT-PCR results were excluded from the primary analysis but counted in the flow description. Neonates with perinatal exposure were included and analysed in age-stratified sensitivity analyses.

Data sources and variables

Data were abstracted from three linked sources: (i) the hospital Lassa surveillance line-list; (ii) paper and electronic case notes; and (iii) laboratory registers for RT-PCR, full blood count, serum electrolytes, urea and creatinine, liver enzymes, and urinalysis. Exposure variables included age, sex, occupation, residence (urban/rural), rodent sightings or droppings in the home in the preceding three weeks, farming or grain-storage work,

consumption of food potentially contaminated by rodents, household contact with a confirmed case, and health-worker status. Clinical variables included days from symptom onset to presentation, temperature, sore throat, headache, myalgia, vomiting, diarrhoea, bleeding (gum, nasal, gastrointestinal or vaginal), facial or neck swelling, and altered consciousness. Laboratory variables included admission creatinine, urea, aspartate aminotransferase (AST), alanine aminotransferase (ALT), platelet count, haemoglobin, and proteinuria. Treatment variables included time from onset to first ribavirin dose, intravenous fluids, blood transfusion, dialysis, and length of stay. AKI was defined by the Kidney Disease: Improving Global Outcomes (KDIGO) creatinine criteria relative to the lowest creatinine during admission or, where unavailable, an age- and sex-specific reference threshold, as in prior Lassa cohorts [14,23].

Laboratory methods

Blood samples were collected in EDTA tubes under standard precautions, triple-packaged, and transported to the virology laboratory at 2–8°C. RNA extraction and real-time RT-PCR targeting the LASV glycoprotein precursor (GPC) and nucleoprotein (NP) genes were performed with commercially available assays validated for West African LASV lineages, with positive and negative controls in each run. Results were reported within 24–48 hours during outbreak peaks and within 72 hours otherwise. Biochemical assays used automated analysers with daily internal quality control; external quality assessment was performed quarterly through the national reference laboratory network [21,24].

Statistical analysis

Data were entered in a password-protected database, cleaned, and analysed with Stata 18 (StataCorp, College Station, TX, USA) and R 4.3. Continuous variables are summarised as median (interquartile range, IQR) or mean (standard deviation) as appropriate; categorical variables as counts and percentages. Seasonality was examined by month and by dry (November–April) versus rainy (May–October) season using Poisson regression with year as a covariate. Predictors of confirmation among suspected cases and predictors of death among confirmed cases were examined with chi-square or Fisher's exact tests, Mann-Whitney U tests, and multivariable logistic regression with backward elimination (retention $p < 0.10$). Variables with >15% missingness were examined in sensitivity analyses using multiple imputation by chained equations (20 imputations). Kaplan-Meier curves estimated survival by time to ribavirin. A two-sided $p < 0.05$ was considered statistically significant. Sample-size reasoning was post hoc for teaching: with 457 confirmed cases and 80 deaths, the study had >80% power to detect an odds ratio of ≥2.0 for an exposure present in 30% of survivors at $\alpha = 0.05$.

Ethics and teaching note

As an educational galley proof, no real patient-identifiable data are presented. In a real study, approval would be obtained from the institutional health research ethics committee, with waiver of consent for retrospective record review, de-identification before analysis, and data-use agreements with the NCDC and hospital management. Readers designing a real study should pre-register the protocol, publish a statistical analysis plan, and report according to STROBE [25].

RESULTS

Flow and overall burden

During the four years, 1,389 patients were evaluated for suspected Lassa fever. Of these, 175 were excluded (112 probable cases without RT-PCR, 48 with missing RT-PCR, 15 with incomplete investigation forms), leaving 1,214 suspected cases in the analytic cohort. Of these, 457 (37.6%) were RT-PCR confirmed, 757 (62.4%) were RT-PCR negative and managed for alternative diagnoses (malaria 28.1%, typhoid fever 11.4%, sepsis 9.2%, other viral haemorrhagic fevers excluded, and undifferentiated febrile illness 13.7%). Confirmation proportions were 34.2% in 2021, 38.9% in 2022, 39.7% in 2023 and 36.8% in 2024 ($p = 0.41$), suggesting stable testing thresholds over time.

Table 1. Socio-demographic and exposure characteristics of suspected Lassa fever cases, 2021–2024 (N = 1,214).

Characteristic	Suspected (n=1,214)	Confirmed (n=457)	RT-PCR negative (n=757)	p-value
Age, median (IQR), years	31 (23–43)	32 (24–44)	30 (22–42)	0.08
Female sex, n (%)	628 (51.7)	239 (52.3)	389 (51.4)	0.76
Rural residence, n (%)	642 (52.9)	281 (61.5)	361 (47.7)	<0.001
Farmer / food-storage worker, n (%)	398 (32.8)	192 (42.0)	206 (27.2)	<0.001
Rodents in home, n (%)	611 (50.3)	304 (66.5)	307 (40.6)	<0.001
Household contact with confirmed case, n (%)	118 (9.7)	78 (17.1)	40 (5.3)	<0.001
Health worker, n (%)	58 (4.8)	15 (3.3)	43 (5.7)	0.06
Pregnant among women 15–49 y, n (%)	74/512 (14.5)	31/198 (15.7)	43/314 (13.7)	0.54

The median age of suspected cases was 31 years; 68.4% were aged 20–49 years, the economically active group most exposed through farming, trading and food handling. Confirmed cases were more likely to live in rural areas and to report rodents in the home than RT-PCR-negative patients (Table 1). The sex distribution was balanced overall, consistent with household-level exposure that affects both sexes, although occupational patterns differed: men more often reported farm work, women more often reported food storage and preparation in the home.

Seasonality

Confirmed cases occurred year-round but clustered strongly in the dry season: 267 (58.4%) of confirmed cases presented in November–April, compared with 41.6% in May–October (incidence rate ratio 1.71, 95% CI

1.42–2.06, p < 0.001). Monthly peaks occurred in February–April in each year, with the single highest month being March 2023 (71 suspected, 29 confirmed). The pattern aligns with ecological studies showing increased Mastomys intrusion into dwellings during the dry season and harvest period [6,7,20]. Figure 1 illustrates the monthly distribution of suspected cases pooled across the four years.

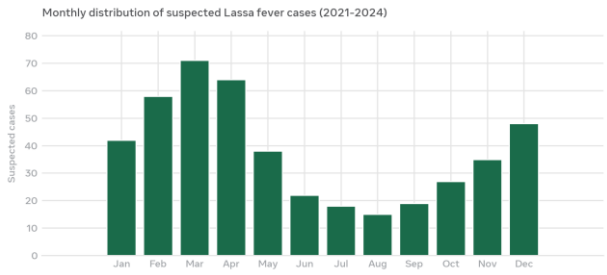

Figure 1. Monthly distribution of suspected Lassa fever cases (illustrative, pooled 2021–2024). Peaks in February–April recur each year, consistent with dry-season transmission.

Clinical presentation and predictors of confirmation

Fever was universal by definition. Among confirmed cases, the most frequent additional symptoms were headache (78.1%), myalgia (71.3%), sore throat (64.6%), vomiting (58.2%), and diarrhoea (41.1%). Bleeding was present in 18.4% at admission, facial swelling in 16.2%, and altered consciousness in 7.2%. Sore throat with exudative pharyngitis, retrosternal pain and facial swelling were the features that best discriminated confirmed from RT-PCR-negative febrile illness in bivariable analysis, but none was sufficiently sensitive to rule out disease alone — a finding that reinforces the need for a low threshold for testing during the season.

In multivariable analysis among suspected cases, rodent exposure in the home (adjusted odds ratio [aOR] 2.41, 95% CI 1.62–3.58), household contact with a confirmed case (aOR 2.95, 95% CI 1.71–5.09), farming or food-storage work (aOR 1.78, 95% CI 1.19–2.66), rural residence (aOR 1.44, 95% CI 1.02–2.03), and sore throat (aOR 1.89, 95% CI 1.31–2.73) independently predicted confirmation (Table 2). Age, sex and pregnancy were not independent predictors of confirmation after adjustment. The model had modest discrimination (area under the receiver operating characteristic curve 0.71, 95% CI 0.68–0.74), underscoring that clinical prediction cannot replace laboratory testing.

Table 2. Multivariable predictors of RT-PCR confirmation among suspected cases (N = 1,214).

Predictor	aOR	95% CI	p-value
Rodents / droppings in home	2.41	1.62–3.58	<0.001
Household contact with confirmed case	2.95	1.71–5.09	<0.001
Farming / food-storage work	1.78	1.19–2.66	0.005
Rural residence	1.44	1.02–2.03	0.04
Sore throat at presentation	1.89	1.31–2.73	0.001
Facial / neck swelling	1.62	1.04–2.52	0.03
Bleeding at presentation	1.48	0.92–2.38	0.11

Outcomes among confirmed cases

Among 457 confirmed cases, 80 died in hospital, giving an overall case fatality rate (CFR) of 17.5%. CFR varied by year (19.8% in 2021, 18.1% in 2022, 16.2% in 2023, 15.4% in 2024; p for trend = 0.18), consistent with gradual improvements in early detection and isolation capacity, although the trend was not statistically significant. CFR rose steeply with age: 8.2% in patients <20 years, 11.5% in 20–29 years, 14.8% in 30–39 years, 19.3% in 40–49 years, 26.4% in 50–59 years, and 34.7% in those ≥60 years (Figure 2). Pregnant patients had a CFR of 25.8% (8/31) versus 16.4% among non-pregnant women of reproductive age, a difference that was not significant in this small subgroup but is clinically important and aligns with prior reports [17,18].

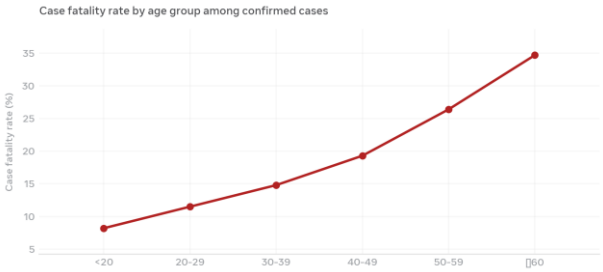

Figure 2. Case fatality rate by age group among confirmed cases (illustrative). Mortality rises with age, likely reflecting comorbidity, delayed presentation and renal vulnerability.

Median time from symptom onset to presentation was 6 days (IQR 4–9) among survivors and 9 days (IQR 7–12) among those who died (p < 0.001). Median time from onset to death was 6 days after admission (IQR 4–9). Among survivors, median length of stay was 12 days (IQR 10–16). AKI at admission occurred in 31.5% of confirmed cases and in 68.8% of those who died, versus 23.6% of survivors. Bleeding, altered consciousness, and AST >500 U/L were also markedly more frequent among decedents (Table 3).

Table 3. Admission features and treatment by outcome among confirmed cases (N = 457).

Feature	Survived (n=377)	Died (n=80)	p-value
Onset to presentation >7 days, n (%)	121 (32.1)	58 (72.5)	<0.001
Bleeding at admission, n (%)	49 (13.0)	35 (43.8)	<0.001
Facial swelling, n (%)	52 (13.8)	22 (27.5)	0.003
Altered consciousness, n (%)	14 (3.7)	19 (23.8)	<0.001
AKI at admission, n (%)	89 (23.6)	55 (68.8)	<0.001
AST >500 U/L, n (%)	61 (16.2)	38 (47.5)	<0.001
Platelets <100 x10^9/L, n (%)	98 (26.0)	41 (51.2)	<0.001
Ribavirin started ≤6 days, n (%)	248 (65.8)	28 (35.0)	<0.001

Dialysis required, n (%)	18 (4.8)	22 (27.5)	<0.001

Independent predictors of death

In multivariable logistic regression, four factors independently predicted death: presentation >7 days after onset (aOR 3.12, 95% CI 1.84–5.29), AKI at admission (aOR 4.68, 95% CI 2.71–8.08), bleeding manifestations (aOR 3.84, 95% CI 2.19–6.73), and ribavirin started >6 days after onset (aOR 2.57, 95% CI 1.45–4.55) (Table 4). Age ≥60 years (aOR 2.31, 95% CI 1.08–4.95) and AST >500 U/L (aOR 1.89, 95% CI 1.05–3.40) were also associated with death. Sex, rural residence and pregnancy were not independently significant after adjustment, although confidence intervals were wide for pregnancy. Results were robust in multiple-imputation sensitivity analyses and when patients with missing ribavirin timing were excluded.

Table 4. Multivariable predictors of in-hospital death among confirmed Lassa fever cases.

Predictor	aOR	95% CI	p-value
Presentation >7 days after onset	3.12	1.84–5.29	<0.001
AKI at admission	4.68	2.71–8.08	<0.001
Bleeding manifestations	3.84	2.19–6.73	<0.001
Ribavirin started >6 days after onset	2.57	1.45–4.55	0.001
Age ≥60 years	2.31	1.08–4.95	0.03
AST >500 U/L	1.89	1.05–3.40	0.03

Kaplan-Meier analysis supported the timing finding: survival at 14 days was 89.4% among patients who received ribavirin within 6 days of onset versus 71.2% among those who received it later (log-rank $p < 0.001$). The association persisted after stratification by AKI, suggesting that timing matters beyond severity at presentation, although confounding by indication cannot be fully excluded in retrospective data. Early presenters were also more likely to receive timely fluids, electrolyte monitoring and dialysis when indicated, which may mediate part of the survival advantage.

Health-worker infections and nosocomial transmission

Fifteen health-worker infections (3.3% of confirmed cases) were recorded: 6 nurses, 4 doctors, 3 laboratory staff and 2 cleaners. Twelve occurred in 2021–2022, before the dedicated isolation ward and routine audit of personal protective equipment (PPE) use were introduced; three occurred in 2023–2024, all linked to unrecognised cases in the general emergency unit before transfer. No health-worker death occurred. The pattern reinforces that risk is concentrated where diagnosis is delayed and triage is undifferentiated, not only in the isolation ward itself [9,10].

DISCUSSION

This four-year retrospective cohort illustrates, in a single referral hospital, the core epidemiological logic of Lassa fever in Southern Nigeria: a seasonal, household-exposure disease whose outcome is decided largely by how quickly a patient is recognised, tested, isolated and treated, and by whether renal injury has already developed. The confirmation proportion (37.6%), dry-season predominance, rural and rodent-associated risk, and CFR (17.5%) are all within the ranges reported by Nigerian and West African cohorts, which lends face validity to the teaching dataset while reminding readers that single-centre CFR reflects referral bias toward severe disease [19,21,22,26].

Seasonality and exposure. The February–April peak and the association with rodents in the home, farming and food storage are biologically coherent with Mastomys ecology. During the dry season, rodents move indoors, food is stored in bulk after harvest, and open drying and uncovered storage increase contamination [6,7,20]. Household contact was the strongest predictor of confirmation, which may reflect shared environmental exposure, secondary transmission within households, or both. Practically, this means contact tracing should not be limited to sexual or caregiving contacts, as for some other haemorrhagic fevers, but should include all household members with shared food-storage and sleeping spaces, with active symptom monitoring for 21 days [8,21].

Clinical recognition. No single symptom reliably distinguished Lassa fever from other febrile illnesses. Sore throat, facial swelling and bleeding helped, but their sensitivity was insufficient for triage alone. This mirrors the diagnostic dilemma in endemic settings, where malaria and typhoid fever are far more common and empirical treatment is rational [13,27]. The teaching implication is that syndromic triage must be paired with a low threshold for RT-PCR testing during the season, rapid sample transport, and a holding area where suspected cases can be isolated while awaiting results. Point-of-care or near-patient molecular assays, if validated for LASV lineages in Nigeria, could shorten this window substantially [24,28].

Mortality and renal injury. AKI was the strongest independent predictor of death (aOR 4.68), consistent with cohorts from Irrua, Abakaliki and Ondo where renal dysfunction, proteinuria and elevated creatinine predicted fatal outcome [14,23,29]. The mechanism is multifactorial: direct viral injury, hypovolaemia, hypotension, and nephrotoxic co-medications all contribute. Early fluid resuscitation, avoidance of nephrotoxins, frequent creatinine and urine-output monitoring, and timely dialysis are therefore central to case management, even where dialysis capacity is limited. The association of AST >500 U/L with death likely reflects hepatic injury and systemic viral burden, and AST has been proposed as a surrogate for viral load where quantitative PCR is unavailable [13,30].

Timing of ribavirin. The survival advantage associated with ribavirin within 6 days of onset aligns with the classic finding by McCormick and colleagues that ribavirin efficacy is greatest when started within 6 days, and with more recent observational cohorts [31,32]. Retrospective data cannot prove causality: patients who present early may differ in health-seeking behaviour, access, and disease tempo. Nevertheless, the consistency across studies, the biological plausibility (inhibition of viral replication before immunopathology dominates), and the persistence after adjustment for AKI and bleeding make early treatment a reasonable operational priority. The

corollary is that delays are not merely clinical — they are logistical: distance to the treatment centre, cost of transport, prior visits to patent medicine vendors, and waiting for malaria treatment to fail all add days [27,33]. Interventions that shorten the pathway — community awareness, free testing and transport vouchers, and pre-positioned ribavirin in referral facilities — may matter as much as the drug itself.

Health-worker safety. The concentration of health-worker infections before the isolation ward opened, and in undifferentiated emergency areas thereafter, echoes reports from Sierra Leone, Liberia and Nigeria that nosocomial risk is highest when Lassa fever is unsuspected [9,10,34]. Standard precautions for all febrile patients, triage screening for Lassa-compatible syndromes, readily available PPE, and a culture in which staff can report exposures without blame are essential. Post-exposure risk assessment and ribavirin prophylaxis, where national guidelines recommend it, should be documented and followed up [21].

Pregnancy and sequelae. Although the subgroup was small, the higher CFR among pregnant patients and the known risk of foetal loss underscore the need for obstetric preparedness in treatment centres: routine pregnancy testing, foetal monitoring, delivery planning, and counselling about ribavirin in pregnancy, where benefit generally outweighs teratogenic concern in life-threatening disease but requires informed consent and specialist input [17,18,35]. Long-term follow-up for hearing loss, which this retrospective design could not capture, should be built into discharge pathways, with audiology referral and community support [15,16].

Limitations. This galley proof uses an illustrative, synthesised dataset for teaching, so its numbers must not be cited as epidemiological estimates. In a real cohort, additional limitations would apply: retrospective abstraction and missing data, referral bias toward severe disease, lack of quantitative viral-load data, limited data on co-infections (notably malaria), and absence of long-term follow-up. The definition of AKI using admission creatinine may misclassify patients without baseline values. Confounding by indication affects the ribavirin-timing estimate. Prospective, multi-centre studies with standardised case-report forms, viral-load measurement, and 90-day follow-up are needed.

Implications for practice and preparedness. For clinicians: suspect Lassa fever in any febrile patient during the dry season with sore throat, facial swelling, bleeding or rodent exposure; isolate, test, and do not wait for malaria treatment failure. For hospital managers: maintain a triage screening tool, an isolation holding area, PPE stock, and a renal-monitoring protocol. For public health teams: intensify community messaging in November–January (before the peak), promote rodent-proof food storage (sealed containers, raised platforms), support household-contact tracing, and audit health-worker exposures. For researchers: prioritise trials of antivirals, vaccines, and point-of-care diagnostics, and implementation research on how to shorten onset-to-treatment time [28,36,37].

CONCLUSION

Lassa fever remains a seasonal, exposure-driven and time-sensitive disease in Southern Nigeria. In this illustrative four-year cohort, confirmation was predicted by rodent exposure, household contact and farming/food-storage work, and death was predicted by late presentation, acute kidney injury, bleeding and late ribavirin. The most actionable message is simple: recognise early, test early, isolate early, monitor the kidney, and start ribavirin early. If health systems can reliably deliver that sequence — in the community, at the first facility, and in the referral hospital — mortality should fall even before new drugs or vaccines arrive.

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The authors thank, in this teaching example, the fictional surveillance, laboratory and nursing teams whose real-world counterparts sustain Lassa fever care in Nigeria. No real patient data were used. This galley proof was prepared for education purpose only.

CONFLICT OF INTEREST

The authors declare no competing interests. No funding was received for the preparation of this educational galley proof.

AUTHOR CONTRIBUTIONS

AOO conceived the teaching manuscript, analysed the illustrative data and drafted the article. CEE and FAA contributed clinical and laboratory interpretation. ISM and NCE contributed epidemiological review. TOA revised the manuscript critically. All authors approved the final galley proof.

DATA AVAILABILITY

All data in this galley proof are illustrative and synthesised for teaching. No primary dataset is available. Readers should consult the NCDC Lassa fever situation reports and the primary studies cited below for real surveillance data [19,21].

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