

# Determinants of Delayed Healthcare-Seeking along the Care Pathway and their Association with Lassa Fever Severity in West Africa: A Systematic Review

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## ABSTRACT

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**Objective:** Lassa fever, an acute viral disease, is most commonly transmitted through contact with infected rodents or contaminated objects; West Africa in particular is mostly affected by Lassa fever. It initially presents generic symptoms, which when not diagnosed and treated quickly and effectively, may have a severe outcome and cause death. This study has comprehensively examined factors affecting delay in seeking medical attention along the treatment pathway and how they are correlated with the severity of the Lassa fever in West Africa.

**Method:** A comprehensive literature search was conducted with the PRISMA methodology, by using Google Scholar and with the help of some manual search. This gave a total of 56 studies with 12 meeting the inclusion criteria after rigorous screening. The different studies included different designs such as cohort, cross-sectional, qualitative, mixed-method, modelling, and review studies. There was methodological variability which prompted the use of a narrative synthesis technique.

**Result:** Findings indicated that delayed healthcare-seeking is driven by a multifactorial relationship of intersections of sociodemographic, sociocultural, economic, psychological, and health system-related influences. Little knowledge about Lassa fever, stigma, reliance on alternative medicines, financial constraints, distance, and reliance of referral networks and the lack of confidence in medical services played critical roles. Some of the steps of the care pathway that featured delays included patient delays (between onset of symptoms and first contact), decision delays (between recognition and decision to seek care), access delays (between accessing healthcare facilities), and system level delays (between referral and starting treatment). Studies have consistently demonstrated that there is a close relation between the delay in seeking medical care and deterioration of disease. Delays of more than 11 days were significantly related to severe disease and increased death with the smallest delay related to worsening outcomes approximating about 6 days post-onset of symptoms. Reported case fatality as high as 13.6% in late presenters was a significant clinical risk.

**Conclusion:** In general, the study demonstrates that time lag at any stage of the care pathway accumulates to issue a poor prognosis, which underlines the importance of targeted efforts aimed at mitigation of institutional and individual barriers to timely care in West Africa.

## How to cite this article

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## Keywords

Lassa fever; delayed healthcare-seeking; care pathway; disease severity; treatment delay; determinants; West Africa; health system factors; access to care.

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## 1. Introduction

Lassa fever is a highly prevalent and acute zoonotic disease that is prevalent in West Africa. Its spread mostly factors in contact with infected rodents and, secondarily, through human-to-human contact in hospital settings with inadequate infection control (WHO, 2024). The disease has a wide spectrum of manifestations with certain cases remaining asymptomatic (about 80 percent of the cases) to severe multiple system involvement (about 20 percent of the cases). In hospitalised patients, case fatality rates are more than 15 per cent and in cases where access to care is delayed, these figures are much higher (WHO, 2024). These initial signs are often similar to other the endemic febrile diseases, thus complicating the diagnosis process, and consuming a lot of time, particularly in low-resource and limited laboratory settings (WHO, 2024). The effectiveness of treatment depends on the time greatly, and treatment should be initiated as soon as possible, within six days following the appearance of the symptoms, though early supportive management and timely administration of ribavirin may result in survival (WHO, 2024; Chandra *et al.*, 2021). Healthcare-seeking behaviour in Lassa fever is complex a combination of

sociodemographic, cultural, behavioural and health system factors which cause any significant delays within the care pathway, such as symptom recognition, decision-making, access to care, referral and treatment initiation (Chandra *et al.*, 2021; Kamara *et al.*, 2024).

Late medical attendance remains a critical issue in the health of people, and it adds to preventable morbidity and mortality in the region despite the ongoing surveillance and control programs. The hospital-based fatality rates of the disease vary between 13% and 20% with a projected number of 5,000 deaths annually, particularly in patients who report to the hospital after the opportune period of treatment (Penfold *et al.*, 2023; Adeleye and Akhere, 2026). It has been found that more than half of the patients report up six days following the onset of the symptoms, with some delayed up to 11 days (Chandra *et al.*, 2021; Adeleye and Akhere, 2026). This highly increases the risk of dire consequences of the disease. These delays are affected by socio-cultural perspectives, stigma, reliance on alternative care, financial constraints, geographic barriers, and institutional inefficiencies such as the inadequate referral system and poor access to healthcare

(Achem *et al.*, 2025; Tiv & Friant, 2021; Koch *et al.*, 2021). More importantly, delayed presentation is always associated with an increased number of complications, increased length of stay, severity of illness and increased mortality, which highlights the critical importance of timely access to health care in disease progression (WHO, 2024; Kamara *et al.*, 2024).

However, still available data remains scattered, often limited to specific environments or aspects of the treatment history and lacks adequate synthesis that links delay-related factors to the serious consequences of the treatment process across the whole spectrum of care. The results which find delay between symptoms emergence and therapy and how these delay cumulatively impact severity of diseases in different West African settings had not been fully incorporated. This gap shows the need to conduct a systematic study to gather together the available data, identify key factors useful in delayed healthcare seeking, and explore the relationship between these factors with the outcome of the diseases. Thus, the aim of the study is to systematically study the variables that lead to late consultation/medical attention during the course of care and their relation to the severity of Lassa fever in West Africa. The review is particularly interested in the points of delays along the healthcare-seeking continuum, how to identify and summarise what causes delays, and how delays in seeking healthcare relate to the severity of diseases in the region.

## 2. Methodology

### 2.1 Research Design

This study applied the systematic review methodology based on the Preferred Reporting Items of Systematic Reviews and Meta-Analyses (PRISMA) framework which provided the framework with a clear, repeatable and methodologically effective synthesis of the evidence of the factors that predisposed healthcare-seeking delays along the care pathway and their relationship with the severity of Lassa fever in West Africa.

### 2.2 Search Methodology and Identification of the study.

To conduct a comprehensive literature research the primary search engine was selected Google Scholar that facilitated easier access to a few academic databases such as Springer Nature, ScienceDirect, PLOS, Oxford Academic, Taylor and Francis Online, SAGE publishing and ProQuest. Further studies were found by citing and screen-reading relevant papers in reference lists. The search strategy was based on the concepts of Lassa fever, delayed healthcare-seeking, care pathway, treatment delay, health-seeking behaviour, West Africa and severity of the disease. The search was then limited and became more relevant with the help of the use of the operators used in working with the search-AND/OR.

There are 56 studies that were initially located during the scoping phase of the review.

### 2.3 Studies and Screening of Studies.

A systematic screening of all 56 studies was carried out in line with PRISMA recommendations. In the first phase, titles and abstracts were considered to identify how they relate to the objectives of the review. Studies not specifically related

to Lassa fever, or treatment of healthcare seeking behaviour or latency in the care pathway were excluded.

Full-text screening was conducted during the second stage to determine the eligibility over a fixed inclusion criterion. The studies meeting these requirements had to: (i) focus on Lassa fever or viral hemorrhagic fevers closely related to Lassa fever that are relevant in seeking care due to Lassa fever; (ii) be studies that examine factors that lead to delays in healthcare-seeking or care-pathway delays; (iii) use the research findings to report on disease severity, morbidity, or mortality.

Through full-text evaluation, 44 articles were dropped, as they were in no way directly related to the objectives of the review. Inadequate methodological relevance or conceptual fit to the purpose of review, poor connection between main aims of the review and the outcomes of Lassa fever, and lack of focus on healthcare-seeking delay were the main reasons of exclusion.

### 2.4 Final Inclusion and Eligibility.

All studies *met all* inclusion criteria and were retained until the final synthesis. Some of the methodological studies involved retrospective cohort studies, cross-sectional surveys, qualitative interviews, mixed-methods studies, mathematical modelling, prospective cohort studies as well as narrative reviews.

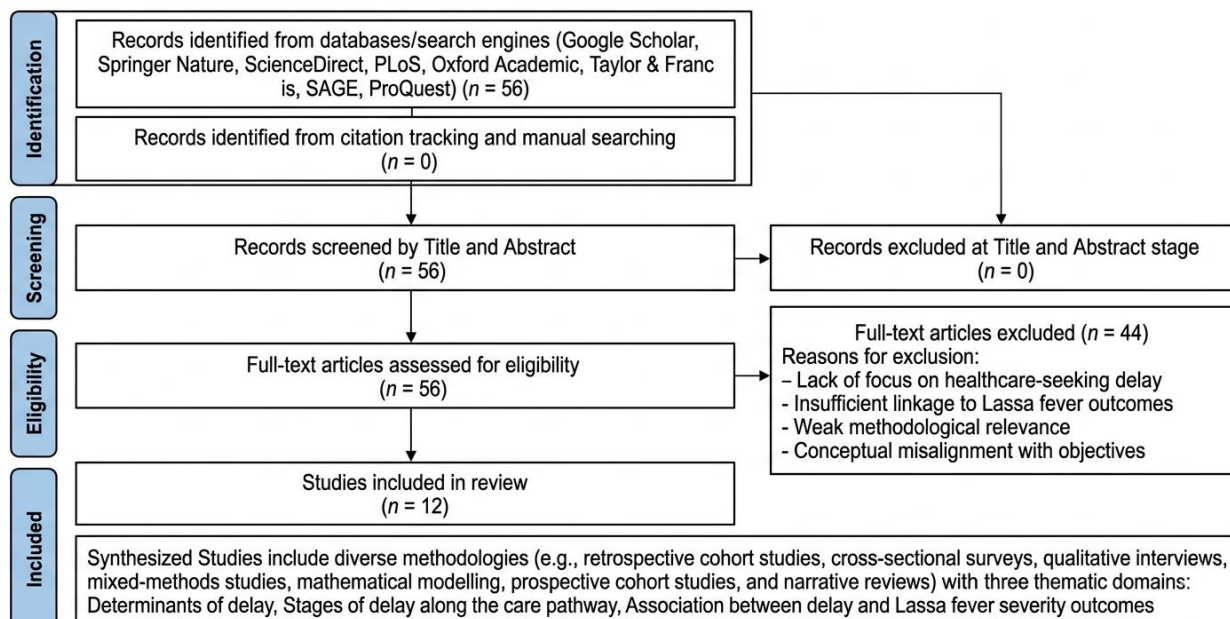
The three major theme areas of the review namely, determinants of delayed healthcare-seeking, stages of delay on the care route and the correlation of delay to Lassa fever severity outcome were supported by the research included.

As an example, Chandra *et al.* (2021) and Adeleye and Akhere (2026) provided quantitative data in relation to delayed presentation and disease severity and mortality outcomes. Kamara *et al.* (2024) and Achem *et al.* (2025) highlighted systemic and behavioural issues, including lack of adequate referral systems, insufficient communication, and culturally misconceptions. Similarly, Afolabi *et al.* (2025) and Tiv and Friant (2021) discovered that structural factors like poor health literacy, stigma, cost, and distance were major reasons of delayed care seeking. As Penfold *et al.* (2023) and Karunarathna *et al.* (2025) emphasized the clinical importance of timely beginning treatment to reduce complications and increase survival, Koch *et al.* (2021) emphasized the impact of the lowered level of trust in health systems after epidemics.

### 2.5 Synthesis of Data

The approach involved a narrative synthesis due to the different study designs, demographics and outcome measures. Those objectives of the study determined the thematic rankings of the findings in three sets: (1) contributing factors to delayed healthcare-seeking, (2) steps on the pathway of care and (3) the interconnection of delay and disease severity consequences.

The PRISMA-guided process ensured systematic identification, clear removal of irrelevant literature and rigorous inclusion of evidence that is directly connected with the research objectives. Finally, the synthesis of 12 studies provides a deep evidence base to understand the influence of the delay along the care pathway on the severity of Lassa fever in West Africa (Fig. 1).

**PRISMA 2020 Flow Diagram for Systematic Review of Lassa Fever Delayed Healthcare-Seeking****Figure 1:** PRISMA Flow Diagram.**3. Results**

As these thorough reviews indicate and Table 1 displays, there exists a complex interplay between sociodemographic,

sociocultural, economic, psychosocial, and health system-related aspects which drive West Africans with Lassa fever to take longer before seeking medical help.

**Table 1:** Determinants of Delayed Healthcare-Seeking among Lassa Fever Patients in West Africa (Systematic Review Findings)

Author (Year)	Identified Determinants of Delay	Type of Determinant	Study Context
Chandra <i>et al.</i> (2021)	Age variation, occupational exposure patterns	Socio-demographic / behavioural	Nigeria (retrospective cohort)
Kamara <i>et al.</i> (2024)	Weak referral systems, poor inter-facility communication	Health system factors	West Africa (HCW interviews)
Achem <i>et al.</i> (2025)	Misconceptions about illness, reliance on faith-based care, overcrowded facilities	Socio-cultural / health system	West Africa (qualitative study)
Afolabi <i>et al.</i> (2025)	Stigma, low education, poor communication access	Socio-demographic / informational	West Africa (cross-sectional survey)
Tiv & Friant (2021)	Cost of care, distance to facilities, low literacy, stigma	Structural / socio-economic	Endemic communities
Koch <i>et al.</i> (2021)	Reduced trust in health system, financial barriers	Health system / economic	West Africa (mixed-methods)
Uchekukwu (2023)	Weak early intervention systems (indirect)	Epidemiological/system-level	Theoretical modeling
Olorunfemi <i>et al.</i> (2025)	Social stigma, poor reintegration support	Psychosocial	Survivors in West Africa
Penfold <i>et al.</i> (2023)	Delayed access to treatment services (system-level inference)	Health system / service delivery	Multi-country West Africa
Adeleye & Akhere (2026)	Late presentation (>11 days delay) linked to severity outcomes	Behavioural / clinical pathway	Hospital-based Nigeria study
Papka <i>et al.</i> (2025)	Misconceptions, stigma, poor knowledge of disease	Knowledge / behavioural	Multi-study review
Karunarathna <i>et al.</i> (2025)	Delayed diagnosis and treatment initiation	Clinical / system delay	Viral hemorrhagic fever review

The factors Behavioural and sociodemographic were made very clear. In certain cases, such as those discussed by Chandra *et al.* (2021) age and patterns of occupational exposures can profoundly differ in determining the timing with which individuals seek medical care; this suggests that some groups of people are more prone to delays. Similarly, Papka *et al.* (2025) and Afolabi *et al.* (2025) stressed poor

knowledge of the disease and persistent misconceptions as vital behavioural impediments, and low educational levels and limited access to communication channels as critical factors, respectively.

The sociocultural factors also influence care-seeking behaviour in a significant way. Achem *et al.* (2025) found out

that postponed reporting into formal health facilities can be explained by the misconceptions about the illness and reliance on faith-based care. Also, as Afolabi *et al.* (2025), Tiv and Friant (2021), and Olorunfemi *et al.* (2025) stated, stigma was always a strong discouraging factor; the latter found that lack of reintegration support in survivors strengthens the fear and creates deterrents to using healthcare services.

Economic barriers and structural barriers were also very significant. Tiv and Friant (2021) suggest that the primary barriers within endemic populations are the high costs of healthcare, long distances to healthcare institutions, and illiteracy. In line with this, Koch *et al.* (2021) also discovered that financial barriers and a lack of trust in the health system further increase delays, meaning that affordability and trust in providing care is also a critical element.

Health system related factors have also been seen to contribute to a significant number of causes of delays. Kamara *et al.* (2024) argue that weak referral mechanisms and poor inter-facility interactions are the barriers to timely access to the right care. Achem *et al.* (2025) submit that Medical institutions service delivery is also slowed due to overcrowding in medical institutions. Uchechukwu (2023) pointed to shortcomings in the early intervention system as being a systemic issue that affected timely response, whereas

Penfold *et al.* (2023) found a significant delay in care by limited access to treatment services.

Lag times related to routes and medical cases were also evident. Karunarathna *et al.* (2025) were able to emphasize delays in diagnosis and treatment onset as key variables in the bigger picture of viral hemorrhagic fevers. Moreover, the clinical implications of delaying medical care were also emphasized by Adeleye and Akhere (2026) since they also provided empirical data that there is a correlation between late presentation (delays exceeding 11 days) and increased severity of the disease.

Altogether, the findings demonstrate that systemic, community, and personal factors are simultaneously intertwined and lead to a delay in seeking medical help to Lassa fever. These delays characterize care-seeking pathway in West Africa, both of which are influenced by sociocultural attitudes and lack of knowledge as well as structural injustices and inefficiencies in health system.

The findings presented by Table 2 indicate that delays in seeking medical attention against Lassa fever occur at multiple correlation points in a continuum of points in the care route in West Africa, between symptom identification down to commencing treatment.

**Table 2:** Stages of Delay along the Healthcare-Seeking (Care Pathway) Continuum for Lassa Fever in West Africa

Author (Year)	Stage(s) of Delay Identified	Description of Delay along Care Pathway	Study Context
Chandra <i>et al.</i> (2021)	Patient delay (symptom recognition → first contact)	Delay in initial presentation to healthcare facility	Nigeria (retrospective cohort)
Kamara <i>et al.</i> (2024)	Referral delay (primary → secondary/tertiary care)	Delay in transferring patients between facilities	West Africa (qualitative study)
Achem <i>et al.</i> (2025)	Patient delay + access delay	Delay due to initial use of alternative care before hospital	West Africa (qualitative study)
Afolabi <i>et al.</i> (2025)	Decision delay (symptom recognition → decision to seek care)	Delay influenced by knowledge, stigma, and communication barriers	West Africa (cross-sectional survey)
Tiv & Friant (2021)	Access delay (decision → reaching facility)	Physical and financial barriers to reaching care	Endemic communities
Koch <i>et al.</i> (2021)	Decision delay + access delay	Delay due to distrust and financial constraints	West Africa (mixed-methods)
Uchechukwu (2023)	System delay (diagnosis → intervention)	Delays in implementing control and treatment measures	Theoretical modeling
Olorunfemi <i>et al.</i> (2025)	Decision delay	Delay in willingness to seek care due to stigma	West Africa (cross-sectional)
Penfold <i>et al.</i> (2023)	Treatment delay (facility contact → treatment initiation)	Delay in receiving appropriate clinical care	Multi-country cohort
Adeleye & Akhere (2026)	Patient delay + treatment delay	Late presentation and delayed clinical management	Nigeria (hospital review)
Papka <i>et al.</i> (2025)	Decision delay + patient delay	Delays driven by poor knowledge and misconceptions	Multi-study review
Karunarathna <i>et al.</i> (2025)	Treatment delay (diagnosis → treatment initiation)	Delay in initiation of antiviral therapy	Clinical review

In the early years several studies had uncovered patient delay which is the period between onset of symptoms and the initial visit to a medical institution. As an illustration, misconceptions and lack of knowledge was the cause of patient and decision delays, whereas Chandra *et al.* have reported initial presentation delays in health institutions in

Nigeria. Early delays were also predicted by the fact that Adeleye and Akhere observed late presentation of patients.

There is a close relationship with decision delay which occur time between symptoms identification and deciding to seek medical attention. This was closely correlated with the socio-

cognitive characteristics. Though Olorunfemi *et al.* especially have focused more on stigma as an important indicator that reduces motivation to seek care, Afolabi *et al.* noted that information gaps, stigma and communication challenges are also major contributors. Moreover, Koch *et al.* discovered that financial restrictions and distrust of the healthcare system were another contributor to a prolonged decision-making process.

The time between decisions to seek care and access delay, or the time it takes to drive to a medical facility, was also widely documented. Achem *et al.* and Koch *et al.* alike noted that alternative care options often postponed the access of patients to formal health care, and that Tiv and Friant described financial and geographical limitations to be key barriers in endemic countries.

Referral, treatment and system delays continue to be experienced at the facility level. The inefficiencies of referral systems were demonstrated when Kamara *et al.* documented patient delays among primary to higher levels of care across the entire West Africa. Penfold *et al.* and Karunarathna *et al.* found delays diagnosed with treatment, particularly in

commencing with adequate clinical and antiviral therapy. Also, Uchechukwu emphasized the problems that are more general in a healthcare system and pointed to a delay in the system which is a delay in the process of diagnosis and implementation of control or treatment measures.

On the whole, the data indicate that delays in the treatment of Lassa fever are not concentrated in only one part of the entire care chain. All these delays arise at an individual level (such as knowledge and stigma), community level (such as cultural practices and use of alternative care), and health systems limitations (such as ineffective referrals and late initiation of treatment), all of which increase the time interval to appropriate care.

A combination of these findings, the observational, qualitative, mixed-methods, and review-based research has presented a steady correlation between increased Lassa severity outcomes across the West African region overall and late healthcare-seeking along the care pathway, summarised in Table 3.

**Table 3:** Association between Delayed Healthcare-Seeking and Lassa Fever Severity Outcomes in West Africa

Author (Year)	Nature of Delay Examined	Severity Outcomes Assessed	Evidence of Association	Strength of Evidence	Study Context
Chandra <i>et al.</i> (2021)	Patient delay (time to presentation)	Clinical progression (implied severity)	Late presentation (>6 days median) suggests increased risk of complications, though no statistically significant predictors identified	Moderate (indirect association)	Nigeria (retrospective cohort)
Kamara <i>et al.</i> (2024)	Referral delay	Mortality outcomes	Delayed referrals contributed to late management and increased mortality among patients	Strong (qualitative consistency)	West Africa (HCW interviews)
Achem <i>et al.</i> (2025)	Patient delay (alternative care use)	Disease progression (clinical worsening)	Delays due to faith-based care resulted in patients arriving at facilities with advanced disease	Moderate (qualitative inference)	West Africa
Afolabi <i>et al.</i> (2025)	Decision delay	Severity risk (implied)	Delayed care-seeking linked to poorer health outcomes due to late intervention	Moderate (cross-sectional inference)	West Africa
Tiv & Friant (2021)	Access delay	Disease complications (implied)	Structural barriers delayed care, increasing likelihood of worsened clinical conditions	Moderate (mixed-methods)	Endemic communities
Koch <i>et al.</i> (2021)	Decision + access delay	Morbidity risk	Reduced hospital attendance associated with delayed diagnosis and increased disease burden	Moderate (mixed-methods)	West Africa
Uchechukwu (2023)	System delay	Transmission persistence and severity burden	Delayed interventions increased disease persistence and severity at population level	Moderate (model-based inference)	Theoretical
Olorunfemi <i>et al.</i> (2025)	Decision delay (stigma-related)	Poor health outcomes (engagement-related)	Stigma-induced delay reduced timely healthcare utilization, worsening outcomes	Moderate (cross-sectional)	Survivors
Penfold <i>et al.</i> (2023)	Treatment delay	Complications, disease burden	Delayed treatment associated with increased complications and poorer clinical outcomes	Strong (prospective cohort)	Multi-country West Africa
Adeye & Akhere (2026)	Patient delay (>11 days)	Mortality (CFR 13.6%), severe disease	Direct association between delayed presentation and increased severity and mortality	Strong (direct quantitative evidence)	Nigeria (hospital-based)
Papka <i>et al.</i> (2025)	Decision + patient delay	Poor outcomes (general)	Consistent evidence that delayed healthcare-seeking leads to worse prognosis	Moderate (review synthesis)	Multi-study review
Karunarathna <i>et al.</i> (2025)	Treatment delay	Survival, treatment effectiveness	Early treatment (within 6 days) improves survival; delayed treatment reduces effectiveness and increases severity	Strong (clinical evidence)	Viral hemorrhagic fever review

Chandra *et al.* (2021) studied patient delay based on time to presentation in Nigeria by using a retrospective cohort design. They discovered that presentation was suggestive of an increased risk of problems following a median of six days. The study findings proposed a role of delayed presentation in clinical worsening although they did not identify statistically significant predictors of severity. Similarly, a cross-sectional study by Afolabi *et al.* (2025) carried out in West Africa revealed that the later the pursuit of medical attention, the poorer the health outcomes, which were largely due to the postponement in the initiation of requisite therapies.

What complements this association is the more direct qualitative and mixed-methods evidence. Kamara *et al.* (2024) found that delayed referrals were closely associated with increased patient mortality and were related to delayed clinical management, based on interviews with healthcare workers across West Africa. Comparatively, Achem *et al.* (2025) discovered that people often ended up in medical facilities at an advanced stage of their diseases, and reliance on faith-based and alternative care systems was also a cause of time wastage among patients. Moreover, Tiv and Friant (2021) observed that the risk of deteriorating clinical symptoms on presentation was compounded by access-related delays due to structural barriers on the endemic population level. In a mixed-methods study Koch *et al.* (2021) also demonstrated a combination of decision and access delay decreased hospital attendance, resulting in a delayed diagnosis, and a more severe burden of disease.

Uchekwue (2023) provided model-based data at the system level that justifies the broader implications of the inefficiency of treatment by demonstrating how the delays in the health system response contribute to the longer propagation and a higher severe load at the population level. Other psychological reasons were also determined. Olorunfemi *et al.* (2025) note that stigma-related option delays a reduction in the uptake of healthcare in time by the survivors, which ultimately resulted in poorer outcomes. Further quantitative data on how treatment delays were significantly associated with increased problems and poor clinical outcomes were supported by a multi-country prospective cohort study by Penfold *et al.* (2023). Similarly, Adeleye and Akhere (2026) discovered that direct, statistically significant, patient delay of 11 days or more was directly linked to more severe illness and mortality, and case fatality rate of late presenters in Nigeria was 13.6%.

Such conclusions were backed by evidence of complementary synthesis by Papka *et al.* (2025) where several studies showed that delay in seeking medical attention is always associated with a poor prognosis in cases of Lassa fever in all settings. Finally, in more in-depth study of viral hemorrhagic fever, Karunarathna and colleagues (2025) determined that delayed treatment reduces treatment efficacy and raises the severity outcomes, and early treatment develops six days after the virus infection positively influences survival outcomes.

According to body of evidence, delays at any of the levels of the care-seeking continuum, such as patient, decision, referral, access, system, or treatment delay are always associated with severity, complications, and mortality in Lassa fever across West Africa. This directionality is

supported by stronger quantitative research based on the qualitative and model-based research.

## 4. Discussion

The synthesis of evidence based on the included research provides a cogent picture on how delayed healthcare-seeking along the care pathway contributes to the outcome of Lassa fever in West Africa. The findings indicate that the delays are multi-pronged, at various levels of the care provision, and all-time associated with the increase in clinical severity on the three objectives.

### 4.1 Determinants affecting the time taken to medically attend to Lassa fever

In the first goal, the review shows that interrelated sociodemographic, sociocultural, economic, psychosocial, and health system variables impact delayed healthcare seeking. Especially vulnerable populations include disadvantaged populations, and age, occupation, education, and access to information impacts the speed of symptom recognition and consequently treatment initiation (Chandra *et al.*, 2021; Afolabi *et al.*, 2025). Besides personal characteristics, other factors that significantly contribute to the care-seeking behaviour are knowledge gaps and false perceptions towards Lassa fever, causing those not to respond properly in the beginning or to only realise that the illness was more severe than previously thought (Papka *et al.*, 2025). Since these delays are usually preceded by faith-based healing products and beliefs in the communities, sociocultural norms aggravate the delays (Achem *et al.*, 2025). However, one of the longest-lasting barriers is stigma, which deters prompt presentation due to the poor reintegration experiences and uncertainty of social isolation experienced by survivors (Afolabi *et al.*, 2025; Tiv & Friant, 2021; Olorunfemi *et al.*, 2025). Financial constraints, including transportation challenges and costs of healthcare, especially in rural settings endemic communities further worsen access to timely healthcare services (Tiv and Friant, 2021; Koch *et al.*, 2021). Kamara *et al.* (2024), Penfold *et al.* (2023) and Uchekwue (2023) point out that the health system suffers from structural inefficiencies that lead to delays (inadequate referral process, facilities overcrowded with people, limited access to early intervention services and programs). Together these findings demonstrate that not pursuing medical help is a system outcome of the interacting vulnerabilities on multiple tiers not merely a behavioural issue on an individual level.

### 4.2 Healthcare-seeking pathways and stages of delay in Lassa fever

As to the second purpose, the information indicates that delays occur at the course of various interdependent phases during the treatment path. The false perception of the seriousness of the disease and insufficient understanding of the symptoms plays a primary role in the first delay of a patient, that is, the period between symptoms onset and the first visit to a healthcare service (Chandra *et al.*; Papka *et al.*, 2025). This is followed by delay in decisions when individuals decline official care due to financial constraints, they do not trust health systems, and other stigmas (Afolabi *et al.*, 2025; Koch *et al.*, 2021). Even after making the decision to receive care, access delays persist due to transportation limitations, geographic distance, and the use of other care providers (Tiv *et al.*, 2021). Delays in the health

system itself in its referral, diagnostic, and treatment, reflect the insufficiency of services delivery and by coordination (Kamara *et al.*, 2024; Karunarathna *et al.*, 2025; Uchechukwu, 2023). This repeats stepwise pattern reflects the cumulative nature of delays, each delay increasing progressively the previous one, so that a successful therapy is waiting longer and longer. The implication of this is that instead of focusing on patient behavior at only one end of the community level, the interventions should be directed to the entire continuum.

#### 4.3 Disease severity and clinical outcomes of Lassa fever in relation to delayed healthcare-seeking

Concerning the third objective, the review indicates that there is a steady relationship between the intensity of Lassa fever and the time lag in seeking medical care. Cross-sectional and longitudinal studies reveal that the delay in presentation is related to increased mortality, prolonged disease, and the risk of complications (Chandra *et al.*, 2021; Adeleye and Akhere, 2026). Qualitative and mixed-methods studies uphold this trend and indicate that patients often present with more advanced stages of diseases in case of less effective clinical management because of postponements in treatment and referral (Kamara *et al.*, 2024; Achem *et al.*, 2025). Structural and decision-related delays have an impact, too, by delaying the diagnosis and reducing the efficacy of antiviral treatments (Koch *et al.*, 2021; Penfold *et al.*, 2023). Modelling studies show that delays both affect individual outcomes and contribute to transmission and increase the total disease burden in endemic populations on the system level (Uchechukwu, 2023). All these findings underscore the role of time-to-care in predicting survival in the cases of Lassa fever, and timeliness of treatment has always been associated with a more favorable prognosis (Karunarathna *et al.*, 2025).

#### 4.4 Implication of the findings

These results have important implications to the policy and practice of West African public health. To start with, delay is a complex concept, so interventions must not only focus on health education but also include structural modifications that intentionally aim to provide solutions to accessibility, affordability, and inherent trust. Focused stigma-reduction programs can increase the number of people who present early, but increasing the community awareness and eliminating myths related to Lassa fever can reduce the number of patients and delays in decision making (Afolabi *et al.*, 2025; Olorunfemi *et al.*, 2025). Second, it is important that decreasing access is achieved through expanding financial and geographic access to healthcare services (particularly in rural endemic regions) (Tiv & Friant, 2021). Third, it is necessary to improve the health system to reduce delays at the facility level, in particular, improving the areas of coordination in referrals and diagnostic abilities and timely initiation of treatment (Kamara *et al.*, 2024; Penfold *et al.*, 2023). Finally, the fixed relationship between the severity and delay indicates the need to have an integrated early warning and early response systems that have the potential to ensure timely diagnosis and initiation of treatment.

The synthesis of evidence contained in the included research elucidates a cogent picture of the impact of delayed healthcare-seeking along the care pathway on the outcomes of Lassa fever in West Africa. The findings demonstrate that delays are complex, they can take place at various phases of

care and are always associated with increasing clinical severity when it comes to the three objectives.

On the first objective, the review illustrates that the sociodemographic, sociocultural, economic, psychosocial, and health system factors responsible in causing delayed healthcare-seeking are interrelated. The less privileged groups are particularly vulnerable to late diagnosis, and age, job, education, availability of information influence the speed at which individuals recognize the symptoms and begin the treatment (Chandra *et al.*, 2021; Afolabi *et al.*, 2025). In addition to personal characteristics, a lack of knowledge and false information about Lassa fever largely affect care-seeking behaviour, risking inappropriate initial response or recognition of the level of severity of the disease (Papka *et al.*, 2025). The sociocultural norms make these delays worse because informal medical procedures and beliefs are frequently followed by formal medical consultation (Achem *et al.*, 2025). One of the biggest barriers that have withstood time is stigmatization that scares away timely presentation due to the poor reintegration experiences of the survivors and the fear of being socially isolated (Afolabi *et al.*, 2025; Tiv and Friant, 2021; Olorunfemi *et al.*, 2025). Financial constraints that include barriers to transportation and the cost of medical care often act as additional barriers to accessing healthcare services in time, especially in rural endemic communities (Tiv & Friant, 2021; Koch *et al.*, 2021). Kamara *et al.* (2024), Penfold *et al.* (2023), and Uchechukwu (2023) also point to poor referral mechanisms or over-crowded facilities as well as ineffective access to early intervention programs, which also lead to delays in the health system. The combination of these outcomes demonstrates that the systemic outcome of interacting vulnerabilities at multiple levels and not a personal behavioural issue were the causes of delay in seeking medical attention.

Regarding the second objective, it is in the data that delays occur within a diverse spectrum of corresponding stages of the treatment route. The fact that most misconceptions related to the severity of the disease and the lack of recognition of their symptoms significantly influence the first delay among the patients, which is the difference between the onset of the symptoms and the first time the patient visits a medical facility (Chandra *et al.*; Papka *et al.*, 2025). Subsequently, there is a delay in decisions, when individuals do not have financial resources to obtain official help due to prejudice toward healthcare systems, lack of trust, and stigma (Afolabi *et al.*, 2025; Koch *et al.*, 2021). Geographic distance, as well as access delays, persist despite making the decision to explore care due to the constraints in transportation, even when alternative care providers are used (Tiv & Friant, 2021; Achem *et al.*, 2025). Delays in referral, diagnosis and treatment within the health system itself are important ways to delay the time to relevant care, which is indicative of service delivery and coordination shortcomings (Kamara *et al.*, 2024; Karunararatna *et al.*, 2025; Uchechukwu, 2023). This is a multi-step process that shows how delays become compounded with one step increasing the wait time of the previous step and creating an observable longer wait time before the start of successful therapy. The implication is that instead of focusing on patient behaviour in the community level only, the interventions should target the entire spectrum.

On the third goal, the correlation between the severity of Lassa fever and the time that it took to seek medical attention is stable. Cross-sectional and cohort studies have shown that late presentation correlates with a higher mortality and morbidity and increases the likelihood of developing complications (Chandra *et al.*, 2021; Adeleye and Akhere, 2026). This trend is confirmed by qualitative and mixed-method studies, where the patients often present themselves with higher stages of diseased conditions when their clinical management offers less effectiveness and the delay in initiating the treatment and referral (Kamara *et al.*, 2024; Achem *et al.*, 2025). Structural and decision-related delays also impact the outcomes by delaying diagnosis and tampering with the effectiveness of antiviral treatments (Koch *et al.*, 2021; Penfold *et al.*, 2023). Modelling studies have found that delays influence individual outcomes and sustained the transmission and increased the overall burden of illness in an endemic population on a system level (Uchechukwu, 2023). All these findings indicate the significance of time-to-care in calculating the chances of survival in Lassa fever, and the sooner the treatment begins, the more likely there is a positive outcome (Karunaratna *et al.*, 2025).

These results have important implications to the policy and practice of West African public health. First, due to the complexity of delay, response intervention should not be limited to health education but must include organization modifications to cover accessibility, affordability, and system trustworthiness. Focused stigma-reduction programs can increase the number of people who present early, but increasing the community awareness and eliminating myths related to Lassa fever can reduce the number of patients and delays in decision making (Afolabi *et al.*, 2025; Olorunfemi *et al.*, 2025). Second, it is important that decreasing access is achieved through expanding financial and geographic access to healthcare services (particularly in rural endemic regions) (Tiv & Friant, 2021). Third, the logistics at the facility level should be minimized by improving the health system, particularly in referral logistics, diagnostic abilities, and prompt initiation of treatment (Kamara *et al.*, 2024; Penfold *et al.*, 2023). Finally, the fixed relationship between the severity and delay indicates the need to have an integrated early warning and early response systems that have the potential to ensure timely diagnosis and initiation of treatment.

## 5. Conclusion

This in-depth review illustrates that there are several coexisting sociodemographic, socio cultural, economic, and psychosocial and health system variables in West Africa delaying healthcare-seeking in Lassa virus incidence. Delays can occur at every stage of the care pathway, rather than occurring immediately, delays are experienced during the care pathway stages of patient, decision, access, referral, and treatment. These delays are often as a result of lack of awareness, stigma, financial constraints, geographical barriers, and poor health systems systems as observed by the data over time. Delay in treatment and presentation was always associated with an increased severity of the illness, complication and deaths in all the studies incorporated. In general, the findings indicate that to positively change the outcomes of Lassa fever in the region, it is necessary to

reduce delays by increasing community-level-based treatment and strengthening health services.

## 6. Recommendations

1. The review has established that the primary causes of delays in seeking medical attention when one has Lassa fever include sociodemographic, sociocultural, economic, psychological (especially stigma) and health system factors. However, the data does not clearly explain the interaction of these factors in varies contexts of West Africa, or their degree of impact. Analytical, multi-country designs in which standardised methods are employed to measure the proportionate contribution of each determinant are recommended in future research. Multilevel models ought to be employed in order to capture the effects at the individual, community, and system levels. There should also be standardised definitions of delay and treatment-based approaches should be integrated to effectively treat the financial barriers, stigma, knowledge deficits and low confidence on the healthcare system.

2. Findings indicate that delays occur at each of the steps on the care pathway, such as patient, decision, access, referral, treatment, and system delays. However, most studies assess these phases as individual entities with minimal time interval measurement along the complete pathway. Future studies should use a longitudinal care pathway study that tracks the patients with the onset of symptoms to the initiation of therapy. The delays at each stage should be measured using time-to-event analysis. More powerful monitoring tools are also needed in order to locate the bottlenecks in real-time and implement focused intervention at the key delay elements, particularly, in the decision-making and referral phases.

3. The evidence consistently shows that delayed healthcare-seeking is associated with increased Lassa fever severity, complications, and mortality. However, most studies are observational, with limited causal inference, inconsistent severity measures, and inadequate adjustment for confounders. It is recommended that future studies adopt prospective cohort designs with standardized severity classifications and robust adjustment for clinical and contextual confounders. Health systems should prioritize early diagnosis and rapid treatment initiation to reduce delay-related mortality and morbidity...

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