

Detection timeliness and case fatality patterns of Lassa fever in Bauchi State, Nigeria: A descriptive epidemiological analysis, November 2024–February 2025

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Introduction

Early detection of Lassa fever is critical for improving treatment outcomes, yet diagnostic and surveillance delays remain a challenge in endemic settings. In 2024, the Nigeria Centre for Disease Control and Prevention (NCDC) reported 1,309 confirmed cases with a case fatality of 16.3%. This study assessed the timeliness of detection and associated case fatality patterns during a Lassa fever outbreak in Bauchi State, Nigeria, from November 2024 to February 2025.

Methods

A descriptive epidemiological approach was used, utilising both retrospective and prospective data analysis. Retrospective data were obtained from line lists of confirmed Lassa fever cases recorded during the outbreak response from November 2024 – February 2025. Prospective data were gathered through active surveillance and field investigations conducted by outbreak response teams. We described the demographic distribution, time interval from symptom onset to laboratory confirmation, and patient outcomes. Detection timeliness was assessed using the first benchmark of the 7-1-7 (case detection within 7 days of symptom onset). Data were analysed using R software

version 4.4.2, and spatial mapping and an epidemic curve were generated.

Results

A total of 161 confirmed cases were identified, with an overall case fatality rate (CFR) of 16.2%. Of these, 44% were detected within 7 days of symptom onset. Median detection delay was 8 days [IQR: 6–10]. The epidemic curve shows an initial rise in confirmed Lassa fever cases beginning in epidemiological week 46 of 2024, with a sustained increase peaking in week 2 of 2025, followed by a gradual decline through week 6 of 2025. Most cases (66%) occurred among individuals aged 20–59 years. The sex distribution was nearly equal, with a male-to-female ratio of 1.1:1. CFRs varied markedly by LGA, ranging from 4.1% to 66.7%, with a simple linear regression showing a statistically significant relationship between median detection delay and Case Fatality Rate (CFR) across Local Government Areas ($\beta = 7.34$, $p = 0.0047$, $R^2 = 0.762$).

Conclusion

Suboptimal detection timeliness contributed to variations in Lassa fever mortality across Bauchi State. Strengthening early diagnostic capacity, routine monitoring of detection benchmarks, and



reinforcing outbreak readiness at all levels of the health system are essential to improve outcomes in future epidemics.