



Lassa Fever Outbreak in Southwestern Nigeria: The Ekiti State Response amidst Economic Recession

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Abstract: A confirmed case in a community requires prompt isolation of affected patients, good infection prevention and control practices, and rigorous contact tracing to stop outbreaks. This study depicts the highlights of the Ekiti state's response to its first confirmed Lassa fever outbreak. The approach used was a coordinated, and integrated rapid implementation of Lassa control measures using multidisciplinary teams. After with appropriate political will, Emergency funds were rapidly mobilized. Seven response teams were constituted to mount an effective and high quality response. The Lassa fever Emergency Operations Centre (EOC) and incident management system was activated to effectively coordinate the response. Clinical, epidemiological, laboratory data, surveillance records and hospital statistics were analyzed during the outbreak. Daily situation reports of the response activities were disseminated to all stakeholders. Throughout the outbreak, the state recorded one confirmed case and nine suspected cases. Their age ranges from 17 years to 53 years with the median age of 25 years. Seventy (70%) of the cases were males. The state recorded 2 deaths during the outbreak but all had negative Laboratory results. The 10 cases were detected from four LGAs across the state. Seventy percent of the cases presented with acute fever ($>38^{\circ}\text{C}$) while 60% presented with bleeding tendencies. Other major symptoms and signs that were common among the cases were sore throat and severe headache, and generalized weakness and muscle pain. The lessons learned support the significance of intersectorial collaboration and political will in response to outbreak at the provincial or state. However, challenges to control efforts included inadequate local laboratory capacity and fear among health workers, panic response among the general populace as well as deficient emergency preparedness.

Keywords: Lassa Fever, Ekiti State, Outbreak Response

1. Introduction

A zoonotic infection first reported in the 1950s from Lassa village in Borno State, northern Nigeria, Lassa fever (LF) [1] has now spread to several West Africa countries causing waves of endemics. [2] A rodent of the genus

Mastomys, commonly known as the "multimammate rat" being the reservoir of infection is capable of shedding the virus in their urine and faeces when infected. Because the clinical course of the disease is so variable, [3] detection of

the disease in affected patients has been difficult. With a case-fatality rate is 1% and observed case-fatality rate among patients with severe illness being 15% the presence of a confirmed case in a community requires prompt isolation of affected patients, good infection prevention and control practices, and rigorous contact tracing to stop outbreaks. Notwithstanding, sporadic outbreaks of Lassa fever have continually challenged the acclaimed achievement of our disease surveillance and response structure of the Nigerian health system. [4] The WHO reported that Nigeria recorded 273 cases of Lassa fever between August 2015 and 17 May 2016 and 149 deaths. Of these, 165 cases and 89 deaths were confirmed through laboratory testing. Furthermore, ten health care workers (HCW) have been infected with Lassa fever virus since August 2015, of which two had died. The frequency and complexity of the outbreak in Nigeria underscores the need for prompt and effective implementation of evidence-based control and containment measures in the community. Early involvement and full cooperation of affected communities is critical for successful control and prevention of epidemics. [5]

Nigeria has witnessed several outbreaks over the last three decades however; the actual Public Health response to previous outbreaks has not been well documented. [6-9] The outbreak response to Ebola Virus Disease (EVD) in 2014 in Nigeria also unveiled the importance of having an outbreak response structure which can be modeled by the relevant health establishments. [10, 11] Hence, this study seeks to build upon the existing body of knowledge on outbreak response to Lassa fever in Nigeria. Some studies have also documented the response to EVD which essentially depicts a vertical or perhaps a top to bottom approach. [6, 12] This paper describes the key activities of the Lassa fever outbreak response, reflecting a horizontal approach to the outbreak management and response which involved a collaborative and community response amidst the prevailing economic recession. The study also highlights key strengths and weaknesses observed which could provide helpful information for reinforcing epidemic preparedness and response competence at the state or provincial level in developing countries.

2. Methods

2.1. Study Location

Ekiti State is one of the six states in the South-western Nigeria created in 1996 with Ado Ekiti as its capital. The state has 16 Local Government Areas (LGAs), comprising four urban LGAs, four rural LGAs and eight semi urban LGAs. The population as at 2016 was estimated at 3,027,949 (NPC 2006 Census). [13] The people engage mostly in farming and agro-allied occupation. Ekiti State has Primary, Secondary and Tertiary Health Facilities strategically located across the State. There are two treatment and isolation centers for management of viral

hemorrhagic fever in the state, one at the Federal Teaching Hospital, Ido-Ekiti and the other at the Oba Adejuyigbe General Hospital, Ado Ekiti.

2.2. Sample Collection and Laboratory Diagnosis

Due to the importance of getting early laboratory confirmation of all suspected cases, through the strong communication between the health facilities, LGA DSNOs and state epidemiology unit, samples was collected from all suspected cases within 3 – 24 hours of admission. Two 5mls blood samples collected into EDTA bottles from suspected case. Emergency transportation of the blood samples collected was done so that the samples get to Virology Laboratory, Irrua between 6 – 12 hours of collection and results were gotten within 24 - 48 hours of submission of the samples.

2.3. Case Management, Outbreak Response, Statistical Methods

Case Management was instituted based on the standard treatment protocol. Concomitantly contact tracing and active case finding was carried out by trained volunteers and community informants. A state wide Community Mobilization and Public Enlightenment campaign was embarked upon to raise awareness of Lassa fever. Capacity building and training of health workers was carried out for improved outbreak response and adherence to best practice during the epidemic. Statistical analysis of quantitative data was done at the univariate level using SPSS Version 20 while qualitative data was analyzed using detailed content analysis.

3. Results

Ekiti state in south western Nigeria recorded in the first confirmed case of Lassa fever in January 2016, an 18 year old student nurse, who was admitted with history of fever, headache and sore throat. Throughout the outbreak, the state recorded 10 cases - one confirmed case and nine suspected cases. (Figure 1). Using a checklist to assess the level of involvement of different stakeholders during the recent Lassa Fever Outbreak in the state, it revealed varying level of involvement (Figure 2). Throughout the outbreak, the state recorded ten cases, one confirmed case and nine suspected cases. Their age ranges from 17 years to 53 years with the median age of 25 years. Seventy (70%) of the cases were males. The state recorded two deaths during the outbreak but all had negative Laboratory results. The 10 cases were detected from four LGAs across the state – Ado LGA (4), Ido-Osi LGA (3), Emure LGA (2), and Ikere LGA (1).

Seventy percent of the cases presented with acute fever ($>38^{\circ}\text{C}$) while 60% presented with bleeding tendencies. Other major symptoms and signs that were common among the cases were sore throat (40%) and severe headache (30%). Twenty percent (20%) had generalized weakness and muscle pain/myalgia. Furthermore, none of the cases developed complications like reduced urine output, terminal shock, difficulty with breathing and difficulty with swallowing.

The community was sensitized towards identification and prompt reporting of sudden deaths within 24 hours to avert

secret burials of suspected cases and allow for safe burial practices supervised by the ministry of environment.

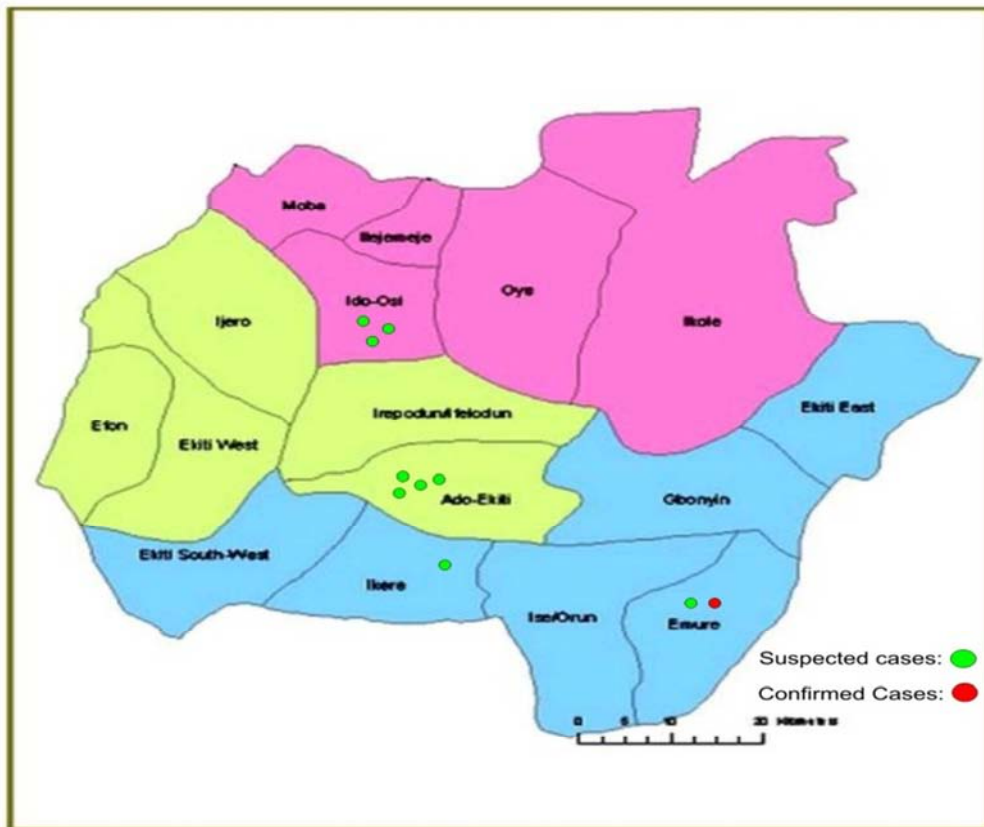


Figure 1. Ekiti State map Showing Distribution of Lassa Fever Cases (Suspected and Lab-confirmed).

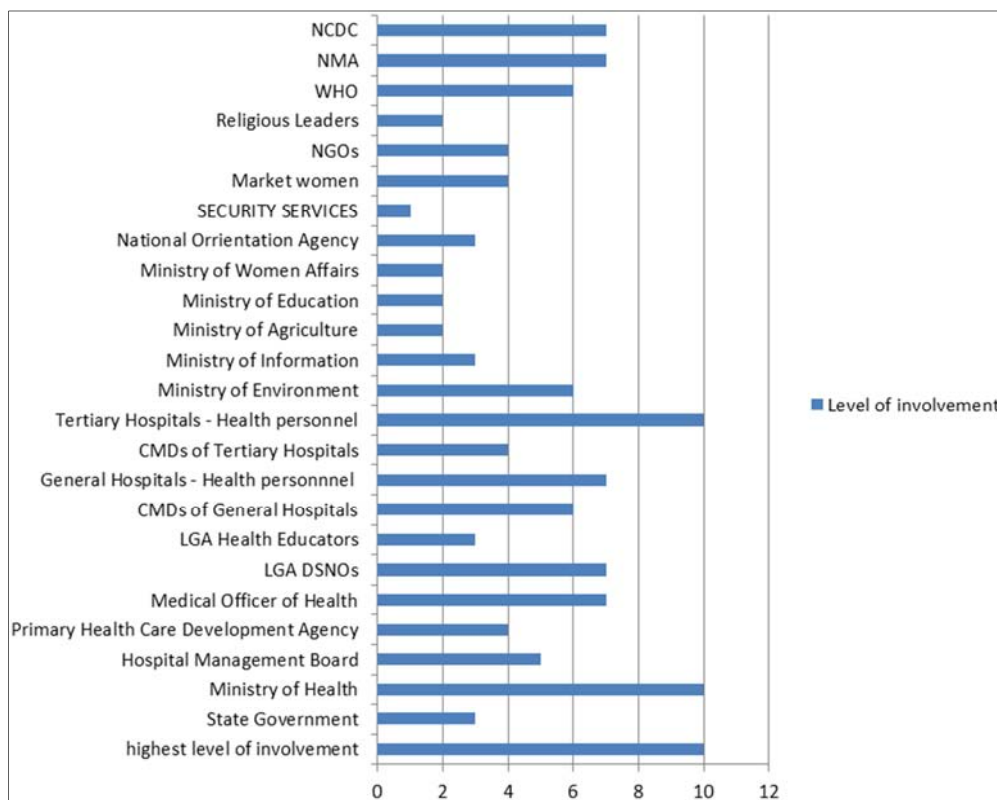


Figure 2. Assessment of the level of involvement of different stakeholders during the recent Lassa Fever Outbreak in Ekiti State.

Advocacy for enhanced political will led to provision of personal protective equipments; though inadequate by enough to boost the confidence of the attending physician. Strict adherence to standard safety precautions was emphasized. One hundred and forty (140) health workers were trained and retrained on donning and the doffing of personal protective equipments at the Federal teaching hospital Ido and Oba Adejuyigbe Isolation centre.

Consequently the increased sensitization and alertness among all cadres of health workers and the citizens of the state set the stage for prompt identification and reporting of suspected cases.

4. Discussion

The response to the Lassa fever outbreak in Ekiti State provides us with essential insights into rudiments of outbreak preparedness and response that states or provinces need to take into perspective considering peculiarities of existing health system in developing country particularly in Nigeria. The Ekiti experience unveiled the reality that a proven case of Lassa fever constitutes a public health emergency. Despite the Lassa fever outbreak in Nigeria showing a declining trend and considering the seasonal peaks in previous years there is the need for improvements in community and health care worker response and preparedness. [14] Major achievements were recorded relative to previous outbreak especially the Ebola outbreak response of July 2014.

4.1. Intersectorial Collaborative Response Approach

Key to successful outbreak containment and control was the adoption of an intersectorial collaborative response approach. [15] An emergency stakeholder forum on Lassa fever outbreak was held. This involved the State Ministry of Health collaborating with all relevant stakeholders such as the Hospital Management Board (HMB), State Primary Health Care development agency and the Federal Teaching Hospital (FTH). Other ministries departments and agencies (MDAs) who partnered with the State Ministry of Health include the Ministry of Environment, Ministry of Information, National Orientation Agency), National Centre for Disease Control, World Health Organization, Nigerian Medical Association, Civil Societies and state government. This provided a platform for planning strategies and hence a unified state response. The collaboration led to an unreserved show of ownership and enhanced participation in preparedness and response. The ownership drive eased out the resources need as outbreak occurred amidst grave economic recession.

4.2. Emergency Operation Center

Another pivot to the achievements and Stemming from the intersectorial stakeholder forum was the establishment of the Emergency Operation Center (EOC). [16] The EOC being “the control tower” of the response, functioned to

synchronize the statewide response activities. The EOC served as the bridge between the field response and advocacy for political will with the Commissioner for Health being the Incident Manager for the outbreak chairs the EOC. Six sub-committees were setup namely the Case Management committee; Contact Tracing; Social Mobilization; Infection Control; Laboratory-Evacuation-Burial-Decontamination-Environmental unit; and Logistics sub-committees. Each of the sub-committee had representatives from relevant stakeholders especially all aspects of the health sector and treatment centers across the state. These members coordinated the operations of their members at their health facility. The EOC met daily where each sub-committee would provide daily report of their activities and plans for subsequent days.

4.3. Community Mobilization and Public Enlightenment

In facilitating a state wide awareness and sensitization campaign, the State Ministry of Health commenced the production of IEC materials (handbills, posters, and case definition cards) and jingles. The public enlightenment coordinated by the Ministry of Information and all media houses but led by a notable figure in this case state Governor signifying political will, engagement and participation. The state wide sensitization, awareness and health education campaigns across the 16 LGAs.

4.4. Capacity Building for Best Practice During Outbreak

Best practice and capacity building remains critical to the development of an effective case management strategy and control measure plan. [17] To ensure this, training and retraining is paramount. Two different trainings were conducted for the case management team at the two isolation centers in the state. The training was organized by SMOH in conjunction with Federal Teaching Hospital, Hospital Management Board, NCDC and WHO. The training contents comprises of Lassa fever and contact tracing; Infection Prevention and control practices; donning and doffing of PPEs; and practical demonstrations.

4.5. Use of LGA Community Informants

An innovation during the outbreak was the use of community informants who reside in the community closest to the populace. Community informants have previously been utilized in the several control programs relating to communicable and non communicable diseases. [18, 19] They are trained and act as scouts for suspected cases, as well as report any instance of sudden unexplainable death. Active case finding was carried out throughout the state and LGA. Other workers involved in active case finding include focal persons, DSNOs and MOHs. They report daily, at the EOC meeting and findings are compiled for further transmission to the Federal Ministry of Health and development partners.

4.6. Case Management

After the confirmation of the index case (an 18 year old student Nurse) she was admitted and managed at the Isolation centre, Federal Teaching Hospital, Ido-Ekiti.

Intravenous Ribavirin treatment for 10 days used according to the standard treatment protocol. [20] On day 10 of treatment, another blood sample was collected to confirm that she was free of the virus. Psychological support was

given to the patient and immediate family members in order to minimize a panic response upon recovery and integration back to the community. Suspected cases were monitored at designated temporary isolation areas at respective health facilities until the laboratory results received. If sample tests positive, such a case will be transferred by a designated ambulance to the Isolation and treatment center closest to the health facility.

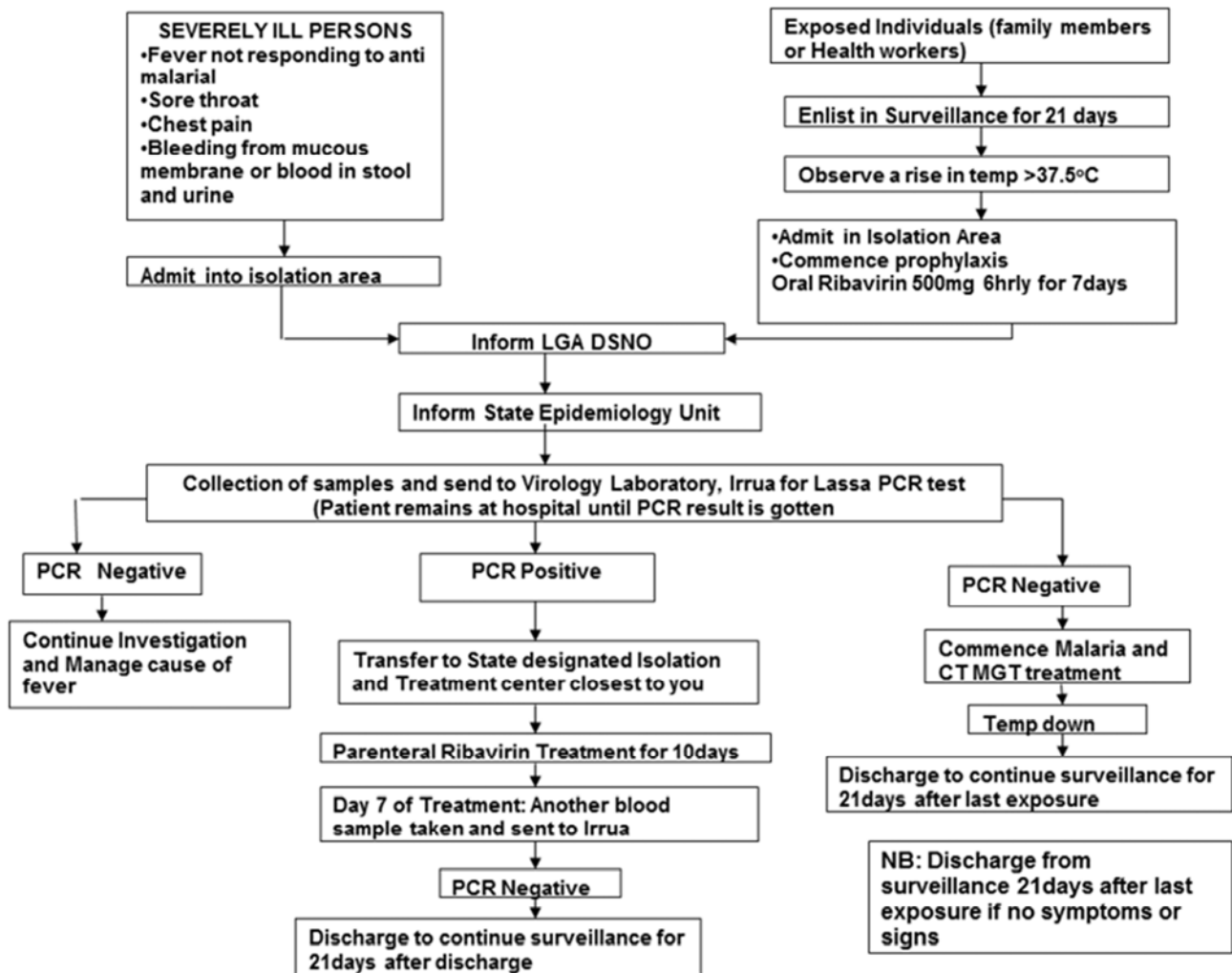


Figure 3. Treatment protocol suspected, and confirmed Lassa fever cases seen during the outbreak.

4.7. Contact Tracing

Contact tracing and follow-up was conducted according to a national standard operating procedure (SOP) adapted from WHO. A contact was defined as any person without any disease signs and symptoms but had physical contact with a case (alive or dead) or the body fluids of a case within the last three weeks. Physical contact includes sharing the same room/bed, caring for a patient, touching body fluids, or closely participating in a burial. Fifty three contacts were identified which included health personnel, hostel roommates and friends in school. Members of the contact tracing team as well as volunteers were mobilized to actively search for contacts and closely monitor them for development of

symptoms for twenty-one days. This involves face-to-face monitoring of the contacts, twice daily temperature checks as well as checking for development of key symptoms.

4.8. Challenges

First and foremost is the lack of capacity for laboratory confirmation posed a major setback. The delays in test confirmation of suspected case usually give room for rumors to thrive and hence and imminent community panic response. At present, only two national laboratories are supporting the laboratory confirmation of Lassa fever cases by Reverse transcriptase polymerase chain reaction (RT-PCR) tests; the Lassa fever research and control centre, Irrua specialist

hospital and Virology laboratory, Lagos University Teaching Hospital. All samples were tested at Irrua specialist hospital a distance of about 200Km taking a time of about four hours by road. The need for establishment of more adequately equipped reference laboratories cannot be overemphasized.

Secondly, the challenges of insufficient logistic support for case management, contact tracing and transportation of samples to the Lassa fever research and control centre, Irrua fatigue most team workers in their initial response drive. Other challenges encountered were the inability of the Local government to sustain epidemic preparedness and mobilization program at the community level. Lack of a centrally coordinated capacity building initiative for health workers was absent in most health facilities.

Thirdly, Daily reporting clinical state of all contacts posed a challenge as actual site assessment of contact, acclaimed to have been done could not be verified. The practice was also noted during the Nigeria Ebola outbreak where GPS enabled phones were used to track volunteers and community informants. [11] Other gainsays were the hierarchical conflict and response difference between the Teaching Hospitals as well as departments in the state Ministry of health. These led to occasional absenteeism or failed representation at the state EOC meetings as well as failure to comply with some EOC decisions.

5. Conclusion

The Lassa fever outbreak in Ekiti state provided a crucial

opportunity to reveal challenges and improve preparedness for managing subsequent outbreaks. Nevertheless, close monitoring, active case search, contact tracing, laboratory support and disease awareness (both in community in general and specific training for health care workers) should continue.

Acknowledgments

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Abbreviations

DSNO: Disease Surveillance and Notification Officer; EDTA: Ethylenediaminetetraacetic acid; EOC: Emergency Operation center; FTH: Federal Teaching Hospital; GPS: Geographical Positioning System; HCW: Health Care Worker; HMB: Hospital Management Board; IEC: Information Education Communication; LF: Lassa Fever; LGA: Local Government Area; MDA: Ministries Departments and Agencies; NCDC: Nigeria Centre for Disease Control; PPE: Personal Protective Equipment; RT-PCR: Reverse Transcriptase-Polymerase Chain Reaction; SMOH: State Ministry of Health; SOP: Standard Operating Procedure; SPSS: Statistical Package for the Social Sciences; WHO: World Health Organization.

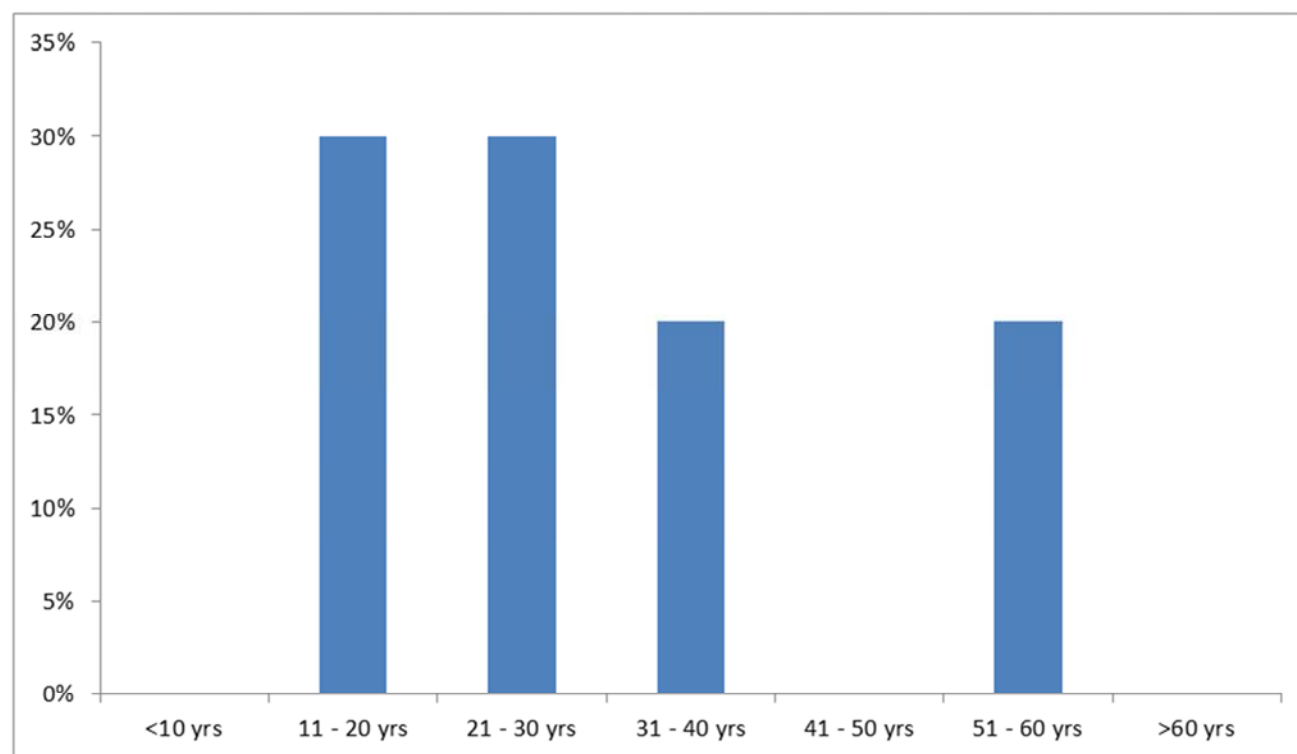


Figure 4. Distribution of Lassa fever suspected cases in Ekiti state by age.

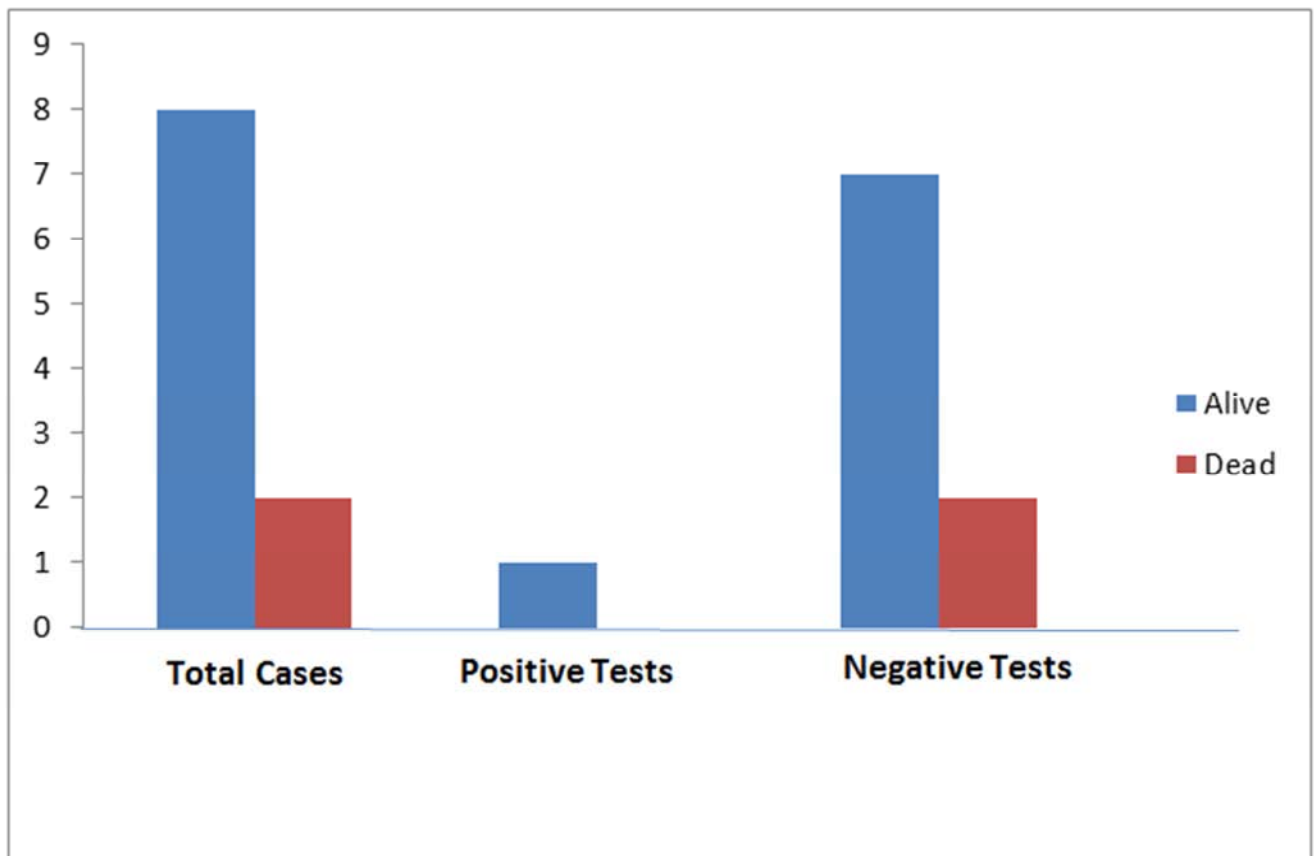


Figure 5. Distribution of Lassa fever cases in Ekiti State by Outcome of Laboratory test.

Table 1. Symptoms and signs of cases reviewed and examined during preliminary investigation.

Symptoms/Signs	Number (n = 10)	%
Acute fever (>38°C)	7	70%
Generalized weakness	2	20%
Joint pains	0	-
Vomiting	1	10%
Severe headache	3	30%
Muscle pain/myalgia	2	20%
Difficulty breathing	0	-
Loss of appetite	0	-
Difficulty swallowing	0	-
Fatigue	1	10%
Diarrhea	1	10%
Haematemesis	0	-
Diarrhea with blood	1	10%
Reduced urine output	0	-
Chest pains and coughs	1	10%
Bleeding tendencies (eyes, mouth, ear, vagina)	6	60%
Terminal shock	0	-
Maculopaular rash	0	-
Sore throat	4	40%
Edema of the face	1	10%

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