

An Epidemiological Investigation of Lassa Fever Outbreak in Ebonyi State South Eastern Nigeria Lessons Learnt (January to March 2018)

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Abstract

Background: We investigated an outbreak of Lassa fever that occurred in Ebonyi state, Southeast Nigeria from January to March, 2018

Methodology: The Emergency operational centre (EOC) model was used for the outbreak coordination. Cases and deaths were identified through the routine surveillance system. Blood specimens collected from suspected cases were sent for confirmation at the Virology Centre, Alex Ekwueme Federal University Teaching Hospital, Abakaliki (AEFUTHA). Active case search was instituted, and identified contacts of confirmed cases were followed up for the maximum incubation period of the disease. Other public health responses included infection prevention and control, communication and advocacy as well as case management. Data collected were analysed using the Epi info statistical software package.

Results: We identified 89 suspected Lassa Fever (LF) cases out of which 61 were confirmed. The mean age was 35±16.2 and the age group mostly affected was 30-39 years. More than half (59.7%) of the confirmed cases were females. The Case Fatality Rate (CFR) was 26.2% among the laboratory confirmed cases. Five of the deaths occurred among health care workers. Out of 325 contacts of the confirmed cases, 304(99.7%) completed the follow-up and only 1(0.3%) of them developed symptoms consistent with LF and was confirmed by the laboratory.

Conclusions: The high CFR in those presenting late to the hospital underscores the need for intensive public enlightenment that encourages early presentation to hospital. Majority of the confirmed cases were primary cases, hence efforts should be intensified in breaking the chain of transmission in the animal–man interphase. Death of healthcare workers involved in management of Lassa fever raises the importance of providing life insurance for concerned healthcare workers.

Keywords: Lassa Fever; Outbreak Response; Emergency operational centre; Nigeria.

Introduction

Lassa fever is a severe acute viral hemorrhagic illness caused by a virus belonging to the family Arenaviridae and endemic in West Africa with several outbreaks recorded over the years. ^[1] Its primary host is the multimammate rat (*Mastomys natalensis*) and is transmitted to humans from contacts with food or household items contaminated with rodents' (*Mastomys natalensis* and *Mastomys erythroleucus*) faeces or urine. ^[2] *Hylomyscus pamfi* might also play a role in disease transmission. ^[3] Person to person spread

may also occur by inhalation or direct contact with body fluids contaminated with Lassa virus.

Since the identification of the virus in Nigeria in 1969, yearly outbreaks have been reported in many states of the country ^[4,5,6,7] In 2018 Nigeria witnessed one of the

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biggest outbreaks in the history of Lassa fever epidemics affecting 19 states (Edo, Ondo, Bauchi, Nasarawa, Ebonyi, Anambra, Benue, Kogi, Imo, Plateau, Lagos, Taraba, Delta, Osun, Rivers, FCT, Gombe, Ekiti and Kaduna).^[8]

The scale of 2017/2018 Lassa fever outbreak in Ebonyi state was unprecedented; this was heralded by a report of a 15-year old male who presented in our hospital with fever and uncontrolled nasopharyngeal bleeding following a recent uvulectomy by a traditional healer. This paper describes the epidemiology of this LF outbreak in the State, outline public health responses conducted and document some key lessons learnt so as to enhance outbreak response in a low resource setting.

Methods

Outbreak setting

Ebonyi State is one of the 36 states in Nigeria and was created in 1996. The State shares a border with Benue State to the North, Enugu State to the west, Imo and Abia States to the south and Cross River State to the East. It has 13 local Government area and an estimated population of 2.5 million.^[9] About 80% are subsistent farmers and reside in the rural areas^[9]. The patients studied were managed at the Virology centre Alex Ekwueme Federal University Teaching Hospital Abakaliki (AEFUTHA). The virology centre is a 27 bed Lassa fever isolation and treatment facility which also has a laboratory. The AEFUTHA is a tertiary health care facility located in Abakaliki the state capital and is a referral centre for health facilities within and outside the state.

Coordination

The investigation of the outbreak as well as implementation of the outbreak response plan was coordinated by the State Ministry of Health officials with technical support provided by the Nigerian Centre for Disease Control (NCDC), Médecins Sans Frontières (MSF) and WHO Ebonyi State field office. The NCDC in conjunction with the Ebonyi State Ministry of Health established an Emergency Operation Centre (EOC) which included an epidemiology and surveillance committee, a case management committee, an infection control and burial committee as well as an advocacy and communication committee. These were the implementation units of the State outbreak response plan for the control of the outbreak with the state epidemiologist designated as the incident manager. Disease Surveillance and Notification Officers

(DSNO) and Volunteer contact tracing personnel recruited were trained by NCDC. Daily coordination meetings were held with situation reports of each unit presented and reviewed, and action points developed to strengthen ongoing response activities.

Contact Tracing and Active Case Search

The DSNOs and Community informants from all the Local Government Areas were trained and engaged in contact tracing and active case search at health facilities and communities in Ebonyi state. The name, age, sex, address, date of onset of illness and clinical symptoms of each suspected case or death identified were collected using the national LF Case investigation form and Integrated Disease Surveillance and Response (IDSR) line-listing forms. The identified contacts were enrolled into 21-day surveillance and follow-up exercise using the national viral haemorrhagic fever contact tracing line list and follow up guidelines as data tools. For each contact under surveillance, daily temperature monitoring and clinical evaluation were carried out for the period of follow up.

Laboratory investigation and confirmation

Laboratory confirmation was performed at the Virology centre Alex Ekwueme Federal University Teaching Hospital Abakaliki, Ebonyi state. The confirmation was based on a positive test using Lassa virus specific reverse-transcriptase PCR (RT-PCR). Blood samples were collected from each suspected case identified during the investigation and transported to the laboratory. Results were provided within 24-48 hours.

Social mobilization and health education

Information, Education and Communication (IEC) materials on LF were distributed to the general public through various channels – print and electronic media, television adverts and radio, posters and banners. The main content of the messages was symptoms of Lassa fever, and routes of transmission. Community and religious leaders were mobilized and empowered to inform and educate their members. Furthermore, the health-care workers across hospitals in the state were trained on case identification using the case definition, universal infectious disease precautionary measures in health care settings and on the importance of intensifying surveillance for additional cases.

Infection prevention & control

Decontamination exercises using chlorine disinfectant kit were carried out daily in hospitals and

vehicles used for transporting confirmed cases. Distribution of infection and prevention control (IPC) supplies such as gloves, aprons, alcohol, soap, chlorine, including complete Personal Protection Equipment (PPE) kits and IPC Standard Operation procedure (SOPs) guidelines to hospitals were carried out.

Case management

Laboratory-confirmed cases were referred to Virology centre for treatment.

Ethical approval

Ethical approval for the study was obtained from Emergency Operation Centre Ebonyi state ministry of Health. Ethical standards and best practice were adhered to throughout the conduct of the study.

Results

Eighty-nine (89) suspected cases of LF were identified from the 13 LGAs {Abakaliki, Afikpo North, Afikpo South, Ebonyi ,Ezza North, Ezza South, Ikwo, Ishielu, Ivo , Izzi ,Ohaozara, Ohaukwu and Onicha) in the State Of these cases, 61 were confirmed cases by the laboratory. The Case Fatality Rate (CFR) among the confirmed cases was 26.2%. Table 1. Sociodemographic characteristics of Lassa fever patients in Ebonyi state, Nigeria, 2018

The mean age was 35 ± 16.2 years with 36.1% within the age group 30-39 years followed by 20-29 years (18.0%) and the least 0-9 years (9.8%). Most were females (59.7%), traders (26.2%) and with tertiary level of education (39.3%), Table 1. Table 2: Distribution of cases across LGAs in Ebonyi State as at March, 2018. *One patient was from outside the state (Agwu LGA in Enugu state). Table 2 shows that majority of the cases were from Abakaliki LGA followed by Afikpo North LGA.

Figure 1: Epicurve(An epi curve is a visual display of the onset of illness among cases associated with an outbreak)of the confirmed cases in Ebonyi State from Epi week 52 to Epi week 13. Fig. 1 shows the epidemic curve of the outbreak, which began in the epidemiological week 53 of 2017 Afterwards, there was an increase in the number of cases from epidemiological week two and peak at week seven. However, fluctuations in the number of cases were noted.

Discussion

A considerable number of suspected cases were

identified, and many were laboratory confirmed indicating a highly sensitive surveillance system. The CFR was high due to late reporting of suspected cases indicating challenges in awareness creation. Furthermore, contacts tracing and follow-up were successful, with only one contact developing the disease.

More than half of the confirmed cases were female. This finding is consistent with outbreak report, in Enugu Nigeria ^[10]. The cultural practices in Nigeria, where mainly women process food and care for the sick increasing their vulnerability to infectious diseases may partly explain the observation The age group mostly affected was 30-39 years; this is the active age group in the community engaged in different activities-business, farming, etc. This finding demonstrates the vulnerability of the young adults and the productive age group to Lassa fever infection The finding is similar to the study by Ajayi et al earlier in the same hospital. ^[7] This is slightly different from what was observed in Irua Edo state Nigeria. ^[11] Majority of the patients were traders, healthcare workers and students. Traders and students may have been affected by eating food from hawkers since these groups spend a great deal of their time outside their homes and tend to patronise food vendors. The healthcare workers were the victims of nosocomial infections that were traceable to patients they cared for.

The CFR (26.2%) among the laboratory-confirmed cases in this outbreak is lower than earlier report of 40% in a previous outbreak in Ebonyi state. ^[7] It is also lower than another reported outbreak in Nigeria. ^[12] The lower CFR reported in our investigation could be attributed to the following; establishment of an Emergency operation centre for effective coordination of response activities and active case search, the Virology Centre for prompt diagnosis and focused treatment of patients, and the strong support by both local and international partners.

The epidemic curve of this outbreak suggests a continuous source pattern of transmission, which is inconsistent with previous outbreak reported in Ebonyi state, Nigeria. ^[7] Apart from the one contact who developed the disease, and 5 health workers who managed the index case there were no known human sources of the disease for the others. Previous investigations have shown similar transmission of the Lassa fever by direct contact with blood and other bodily fluids of people who are acutely ill. ^[7]

The public health strategy using EOC model effectively contained the outbreak within a short period of time. The use of EOC model for prompt and successful containment of diseases outbreaks and other public health condition in Nigeria and African regions has been reported.^[13,14,15]

The outbreak recorded nosocomial transmission of the disease among health-care workers who treated confirmed LF cases. Transmission among health-care workers has been a common occurrence in previous LF outbreaks in Ebonyi state Nigeria with high incidence and fatality recorded among health workers providing care for unsuspected patients with LF^[7]. Health Care Workers interviewed identified a low index of suspicion for Lassa fever leading to inadequate infection prevention and control (IPC) practices as possible contributing factors to nosocomial transmission^[16] In addition although several awareness creation and sensitization trainings on infection prevention and control in hospital settings were conducted for health workers across the state, prior to the outbreak, these workers were not provided with PPEs materials and tools to protect themselves in most cases. Clusters of suspected nosocomial transmissions have been reported, particularly in health care setting,^[17] hence the need to provide adequate infection preventive materials and institute measures within the health care setting to reduce exposure of health-care workers to infectious diseases.

Conclusion

Key lessons learnt from the investigation -the need for intensive public enlightenment that encourages early presentation to the hospital, efforts should be intensified in breaking the chain of transmission in the animal –man interphase life. There is need to ensure that health care workers are trained and retained regularly on infection prevention and control strategies as well as motivated through provision of good Insurance packages for those working in areas prone to outbreaks of infection by very virulent pathogens such as Lassa virus.

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Competing Interests

The authors have declared that no competing interests exist.

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