

## Lassa Feverburden among Suspected Cases Presenting In Health Facilities in Nasarawa State, North Central Nigeria.

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**Abstract:** Background: Since the first case of Lassa Fever was reported 50 years ago, Nigeria has recorded several outbreaks of the disease with high case fatality many of them in health workers. Lassa fever is a viral hemorrhagic fever caused by Lassa Fever Virus which is transmitted through contact with excreta, secretions of body fluids of the rodent, *mastomysnatalensis*. Human to human transmission occurs in health care settings. Early diagnosis and treatment improve survival of Lassa fever patients.

Rationale: Nasarawa state is among the states that has reported many of the outbreaks of Lassa fever. Despite these, the state lacks adequate infrastructure for the management of this viral Hemorrhagic fever.

The Aim of this study is to find out the burden of Lassa Fever among suspected cases that present in health care facilities in Nasarawa state and to find out their treatment outcomes.

Methodology: This was a Retrospective Study that utilized data from the State Ministry of Health. Data was extracted from the Records of all cases that met the case definition of Lassa Fever Suspect from all the Health Facilities in the State between December 2015 and October 2018. The results were analyzed using SPSS version 23, Chi square was used to test associations with 95% confidence level.

Results: Data from 174 suspected cases were analyzed. They were aged between one and 67 years. Twenty-Nine (16.7%) of the suspects were confirmed to have Lassa Fever. Eighteen (62%) of the Confirmed cases (18/29) died while the mortality rate of the suspects was 22.4% (39/174).

Conclusion: The burden of Lassa Fever in this study and the high case fatality rate is a wake-up call to policy makers and all stakeholders to put in place adequate and appropriate infrastructure and human resource for early diagnosis and management of Lassa Fever.

**Key Words:** Lassa fever, burden, treatment outcome, Nasarawa State.

Date of Submission: 01-02-2019

Date of acceptance: 16-02-2019

### I. Introduction

Nigeria has recorded several outbreaks of Lassa fever in the past few years yet not much has been put in place in terms of infrastructure to manage the recurring outbreaks of this viral hemorrhagic fever. Nasarawa state is one of the states which has witnessed the outbreaks of Lassa fever often with high mortality in confirmed cases.

Following its discovery fifty years ago in Nigeria, Lassa fever has been found to be endemic in West Africa and frequently results in epidemics. In areas where Lassa fever is not endemic, sporadic cases have been known to occur including Europe, Asia and America. Over the years, several outbreaks of the disease have continued to occur in Nigeria.<sup>[1,2,3]</sup>

Lassa fever is one of the viral hemorrhagic fevers. It is an acute febrile illness caused by Lassa fever Virus, a single stranded Ribonucleic acid (RNA) virus from the family Arenaviridae. Lassa fever is majorly a zoonotic infection transmitted by rats of the *mastomysnatalensis* species through their excreta, secretions and body fluids. However, human to human transmission can occur especially in health care settings where nosocomial spread is associated with poor infection control practices.<sup>[4,5,6]</sup>

Prevalence of Lassa fever virus antibodies has been reported to vary in different parts of West Africa where the disease is endemic. In Sierra Leone 8-52 % of the population have the antibodies while in Guinea the antibody prevalence is between 4-55% and in Nigeria it is 21%.<sup>[4,7]</sup>

About 80% of those who are infected with Lassa fever virus do not produce serious symptoms, the remaining 20% are the ones that go to manifest symptoms of Lassa fever.<sup>[5, 8]</sup> Early Lassa fever symptoms are non-specific hence early diagnosis is usually difficult. However, early diagnosis and early commencement of treatment is key to survival in patients with Lassa Fever.<sup>[4, 5, 6, 9,10,11]</sup> Mortality associated with Lassa fever is usually attributed to late presentation, diagnosis and commencement of therapy. Reports indicate that Case Fatality is between 12- 23% and can be as high as 50% during outbreaks.<sup>[4, 6]</sup>

Nigeria witnessed several Lassa fever outbreaks in the past few years with the most recent occurring in 2018 involving eighteen of the 36 states.<sup>[2]</sup>

Nasarawa state is among the states in Nigeria that recorded high mortality rates in 2017. Among the mortalities reported was that of a health care worker.<sup>[12]</sup>

### **Rationale for the study:**

Even though Nasarawa state has recorded several Lassa fever outbreaks with high mortality in confirmed cases since the State's creation, the State is yet to put in place adequate infrastructural resources for the diagnosis and management of the disease.

The aim of this study is to find out the burden of Lassa fever among suspected cases reporting at health facilities in Nasarawa state and to determine their treatment outcomes. This will help the state and the country at large in planning and allocation of resource for the management and control of Lassa fever.

## **II. Materials & Methods**

### **Study area:**

The study was carried out in Nasarawa state, North Central Nigeria. It has boundaries with 5 states namely Plateau, Kaduna, Kogi, Benue and Taraba as well as the Federal Capital Territory. The state has 2 tertiary health facilities, 17 General Hospitals and over 700 Primary Health care Clinics all of which are public health facilities. The State also has several privately-owned health facilities. All health facilities in the state report suspected cases of Lassa fever to the State Ministry of Health.

### **Study Population:**

All suspected cases of Lassa fever which were seen in health facilities in the state.

### **Inclusion Criteria:**

All suspected cases of Lassa fever which were reported to the Emergency Response team of the State Ministry of Health between December 2015 and October 2018.

### **Exclusion Criteria:**

Suspected cases which were seen at health facilities and were not documented  
Suspected cases whose specimens were not collected for confirmation.  
Probable cases epidemiologically linked with or to a confirmed case.

### **Outcome measure:**

Prevalence of confirmed Lassa fever cases among the suspected cases seen in health facilities in Nasarawa state.

### **Study Design:**

The study was a Retrospective study that utilized secondary Data of all Suspected Lassa fever cases in Nasarawa state. Source Document was the Lassa Fever records at the State Ministry of Health from December 2015 to October 2018.

### **Sample size:**

All suspected cases in the Record were included in the study totaling 182.

### **Procedure methodology:**

A total of 182 suspected cases were recorded but only data of 174 (95.6%) suspected cases was analyzed. Data of 8 of the suspected cases were incomplete.

Data which were extracted included Age, Sex, Facility where patient was seen, Whether Blood samples were collected for Confirmation of diagnosis, Result of Diagnosis/Confirmation and their treatment outcomes.

All the 174 patients had their blood specimens sent for Lassa fever virus confirmation at Lassa Fever Research Laboratory at Irrua Specialist Hospital, Edo State or the National Reference Laboratory, Gaduwa, Abuja.

**Duration of study:**

This study was carried between November 2018 and January 2019.

**Data Analysis:**

The results were imputed in SPSS version 23 and analyzed. Chi square was used to determine degree of association at 95% confidence level.

**Ethical approval:**

Ethical approval for this study was obtained from the Research Ethics Committee of the DalhatuAraf Specialist Hospital, Lafia, Nigeria.

**III. Results**

Of the total of 174 suspected cases analyzed, 91 representing 52.3% were males while 83 (47.7%) were females. The patients were aged from One to 67 years with a mean age of 27.9. Eighty-Seven percent of the patients were seen in public health facilities while 13% were seen in Privately owned health facilities. A total of 107 (61.5) of the patients were from Urban settlements while 67 (38.5%) were from Rural settlements Twenty-Nine (16.7%) of the suspected cases were confirmed Positive for Lassa fever Virus while 81.6% were Negative. Three (1.7%) of the results were not documented. More men were found to be confirmed with Lassa Fever 16 out of 29 than women 13 out of 29 but there was no significant statistical association with sex.

**Table 1.** Distribution of suspected Lassa Fever cases by the Confirmation Result and Sex.

LASSA FEVER CONFIRMATION RESULT	Male N (%)	Female N (%)	TOTAL N (%)
POSITIVE	16 (55.2)	13 (44.8)	29 (100)
NEGATIVE	73 (51.4)	69 (48.6)	142 (100)
NO RESULT	2 (66.7)	1 (33.3)	3 (100)
TOTAL	91 (52.3)	83 (47.7)	174 (100)

P= 0.823

Similarly, 21 out of 29 (72.4%) of the confirmed cases were seen in public health facilities while only 8 (27.6%) were seen in Private facilities. There was significant association between Lassa fever cases and the facility.

**Table 2.** Distribution of suspected Lassa Fever cases by the Confirmation Result and type of facility.

LASSA FEVER CONFIRMATION RESULT	PUBLIC HEALTH FACILITY N (%)	PRIVATE HEALTH FACILITY N (%)	TOTAL N (%)
POSITIVE	21 (72.4)	8 (27.6)	29 (100)
NEGATIVE	128 (90.1)	14 (9.8)	142 (100)
NO Table RESULT	2 (66.7)	1 (33.3)	3 (100)
TOTAL	151 (86.8)	23 (13.2)	174 (100)

P= 0.020

The total mortality rate among suspected cases in this study was 22.4% (39 out of 174) while the Case Fatality Rate among Confirmed Lassa Fever cases was 62.1% (18 out of 29). There was significant association between the Lassa fever confirmation result and their treatment outcomes.

**Table 3.** Distribution of suspected Lassa Fever cases by Confirmation Result and treatment Outcome

LASSA FEVER CONFIRMATION RESULT	UNKNOWN OUTCOME N (%)	ALIVE N (%)	DEAD N (%)	TOTAL N (%)
POSITIVE	1 (3.4)	10 (34.5)	18 (62.1)	29 (100)
NEGATIVE	0	123 (86.6)	19 (13.4)	142 (100)
NO RESULT	0	1 (33.3)	2 (66.7)	3 (100)
TOTAL	1 (0.6)	134 (77.0)	39 (22.4)	174 (100)

P=0.000

Analysis also shows that 65.5% (19 out of 29) of those who had confirmed Lassa fever were from Urban settlements while 34.5% (10 out of 29) were from Rural settlements. There was no significant statistical association between the type of settlement and the Lassa fever result in this study.

**Table 4.** Distribution of suspected Lassa Fever cases by Confirmation Result and their Settlement.

LASSA FEVER CONFIRMATION RESULT	URBAN SETTLEMENT N (%)	RURAL SETTLEMENT N (%)	TOTAL N (%)
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POSITIVE	19 (65.5)	10 (34.5)	29 (100)
NEGATIVE	88 (62)	54 (38)	142 (100)
NO RESULT	0	3	3 (100)
TOTAL	107 (61.5)	67 (38.5)	174 (100)

P= 0.082

#### IV. Discussion

This study found the prevalence of Lassa Fever to be 16.7% in suspected cases. The cases were in patients of all ages and both males and females are affected. This study found that more Lassa fever cases occurred in males (52%) than females (47%). A similar study also reported a higher rate of infection in males than females. However, most reviews report that Lassa fever has no predilection for age, sex or race. [6, 13, 14].

The Lassa Fever prevalence of 16.7% in this study is higher than the report of 12% of all samples tested in one study but lower than the 42% prevalence among clinical suspects in another study. [13,14].

Majority of the suspects were seen in public health facilities. Similarly, majority (72%) of the confirmed cases were among those seen in public health facilities. Only 28% of the confirmed cases were seen in private health facilities. Although no studies have reported on the ratio of patients with Lassa fever seen in public and private health facilities, the high cost of services in private health facilities may be a factor in fewer patients presenting in those facilities. Another factor that may contribute to higher numbers of Lassa fever suspects and cases seen in public health facilities may be the fact that most suspects are immediately referred to tertiary facilities due to availability of experts.

The mortality rate among suspected cases in this study was 22.4% (39 out of 174) where as the Case Fatality Rate among confirmed cases was 62.1% (18 out of 29). Most reports give the average Case Fatality Rate to be between 15 to 20% in hospitalized patients with up to 50% during outbreaks. [5]. Other reports have found Case Fatality Rates of 27% - 39%. The finding in this study is therefore higher than the average case Fatality rates reported in most studies. However, a study by Chollom et al 2016, reported a higher Case Fatality Rate of up to 70%. The high Case Fatality Rate in this study may be due to poor infrastructure and lack of appropriate training and equipment for managing the disease. [4, 13, 14,15, 16].

This study found that majority of the suspects (61.5%) and confirmed cases (65.5%) were from Urban settlements and 34.5% from Rural settlements. A study by Shehu et al 2018 also found that 73% of confirmed cases were from urban settlements while only 27% were from Rural settlements. [14]. Most reports on the epidemiology Lassa Fever indicates that rural dwellers are most at risk of Lassa fever. A study of Lassa Fever virus antibodies in a population showed higher prevalence of antibodies in rural dwellers than in urban dwellers. Our finding of higher Lassa fever prevalence in patients from Urban settlements may be an indication of the poor living conditions of many Urban dwellers especially with the emergence of Urban slums. [7, 17]

#### V. Conclusion

The high prevalence of Lassa Fever among suspects in this study and the high Case Fatality Rate is a wake-up call to policy makers, health care workers and all stakeholders to make serious commitment to the control of Lassa Fever. Policy makers and administrators should ensure adequate resources and the right infrastructure are available for early diagnosis and treatment which is critical to survival.

#### Limitations of the Study:

Only suspected cases reported to the State Ministry of Health were included in this study. Also, probable cases that are epidemiologically linked to confirmed cases were not included in this study. These findings may therefore not represent the true numbers. Further studies may be needed to further highlight the true state of Lassa fever in Nasarawa State.

#### Acknowledgements

I wish to acknowledge the contribution of Mrs Josephine Marcus who helped with the data analysis.

#### CONFLICTS OF INTEREST:

The authors declared no conflicts of interests.

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Dr. Esther Solomonau. "Lassa Feverburden among Suspected Cases Presenting In Health Facilities in Nasarawa State, North Central Nigeria." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, vol. 18, no. 2, 2019, pp 25-29.