Original Article

Clinical Features And Treatment Outcomes Of Lassa Fever Among Patients In A Tertiary Health Facility In Benue State, Nigeria: A Retrospective Study

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ABSTRACT

There is a silent predator in the heart of West Africa that lurks in the shadows of rural communities, periodically emerging to wreak havoc on human lives and healthcare systems. This formidable foe is Lassa fever, a viral hemorrhagic illness that has become synonymous with fear and urgency in Nigeria's public health landscape. This study aimed at assessing the clinical features and treatment outcomes of Lassa Fever among Patients in a Tertiary Health Facility in Benue State, Nigeria. This was a retrospective, descriptive hospital-based research encompassing January 2022 to March 2024. Medical records of those admitted for treatment at the Benue State University Teaching Hospital were reviewed. The relevant data was coded and analyzed using IBM SPSS version 23. Data obtained showed that 219 persons were hospitalized for suspected or probable Lassa fever throughout the study period while 85 of them were confirmed positive for Lassa fever giving an incidence rate of 38.8%. Findings from the study showed that there were 105(47.9%) males and 114 (52.1%) females. The treatment outcome showed that 78(35.6%) survived and were discharged, 108(49.3%) were referred to other facilities for dialysis and 33 (15.1%) patients died, giving a mortality rate of 15.1%. The common clinical features were abnormal bleeding, myalgia, retrosternal pain, cough, abdominal pain, malaise, nausea, vomiting, fever, headache, and sore throat. Laboratory indices showed that 110 (50.2%) of them had impaired liver function while 109 (49.8%) showed normal liver function. The RT-PCR for Lassa fever virus was positive in 85(38.8%) whereas 85(38.4%) of the patients had haematuria, 61(27.9%) of them had proteinuria and 67(30.6%) had both haematuria and proteinuria on urinalysis.

Keywords: Clinical features, Health facility, Lassa fever, Patients, Retrospective study,Treatment Outcome.

INTRODUCTION

Lassa Fever (LF) is a viral disease that is endemic in several West African countries, including Nigeria, Sierra Leone, Liberia, and Guinea [1]. it is estimated that approximately 2 million human infections and 5,000–10,000 deaths are associated with LF annually [2]. In Nigeria, LF is referred to as a disease of poverty and has emerged as a disease with severe outbreak potential and as a public health threat in the country [3]. It is caused by Lassa fever virus (LASV), a single-stranded, segmented, RNA virus belonging to the Arenaviridae family [4]. The disease occurs in humans of all age groups and both sexes. Humans get infected with LASV mainly via contact with urine or faeces of infected Mastomys rats, other rodents, or blood and other bodily secretions of a person infected with Lassa fever [5-7].

Lassa infection is asymptomatic in about 80% of cases, but causes an acute illness in the rest. The incubation period for Lassa fever typically ranges from 6 to 21 days, after which the disease manifests in stages. In the early stage, patients commonly experience gradual onset of fever, general weakness, and malaise. These symptoms are often accompanied by headache, sore throat, muscle pain, and chest pain. Gastrointestinal symptoms, including nausea, vomiting, diarrhea, and abdominal pain, are also frequently reported. This constellation of symptoms can easily be mistaken for other endemic diseases such as malaria, typhoid fever, or other viral hemorrhagic fevers, contributing to the difficulty in early diagnosis and in the

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late stages sometimes disorientation and coma [8-9]. Deafness occurs in 25% of cases. In fatal cases, it kills rapidly – usually within 14 days. The overall case fatality rate is around 1%, rising to 15% of hospitalized cases [10].

The treatment outcomes of Lassa fever vary significantly based on the severity of the disease and the availability of care. Ribavirin is the only antiviral treatment available, and it is most effective when administered within the first six days of symptom onset [11]. In a study, 75% of patients survived and were discharged, with a mortality rate of 8.6%, primarily due to acute kidney injury and encephalopathy. Early intensive supportive care, including fluid management and symptomatic treatment, can improve survival chances. The case fatality rate for hospitalized patients ranges from 20% to 40%, depending on the severity of the disease [11]. In a study done in 2022, 1,991 cases of suspected Lassa fever had complete records of laboratory diagnosis for the 2 years in review, of which 815 (40.9%) were RT-PCR LF confirmed cases. Of the confirmed Lassa fever cases, 724 persons had complete records of clinical outcome, of whom 100 died, giving a case fatality rate of 13.8% [12]. Our study aimed to address this gap in Benue State, Nigeria by identifying the Clinical features and treatment outcomes of Lassa Fever, for easy case definition and prompt management among cases encountered in the locality.

MATERIALS AND METHODS

Study area and Population

Study Area: The study was conducted in the Infectious Diseases Isolation and Treatment facility of Benue State University Teaching Hospital Makurdi, North Central Nigeria which is the only one in the state. This institution is a state-owned university teaching hospital that provides tertiary health care mostly for residents of the state and sections of bordering states of Nassarawa, Taraba and Cross River.

Study Population: This involved data of Lassa fever patients admitted for treatment at the Benue State University Teaching Hospital from January 2022 to March 2024.

Inclusion criteria

Patients hospitalized for suspected Lassa fever and admitted based on case defining symptoms.

Patients hospitalized for suspected Lassa fever within the period of the study.

Exclusion criteria

Patients' data which was incomplete were excluded.

Data Sources

Data analyzed included the surveillance data, hospital records, and the outbreak response activities. Additional information about the affected LF patients was collected from the individual clinical records. We collected data on the onset of the outbreak and the management of individual patients. For suspected and confirmed LF cases, we collected data on their socio-demographic and clinical characteristics (age, sex, residence, occupation, most likely source of exposure, clinical presentation, and laboratory data), as well as the final outcome of their management. Additional information related to timing of events was also collected.

Study Procedure

The Benue State University Teaching Hospital staff of the records unit identified and retrieved case folders of all patients admitted as suspected or confirmed cases of Lassa fever throughout the research period using the admission register at the Isolation and Treatment center. Relevant information from these case files was retrieved by the researchers and entered into a standardized proforma. These included the demographic data *i.e*., Gender, Age, Local government of residence and occupation, clinical information including all symptoms and signs, laboratory investigation results mainly the RT-PCR for Lassa virus, liver function test, urinalysis for the presence of hematuria or proteinuria, the time taken for confirmation of diagnosis and initiation of Ribavirin, duration of hospital stay, complications, treatment and outcome of treatment. Data such as age were categorized into ranges. The variables were assigned numerical values and coded for statistical analysis using the Excel spreadsheet.

Ethical Considerations

Ethical permission was requested and granted from the Health Research Ethical Committee of the Benue State University Teaching Hospital, Makurdi for the conduct of the study. Strict confidentiality was maintained in the management of patient's medical records that were utilized for data extraction.

RESULTS

Socio-demographic characteristics: The age range most affected as either confirmed or suspected Lassa fever cases was age 31-35 years with percentage of 23.7%, more females (52.1%) than male (41.9%), a greater number of the patients 157 (71.7%) were unemployed and 93(42.5%) respondents had attained the level of secondary education while 8 (3.7%) were healthcare workers as being employed who probably acquired it in the course of their work as indicated in Table 1.

Clinical presentation and Laboratory features. The commonest symptoms of Lassa fever noticed among patients were abnormal bleeding 171(9.8%), myalgia 172 (9.8%) and malaise 151(8.6%) as shown Figure 1. The signs in descending order of frequency included bleeding 173(14.1%), fever 163 (13.3%), and pallor 150 (12.2%) as shown in Figure 2.

Laboratory findings here revealed that 110 (50.2%) of them had impaired liver function while 109(49.8%) showed normal liver function. The RT-PCR for Lassa fever virus was positive in 85(38.8%) whereas 85(38.4%) of the patients had haematuria, 61(27.9%) of them had proteinuria and 67(30.6%) had both haematuria and proteinuria on urinalysis as shown in Table 2.

Findings on treatment outcomes and complications; acute kidney injury occurred the most among the complications with 45 (20.5%) patients were affected. Also, the treatment outcome was not so good as 33 (15.1%) patients were said to have died though it includes confirmed and unconfirmed cases of Lassa fever in Makurdi, 84.9% were either discharged or referred as shown in Table 3.

Table 1: Socio-demographic Information of Patients at the Benue State University teaching hospital Lassa Fever treatment unit as January 2022- March 2024

Variables	Frequency	Percentages
Age (Years)ȝ5.36± 12.21		
5-10	6	2.7
15-20	76	34.7
21-25	12	5.5
26-30	34	15.5
31-35	52	23.7
36-40	4	1.8
Above 40	35	16.0
Gender		
Female	114	52.1
Male	105	47.9
Employment Status		
Employed	62	28.3
Unemployed	157	71.7
Occupation		
Business	39	17.8
Civil Servants	47	21.5
Farmer	83	37.9
Student	20	9.1
Health worker	8	3.7
Clergy	5	2.3
Carpenter	7	3.2
None	10	4.6
Educational Attainment		
No formal Education	11	5.0
Primary	50	22.8
Secondary	93	42.5
Tertiary	65	29.7
Total	219	100

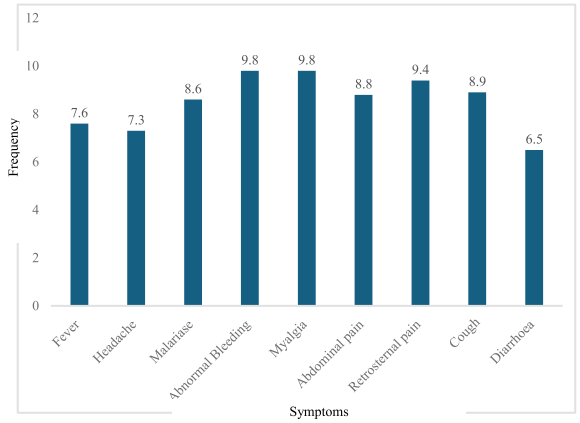

Figure 1: Symptoms of Lassa fever among the respondents

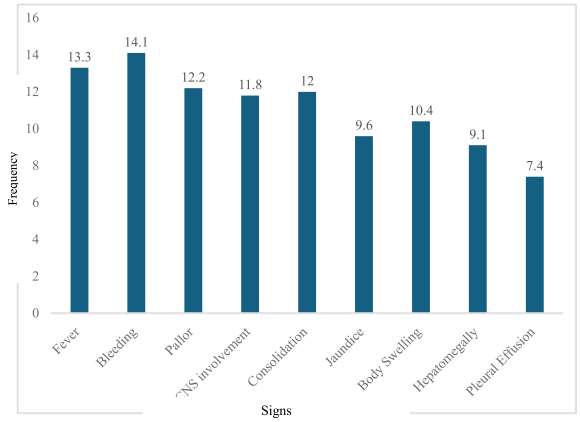

Figure 2: Signs of Lassa fever among the respondents

Table 2: Laboratory Investigation Indices

Variables	Frequency	Percentage
Liver Function Test		
Normal	109	49.8
Deranged	110	50.2
RT-PCR For Lassa Virus		
Positive	85	38.8
Negative	134	61.2
Haematuria		
Yes	85	38.4
No	135	61.6
Proteinuria		
Yes	61	27.9
No	158	72.1
Haematuria and Proteinuria		
Yes	67	30.6
No	152	69.4

Table 3: Treatment outcomes and complications

Variables	Frequency	Percentage
Complications		
Acute kidney injury	45	20.5
Neurological involvement	33	15.1
DIC	3	1.4
None	138	63.0
Treatment outcome		
Cured and discharged home	78	35.6
Died	33	15.1
Referred	108	49.3

DISCUSSION

This study examined the clinical features and treatment outcomes of Lassa Fever among Patients in a Tertiary Health Facility in Benue State, Nigeria. The study's findings revealed that a total of 85 Lassa virus RT-PCR positive patients representing (38.8%) of 219 suspected cases hospitalized during the study period satisfied the inclusion criteria. The study's findings are slightly higher than the report of 2023 at Benue State Teaching Hospital Makurdi, North-central Nigeria, which reported an incidence rate of 31.8% among patients hospitalized for suspected Lassa fever cases [13]. The findings of this study however differ from the report in a rural area of South-south Nigeria which showed 7.7% of patients were positive [14]. This discrepancy may be attributed to public awareness. Variations in public awareness about Lassa fever and preventive measures can affect incidence rates. Regions with effective public health campaigns and education programs tend to have lower incidence rates due to better preventive practices. It might also be attributed to lack of health education. Lack of knowledge about the modes of transmission and preventive measures can lead to higher incidence rates. Educating communities about hygiene, proper food storage, and avoiding contact with rodents is crucial. A possible reason for higher incidence rate might be attributed to high population of the vectors. The presence of a large population of Mastomys natalensis, the primary reservoir of the Lassa virus, significantly increases the risk of transmission to humans. Regions where these rodents thrive, such as areas with abundant food sources and suitable nesting sites, often have higher incidence rates.

The common clinical features were abnormal bleeding, myalgia, retrosternal pain, cough, abdominal pain, malaise, nausea, vomiting, fever, headache, and sore throat. This result is similar to the study that found bleeding diathesis, abdominal pain, fever >38 ◦ C, headache and sore throat with frequencies of over 40% [15]. It is also similar to the findings of the study conducted in 2012 that also found fever, abdominal pain, headache and sore throat to be present in more than 40% of patients [16]. It is almost same as the findings in 2023 found fever and gastrointestinal symptoms among study participants [17].

Other clinical features included pallor suggesting varied degrees of anemia, central nervous system involvement in the form of seizures and altered consciousness as well as lung consolidation. The clinical characteristics are not different from those of other viral hemorrhagic fevers and infections such as malaria or enteric fever.

The urinalysis revealed both hematuria and proteinuria in many patients, suggesting a high prevalence of renal involvement in the condition. In resource-limited settings, the combination of proteinuria and hematuria may serve as an alternative to urea and electrolytes tests, which require more advanced equipment. Early suspicion of Lassa fever should be considered in febrile individuals exhibiting this combination, especially when other potential explanations are absent[18]. The presence of both hematuria and proteinuria in the urine of many patients in this study is similar to the report of a study previously conducted in Benue State [13]. A study in 2018 who found higher incidence of proteinuria and hematuria in patients with Lassa fever [19] . Direct contact with these materials, whether handling filthy things, eating contaminated food, or exposure of open injuries or sores,

can lead to illness.

Acute kidney injury was the major complication that was reported among lassa fever patients. This finding agrees with the report of the previous study in Benue State [13] who found acute kidney injury, neurological involvement and DIC as the major complications that were associated with Lassa fever patients. It is also similar to the findings of another study in 2018 where acute kidney injury was reported as an important complication of acute Lassa fever in Nigeria [19]. In the same manner, in another study in (2022) reported acute kidney injury, neurological involvement effusion edema and bleeding leading to mortality of hospitalized patients as the major complications of patients with Lassa fever [20].

Furthermore, about the treatment outcomes, our study showed that the treatment outcome showed that 78 (35.6%) survived and were discharged, 108 (49.3%) were referred to other facilities for dialysis and 33(15.1%) died, giving a mortality rate of 15.1%.However, there was a higher cure rate in the study done in a tertiary hospital among participants within the age range of 21-25years, but there was no significant association found between age and outcome of treatment [13]. Another study defers from ours which confirmed 815 of 1991 suspected LF cases with complete records during this period. Of these, 724/815 confirmed cases had known clinical outcomes, of whom 100 died [12]. This can be accounted for by the availability of infrastructures, equipment and expertise to manage these cases in various health institutions.

CONCLUSION

Lassa fever has proven to be an epidemic in certain states over the years therefore, elaborate measures are needed to prevent poor clinical outcomes and rising incidence year after year.

RECOMMENDATION

More infrastructure particularly lab, dialysis machine and specialized treatment centers should be put in place by the Government to enhance treatment of Lassa fever and Health care workers should intensify Health education not only within hospital facilities but on all media platforms.

LIMITATIONS

Financial constraint was a limitation however, partnership among the co-authors enabled the work.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest in the study.