

# Knowledge and Perception of Lassa Fever Among Medical Students in Southeastern Nigeria: A Study of Ebonyi State University

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*Abstract- Lassa fever, an acute hemorrhagic viral illness endemic in West Africa, poses a significant public health danger. Understanding medical students' knowledge of this disease is essential for effective future healthcare provision and disease management. The research employed a cross-sectional approach, surveying 250 medical students from various academic years through a structured questionnaire. This comprehensive instrument explored students' knowledge across key domains, including epidemiology, transmission dynamics, clinical manifestations, potential complications, and preventive strategies related to Lassa fever. Findings revealed a progressive enhancement of disease knowledge as students advanced through their medical education. Fifth-year students consistently demonstrated the most sophisticated understanding, achieving correct response rates of 90-100% across most assessment areas. While there was remarkable consistency in identifying the disease's Nigerian origins (72-98.5%) and primary transmission through *Mastomys* rats (76-100%), significant variations emerged in other knowledge domains. Notably, students' comprehension of disease seasonality showed considerable variability (25.3-90%), highlighting potential gaps in educational coverage. A particularly concerning finding was the widespread misconception about vaccine availability, with 44-75% of students incorrectly believing a vaccine existed. Clinical feature and preventive measure understanding demonstrated a clear correlation with academic progression, with higher-level students exhibiting comprehensive knowledge (92-100%) compared to their junior counterparts (40-60%). The study underscores the current medical curriculum's effectiveness in gradually building Lassa fever knowledge while simultaneously revealing critical areas requiring targeted educational intervention. Recommendations include*

*strategically enhancing curriculum focus, introducing foundational concepts earlier, implementing continuous education programs, increasing practical exposure, and diversifying teaching methodologies to comprehensively prepare future healthcare professionals for managing this significant regional health challenge.*

## I. INTRODUCTION

Lassa fever is an acute hemorrhagic viral illness caused by Lassa virus, belonging to the arenaviridae family and classified as a category-A bioterrorism agent. It is an enveloped, circular, pleomorphic, single-stranded, both positive and negative sense RNA virus with a helical capsid. <sup>1</sup> It has a diameter of 50-300nm with two RNA segments. The virus is named after the town Lassa, Borno state in Nigeria where the first cases occurred in 1969 after two missionary nurses became ill with the virus. It is a zoonotic disease transmitted to humans via contact with food or household items contaminated with rodent urine or faeces. The host or animal reservoir of Lassa virus is a rodent of the genus *Mastomys natalensis*, also known as multimammate rat. The *Mastomys natalensis* sheds the virus in their faeces, urine, saliva and other body fluids. <sup>2,3</sup> Transmission of the Lassa virus is primarily via the ingestion of food materials contaminated by infected rodent excreta, inhalation of aerosolized virus and catching and preparing infected rat as a source of food. Human to human transmission also occur via direct contact with blood tissues, excretions or secretions of infected humans, needle stick and inhalation of aerosolized virus. <sup>4</sup> Laboratory transmission is possible particularly in hospitals without adequate infection prevention and control measures. Hospitalized patients with Lassa fever poses a significant risk to health workers and to other patients due to its highly contagious nature. <sup>4</sup> The virus

has an incubation period of usually 7-10 days, with a reported range of 3-21 days.<sup>3</sup>

Lassa fever is endemic among West African countries including Nigeria, Sierra Leone, Guinea and Liberia where the environmental conditions support the natural reservoirs of Lassa fever virus, others include Congo, Senegal, Mali, Cote d'Ivoire and Central African Republic.<sup>1,4,5</sup> It is associated with seasonal clustering between November and May in Nigeria, and has been reported in 32 states and the FCT.<sup>4,6</sup> Several outbreaks has occurred in Nigeria since 2013, the most recent outbreak started December 2015 till date. The high burden states are Ebonyi, Edo, Ondo, Bauchi, Taraba, Nasarawa, and Plateau.<sup>7</sup> An estimated 100,000 – 300,000 infections of Lassa fever occur annually with approximated 5000 deaths<sup>1</sup>. In Nigeria, from 3 to 30<sup>th</sup> January 2022, there was 211 laboratory confirmed cases of Lassa fever and 40 deaths from 14 states and the Federal Capital Territory with three states accounting for the 82% of confirmed cases: Ondo (63), Edo (57) and Bauchi (53).<sup>8</sup> Ebonyi state is one of the three high burdened states with frequent occurrences of Lassa fever outbreaks.<sup>7</sup> It was observed that during the 2018 and 2019 outbreaks in Ebonyi state, Abakaliki Local Government Area had the highest proportion of confirmed cases of Lassa fever in the state.<sup>9</sup>

Researches done in several parts of the country showed that knowledge of Lassa fever disease is deficient and inadequate among large population including students, making it difficult to prevent and control the incident of an outbreak.<sup>10</sup>

Assessment of the knowledge of Lassa fever among students in Benin showed that 91.7% of participants had poor knowledge of the infection. It was also reported that 73.3% of those with good knowledge were involved in good preventive measures.<sup>11</sup> A similar study carried out in Ondo state in south west of Nigeria showed that 62% and 92.6% of the respondents knew that Lassa fever is caused by virus and transmitted by rats respectively.<sup>12</sup> This particular study also showed that many of the students think that the infection had no complications (34.6%), there were also those who believed that it causes epilepsy (16.5%) and impotence (14.1%).<sup>12</sup> But another study carried out in a rural community of the same state showed that

only 17.1% were aware of Lassa fever<sup>13</sup>. Similarly, there is low knowledge level on the role of rat in the transmission of Lassa virus, general preventive measures, and early symptoms of Lassa fever among locals in a study done in Ibadan, Oyo state.<sup>14</sup>

With regards to the poor knowledge of the populace to Lassa fever, the federal and state governments made some efforts to curtail the menace through establishment of disease surveillance, health education through mass media, establishment of diagnostic centers and rapid-response team<sup>15</sup>. To access the impart of the efforts and commitments of the government and non-governmental organizations in curtailing this menace, there's need to access the level of information, awareness and knowledge base of medical students who will soon become the front-line workers, making the diagnosis and managing the patient affected with Lassa fever virus and educating the community on the effectiveness of the infection prevention control measures.

## II. RESULTS

Table 1: Socio-Demographic Data of the Participants.

Total number of Respondents (N=250)

| SOCIO-DEMOGRAPHIC DATA |                         |
|------------------------|-------------------------|
| Respondents            | No. of participants (%) |
| Sex                    |                         |
| Male                   | 160 (64)                |
| Female                 | 90 (36)                 |
| Age Group (years)      |                         |
| <20                    | 60 (24)                 |
| 20-25                  | 105 (42)                |
| 26-30                  | 80 (32)                 |
| >30                    | 05 (02)                 |
| Level of Study         |                         |
| 100                    | 75 (30)                 |
| 200                    | 35 (14)                 |
| 300                    | 55 (22)                 |
| 400                    | 65 (26)                 |
| 500                    | 20 (08)                 |
| Residence:             |                         |
| Hostel                 | 45 (18)                 |
| Staff quarters         | 30 (12)                 |
| Off-campus             | 100 (40)                |

|                                      |           |
|--------------------------------------|-----------|
| No Response                          | 75 (30)   |
| Faculty                              |           |
| Basic Medical Science                | 81 (32.4) |
| Basic Clinical Sciences              | 84 (33.6) |
| Clinical Medicine                    | 85 (34)   |
| Source of information on Lassa fever | 65 (26)   |
| Radio                                | 10 (04)   |
| Television                           | 20 (08)   |
| Social media                         | 155 (62)  |
| Lecture                              |           |

Figure 1: Chart Representation of the students Choice of Residence

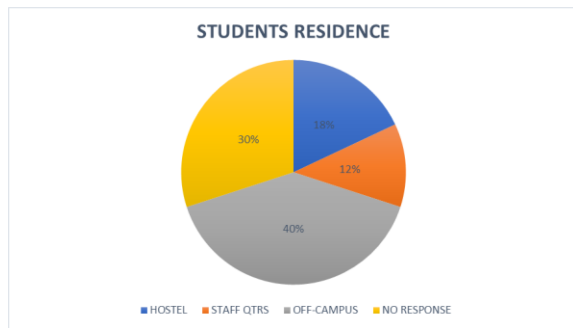


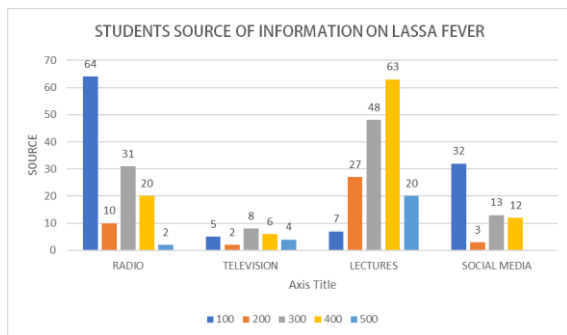
Table 2: Showing the number of Participants with the Correct Responses to each Question on Knowledge of Lassa fever among the Different levels of EBSU Medical Students

| KNOWLEDGE OF LASSA FEVER AMONG EBSU MEDICAL STUDENTS |            |            |            |            |            |
|--|------------|------------|------------|------------|------------|
|  | 100 lev el | 200 lev el | 300 lev el | 400 lev el | 500 lev el |
| <b>EPIDEMIOLOGY</b>                                  |            |            |            |            |            |
| Lassa fever was discovered in Nigeria                | 35         | 23         | 40         | 64         | 19         |
| It is endemic in West Africa                         | 36         | 21         | 47         | 63         | 20         |
| Infection peak between Dec and June                  | 19         | 16         | 34         | 42         | 18         |
| Outbreak occurs every year                           | 4          | 7          | 9          | 4          | 2          |
| Vaccine-preventable                                  | 33         | 21         | 23         | 34         | 15         |

| MODE OF TRANSMISSION                                 |    |    |    |    |    |
|--|----|----|----|----|----|
| Urine and faeces of <i>mastomys</i> rats             | 37 | 23 | 50 | 65 | 20 |
| Inhaling contaminated aerosol                        | 20 | 29 | 41 | 64 | 20 |
| Consumption of multimammate rats                     | 29 | 27 | 42 | 63 | 19 |
| Swallowing the virus in food or contaminated utensil | 34 | 21 | 44 | 62 | 20 |
| Contact of rat excreta with open wound               | 29 | 31 | 49 | 64 | 20 |
| Sexually transmitted                                 | 26 | 34 | 41 | 59 | 20 |
| <b>CLINICAL FEATURES AND COMPLICATIONS</b>           |    |    |    |    |    |
| The majority of infections are mild or asymptomatic  | 28 | 21 | 35 | 64 | 20 |
| Sore throat  | 23 | 24 | 43 | 60 | 19 |
| Body weakness  | 30 | 32 | 41 | 64 | 20 |
| Abdominal pain, vomiting and diarrhea                | 30 | 26 | 47 | 61 | 19 |
| Bleeding from the mucus membrane                     | 24 | 28 | 48 | 64 | 20 |
| Acute febrile illness                                | 21 | 25 | 41 | 62 | 20 |
| <b>COMPLICATIONS of Lassa fever</b>                  |    |    |    |    |    |
| Deafness   | 3  | 29 | 38 | 60 | 20 |
| Spontaneous abortion                                 | 12 | 31 | 18 | 60 | 20 |
| Hepatitis  | 15 | 28 | 47 | 60 | 20 |
| Encephalitis, convulsion and coma                    | 23 | 29 | 38 | 59 | 20 |

|  |    |    |    |    |    |
|--|----|----|----|----|----|
| Hospital-acquired cases are more fatal than others | 29 | 25 | 36 | 55 | 19 |
| PREVENTIVE MEASURES                                |    |    |    |    |    |
| Social distancing                                  | 24 | 23 | 38 | 64 | 20 |
| Alcohol-based sanitizer                            | 23 | 25 | 46 | 60 | 19 |
| Face mask  | 25 | 32 | 39 | 56 | 20 |
| Patient isolation                                  | 30 | 29 | 48 | 61 | 20 |

Figure 2: Chart Representation of the Response for Major Source of Information on Lassa fever among the Medical Students



## DISCUSSION

This study assessed the knowledge of Lassa fever among medical students at Ebonyi State University (EBSU) across different levels of study. The results reveal varying levels of understanding across different aspects of Lassa fever, with some concerning gaps in knowledge.

The residential distribution among medical students showed distinct patterns. The majority (40%) resided in off-campus accommodations, while 18% lived in school hostels and 12% occupied staff quarters. A significant portion (30%) of participants chose not to disclose their residential status, which was recorded as "no response" in the study's charts. An intriguing observation emerged regarding information sources about Lassa fever: students who primarily obtained information through radio and television were predominantly those living outside the school hostel. This correlation suggests that students' residential

arrangements might influence their access to and engagement with health-related information

A study of medical students' understanding of Lassa fever's geographical origins revealed significant variations across academic levels, with advanced students demonstrating substantially higher awareness compared to their junior counterparts. The highest level of knowledge was observed among 500-level students (95% accuracy) and 400-level students (98.5% correct identification), while first-year students showed the lowest comprehension at just 46.7%. This progression highlights the critical role of cumulative medical education in building comprehensive epidemiological knowledge and understanding of regional health challenges. While the majority of the 100-level students chose the radio as the major source of their information on Lassa fever, the higher levels selected the class lecture as their major source. This aligns with the historical context of the disease's discovery in 1969 in Lassa, Nigeria.<sup>16</sup> However, knowledge about the seasonal peak of infections (December to June) was less consistent, particularly among lower-level students. 500-level students demonstrated the highest understanding of Lassa fever's seasonality, with 90% accuracy, followed by 400-level (64.6%), 300-level (61.8%), 200-level (45.7%), and 100-level students (25.3%). These findings align with a study by Ogoina *et al.* (2018) conducted in Nigeria, which revealed significant knowledge gaps regarding the seasonal variations of Lassa fever among healthcare professionals. Knowledge about the primary mode of transmission (via *Mastomys* rats) was generally good, especially among higher-level students. This is encouraging, as understanding the primary vector is crucial for prevention strategies. Across all questions in this category, 500 level consistently had the highest proportion of correct responses (100% for most questions), followed closely by 400 level. Lower levels generally showed lower proportions of correct responses. However, there were notable misconceptions among students about alternative modes of Lassa fever transmission, particularly regarding sexual transmission. Some students incorrectly believed that Lassa fever could be directly transmitted through sexual contact, which is not scientifically supported. A significant proportion of students misunderstood the primary transmission

route, erroneously thinking that human-to-human sexual transmission was possible, despite the disease being primarily spread through rodent contact and bodily fluids.

This finding aligns with the research by Asogun *et al.* (2016), which similarly reported widespread misconceptions about Lassa fever transmission among healthcare workers in Nigeria. These misconceptions highlight the critical need for targeted educational interventions to clarify transmission mechanisms and dispel myths about the disease's spread.

Regarding the clinical manifestations of Lassa fever, again 500-level and 400-level students consistently showed the highest proportions of correct responses across most questions. However, for some complications like deafness and spontaneous abortion, the proportions were lower across all levels. Understanding of clinical features improved with advancing academic levels, which is expected, as students progress through their medical education (McCormick *et al.*, 1987).<sup>19</sup>

On the details about preventive measures, the knowledge was generally good across all levels, with a high percentage of students recognizing the importance of patient isolation as an effective preventive measure. Nevertheless, there were some misunderstandings about the effectiveness of preventive measures like social distancing and face masks usage, which are basically not among the primary prevention strategies for Lassa fever. This suggests a potential conflation with COVID-19 prevention measures, emphasizing the need for clear, disease-specific education in the long run.

Generally, there's a clear trend of increasing knowledge as students progress to the higher levels of their medical education. This is particularly apparent in the consistently high performance of 500 level students across most questions. 400 level students often showed proportions of correct responses very close to 500 level, and sometimes exceeding, those of 500 level students. This suggests that by the fourth year, students have acquired a substantial knowledge base about Lassa fever. 100 and 200 level students generally showed lower proportions of correct

responses, which is expected given their earlier stage in medical education.

The overall pattern of knowledge improvement with advancing academic levels is consistent with findings from other studies on infectious disease knowledge among medical students. For instance, Ighedosa *et al.* (2020),<sup>20</sup> found a similar trend in knowledge about Ebola virus disease among Nigerian medical students. Nonetheless, the persistent misconceptions about vaccine availability and some modes of transmission needs to be addressed. These findings highlight the need for targeted education on Lassa fever, particularly focusing on correcting these misconceptions. This need for intervention on the addressing certain areas of knowledge gap aligns with recommendations from Asogun *et al.* (2016),<sup>18</sup> who emphasized the importance of continuous medical education on Lassa fever for healthcare workers in endemic regions. Based on the proportion of correct responses relative to the number of participants, the 500 level students consistently demonstrate the best performance across almost all questions. They have the highest percentage of correct answers in 23 out of 25 questions. The consistent high performance of 500 level students across nearly all questions suggests that they have the most comprehensive and accurate knowledge about Lassa fever among all the levels studied. This aligns with expectations that final-year medical students would have accumulated the most knowledge through their years of study and clinical exposure.

Notably, there was a widespread misconception that Lassa fever is vaccine-preventable, with a high proportion of students across all levels incorrectly believing this. This is a significant concern, as no licensed vaccine for Lassa fever currently exists.<sup>21</sup> This misconception could lead to a false sense of security and potentially impact future clinical practice. Conclusively, while there is a general trend of improving knowledge with advancing academic levels, significant gaps and misconceptions exist especially on the vaccine prevention front. These findings highlight the need for enhanced, targeted education on Lassa fever in medical programmes, particularly focusing on epidemiology, transmission, and prevention of diseases. Given the endemic nature of Lassa fever in Nigeria, ensuring accurate and

comprehensive knowledge among future healthcare professionals is very vital for effective disease management and prevention.

### CONCLUSION

This study shows a progressive improvement in knowledge about Lassa fever among medical students at Ebonyi State University as they advance in their academic years. Fifth-year students consistently demonstrated the most comprehensive understanding across various aspects of the disease. However, significant knowledge gaps and misconceptions persist, particularly regarding vaccine availability and some modes of transmission.

The findings highlight the effectiveness of the current medical curriculum in building knowledge about Lassa fever over time. Nevertheless, they also underscore the need for targeted educational interventions to address specific areas of misunderstanding. Of particular concern is the widespread misconception about vaccine availability, which could have serious implications for future clinical practice.

Given the endemic nature of Lassa fever in Nigeria, ensuring accurate and comprehensive knowledge among future healthcare professionals is crucial. This study provides valuable insights for medical educators to refine and enhance their teaching strategies on Lassa fever and other infectious diseases.

By implementing the recommended educational strategies, medical schools can better prepare their students to effectively manage and prevent Lassa fever in their future roles as healthcare providers. This improved education will contribute significantly to the broader efforts of controlling Lassa fever in endemic regions.

### RECOMMENDATIONS

Based on the comprehensive findings of this study examining Lassa fever awareness among medical students at Ebonyi State University, we propose a multi-faceted approach to enhance medical education and knowledge dissemination about this critical public health concern.

**Curriculum Enhancement:** The medical school curriculum requires strategic modification to address Lassa fever education comprehensively. Specific recommendations include:

#### Vertical Integration of Knowledge

Introduce foundational Lassa fever concepts in early academic years

Progressively develop the complexity of content across academic levels

Ensure systematic knowledge building from theoretical to practical understanding

#### Targeted Educational Interventions

Design targeted modules addressing identified knowledge gaps

Focus on critical areas such as disease seasonality, transmission dynamics, and potential complications

Develop evidence-based educational strategies to rectify persistent misconceptions

#### Pedagogical Diversification

Implement multiple teaching modalities:

Interactive workshops

Clinical simulations

Case-based learning

Multimedia educational resources

Enhance student engagement through varied instructional approaches

Clinical Competency Development Practical Exposure

Increase clinical exposure to Lassa fever cases

Integrate real-world scenarios and case studies

Bridge theoretical knowledge with practical clinical application

Continuous Learning Framework 5. Ongoing Education Model

Establish periodic refresher courses

Conduct regular seminars and update sessions

Create mechanisms for continuous knowledge reinforcement

**Strategic Objectives:** The overarching goals of these recommendations are to:

Standardize Lassa fever knowledge across academic levels

Develop competent future healthcare professionals

Enhance regional disease management capabilities

Promote evidence-based understanding of endemic health challenges

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