

ISSN: 3007-4487

SIERRA LEONE JOURNAL OF MEDICINE

The Official Journal of University of Sierra Leone Teaching Hospitals Complex

Journal Homepage: www.sljm.org



Assessment of Knowledge and Preventive Practices Regarding Lassa Fever in a Rural Community in Gboko, Benue State, Nigeria.

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ARTICLE INFO

Article History

Received: December 20, 2024

Accepted: June 11, 2025

Published: November 08, 2025

Corresponding Author:

Dr. David Aondona Daniel

Technical Information

How to Cite: Daniel A. D. et al. Assessment of Knowledge and Preventive Practices Regarding Lassa Fever in a Rural Community in Gboko, Benue State, Nigeria: SLJM 2025;Vol 2(2) pp 46-52. https://doi.org/10.69524/sljm.v2i2.156

Editor-in-Chief: Prof. Kehinde S. Oluwadiya, University of Sierra Leone Teaching Hospitals Complex, Freetown, Sierra Leone.

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Funding: No funding was received for this study.

Ethical Consideration

Conflict of interest: The authors declare they have no conflicts of interest that are directly or indirectly related to the research.

ABSTRACT

Background: Lassa fever is a highly infectious viral illness transmitted through fluids and secretions infected rodent, Mastomys natalensis. The study aimed to explore the awareness, knowledge, and preventive practices related to Lassa fever in order to improve prevention efforts for this infectious disease.

Methods: The study was a cross-sectional study of 414 participants, selected by consecutive non-probability sampling with an interviewer-administered questionnaire used during a medical outreach in Mbasur, a rural community in Gboko, Benue State. The data was analyzed using SPSS version 23 and statistical significance was set at P < 0.05.

Results: Most of the participants, 215(52%) were aged between 20-39 years and female, 242 (58.5%). Most, 280(67.6%) were married, attained secondary education, 256(61.8%) and were farmers 346(83.6%). Only 106(25.6%) were aware of the disease and out of these, 72(67.9%) had their sources of information from mass media. Among the 106 individuals aware of Lassa fever, 100 (94.3%) consumed rats as a delicacy, 57 (53.8%) exhibited poor knowledge, and 63 (59.4%) demonstrated good preventive practices. Good knowledge of the disease was significantly associated with being single (p=0.019) and not consuming rodents as a delicacy (p<0.001). There was also a statistically significant association between poor knowledge of Lassa fever and poor preventive practices (p<0.001).

Conclusion: Lassa fever awareness, knowledge and preventive practices was poor in the rural community. The main source of information about the disease was mass media. It is recommended that awareness campaigns should be scaled up by using direct health talks in rural communities and not depend only on mass media.

Key words: Awareness, Knowledge, Lassa Fever, Preventive Practices, Rural Community

1. INTRODUCTION

Lassa fever is an infectious acute hemorrhagic viral illness ^{1,2}. The Lassa virus was not identified until 1969 due to the death of two missionary nurses working in Lassa, a town in Bornu state Nigeria ². The virus named after Lassa town is a member of the Arenaviridae family endemic in West Africa ^{3,4}.

The case fatality rate of Lassa fever is 1% but among hospitalised patients, it could rise to 15% ⁴ An estimate of 100,000 to 300,000 cases of Lassa fever has been reported in West Africa with about 5000 deaths ^{1,4}. Nigeria recorded the highest burden of the disease in Sub-Saharan Africa with 25,191 suspected cases and 3897 confirmed deaths between 1969-2021⁵.

Lassa fever occurs in all age groups with no gender predilection ^{1,5}. Those in the rural areas who mostly are involved with farming activities where the rodent Mastomys Natalensis are usually found are at a greater risk ⁴. Over-crowding, poor sanitation, handling of infected rodents, consuming rat as a delicacy and health workers not practicing barrier nursing are also at risk ^{4,5}.

The disease is zoonotic and transmission is by contact with urine and faeces of the infected multimammate rat and also by human-to-human contact via infected bodily fluid ⁴. Stored food contami-

Table 1: Socio-Demographic Characteristics (N=414)

Variable Frequency Percentage Age (Years) Mean 37.2 ±19.5 54 13 0-19 54 13 20-39 215 52 40-59 84 20.3 60-79 37 8.9 ≥80 24 5.8 Gender Male 172 41.5 Female 242 58.5 Marital Status Single 129 31.2 Married 280 67.6 Divorce/Separated 1 0.2 Widowed 4 1.0 Ethnic Group Tiv 410 99 Idoma 2 0.5 Others 2 0.5 Religion 2 0.5 Christian 393 94.9 Moslem 2 0.5 Traditional 19 4.6 Level of Education 1nformal 52 12.6 Primary 96 23.2 <t< th=""><th colspan="4">Table 1: Socio-Demographic Characteristics (N=414)</th></t<>	Table 1: Socio-Demographic Characteristics (N=414)			
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Tertiary 10 2.4 Occupation Unemployed 40 9.7	Primary	96	23.2	
Occupation Unemployed 40 9.7	Secondary	256	61.8	
Unemployed 40 9.7	Tertiary	10	2.4	
· ·	Occupation			
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	Farming	346	83.6	
Government/Private Employed (Civil	Government/Private Employed (Civil			
Servants, Artisans and Skilled Workers) 28 6.7	Servants, Artisans and Skilled Workers)	28	6.7	
Monthly Income (Naira)	Monthly Income (Naira)			
≤30,000 269 65.0	≤30,000	269	65.0	
30,000 – 99,999 113 27.3	30,000 – 99,999	113	27.3	
100,000 and Above 32 7.7	100,000 and Above	32	7.7	

nated by infected rat urine and faeces are also potential disseminator of the Lassa virus ¹.

Though Benue state is within the endemic region, cases of Lassa fever which usually occur between December and April are becoming much higher than previous seasons 6. There are currently no vaccines to protect against the disease however, various vaccines for Lassa fever are undergoing clinical trials 7. Preventive practices are hinged on improving community hygiene which would discourage rodents from dwelling close to human habitation ^{6,8,9}. Rodent proof container should be utilized to store grain and other foodstuff ⁶. Disposal of waste should be far away from residential areas and all animal product especially rodents used for delicacy should be properly cooked before consumption ^{5,6,9}. Several studies reveal that adequate knowledge and preventive practices toward an infectious disease is pivotal in curbing its spread in the populace 5,8,9. A study conducted in rural Guangdong, China, emphasized the importance of understanding the unique vulnerabilities of these communities during epidemic outbreaks. The research highlighted that enhancing knowledge, attitudes, and practices (KAP) related to infectious diseases enables rural residents to recognize risks and adopt appropriate preventive measures, thereby mitigating the progression of outbreaks¹⁰. Similarly, in Gombe State, Nigeria, a study assessed community members' knowledge and prevention practices concerning rabies. The findings underscored the necessity for targeted public health interventions to improve awareness and preventive behaviours in rural settings. Studies have found that even when there is adequate knowledge about infectious diseases, it often fails to translate into effective preventive behaviours¹¹. Due to the high-risk exposure of rural communities in Benue state to Lassa fever, this study set out

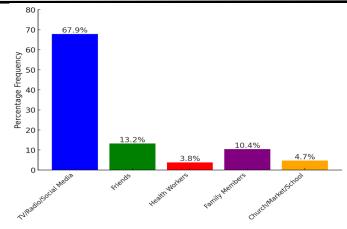


Figure 1: Shows Sources of Information About Lassa Fever (n=106)

to evaluate the knowledge and preventive practices of Lassa fever in Mabsur, a rural community in Mbatiav district of Gboko Local Government Area, Benue State Nigeria. The aim is to identify gaps in knowledge and preventive practices and recommend measures to improve them. This will help reduce the burden of Lassa fever in rural communities, which serve as hotspots for its spread to urban areas.

2. MATERIALS AND METHODS

2.1 Study Area:

Mbasur is an agrarian community in South-West of Mbatiav district of Gboko Local Government Area of Benue State, Nigeria. The community has a homogenous ethnic entity as most of the residents are of Tiv extraction. It is known for its production of commercial agricultural commodities like yams, cassava and groundnuts. A Primary Health Care centre staffed with Community Health Extension Workers provides essential primary care services to the community. Severe health issues are referred to tertiary health institution located in Makurdi the capital of Benue State, which is about 250 km from Mbasur community.

2.2 Study Design:

This was a cross sectional descriptive study design

2.3 Study Population:

The study population included all participants who consented to partake in the study during a two-day outreach tagged Mbasur Medical Outreach by Oasis of Love UK in conjunction with Rebecca Kukase Iornungu Foundation

2.4 Sample Size Determination:

The Cochran formula (1975) was used to determine the sample size for the study and was calculated as shown below:

Where,

n = the required sample size

Z = is the constant (found in the z-table)

p = 50% (there was paucity of studies in North-Central, Nigeria)

q = 1-p

e = is the desired level of precision (i.e. the margin of error)

Therefore, sample size (n)

However, to account for non-response to questions and missing questionnaires, additional 10% of the calculated sample size was added to make a total of 420.

2.5 Sampling Techniques:

Convenient sampling of participants in the medical outreach who

Variable (n=106) Frequency (%) Lassa Fever is Caused by a Virus Yes* 61 (57.5) Yes* 61 (57.5) No 32 (30.2) Not Sure 13 (12.3) Rats Can Transmit Lassa Fever Yes* 65 (61.3) No 30 (28.3) No 30 (28.3) Not Sure 11 (10.4) Lassa Fever is Named After a Town in Nigeria Yes** 17 (16.0) Yes* 17 (16.0) 77 (72.6) Not Sure 12 (11.4) Lassa Fever is Common in Benue State 12 (11.4) Lassa Fever is Common in Benue State 12 (11.4) Lassa Fever is Common in Benue State 12 (11.4) Lassa Fever is Common State 44 (41.5) No 49 (46.2) No No 49 (46.2) No No 49 (46.2) No No 40 (41.5) No So (28.2) So (28.2) So (28.2) So (41.5) No So (41.5) No So (28.2) So (41.5) No So (47.7) No 33 (31.1) No (30.1) No (30.1) No So (47.2) No So (47.2) No No (41.5) No	Table 2: Knowledge about Lassa Fever	
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consented to partake in study was employed.

2.6 Data Collection Tools and Scoring of Outcome Variables:

An interviewer-administered questionnaire was employed. The questionnaire had four sections. The first section comprised the socio-demographic characteristics. The second section had questions that addressed awareness of Lassa fever. The third section had 15 items that assessed the knowledge of Lassa fever. A correct response was scored 1 point while an incorrect response scored 0. A total score of \geq 8 is good knowledge while a score of \leq

7 is poor knowledge of Lassa fever. The fourth component had 13 items and assessed preventive practices of Lassa fever. A correct response scored 1 point while an incorrect response scored 0. A total score of \geq 7 was considered good preventive practices. A total score of \leq 6 was graded as poor preventive practices.

A pretest of the questionnaire was carried out at Apir village market close to Makurdi town. The questionnaire was explained to the participants who consented. The questions that appeared ambiguous were attuned to represent correctly the idea intended by the author in the study.

2.7 Data Analysis/Management:

Data entry and analysis were conducted using SPSS version 23. Data cleaning and validation were performed before analysis to ensure accuracy. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were generated for each study variable. Cross-tabulation and Chi-square tests were used to compare proportions. Results were presented using tables and bar charts for clear visualization. A p-value of ≤ 0.05 was considered statistically significant.

2.8 Ethical issues:

An approval letter was obtained from the state Ministry of Health, Benue state to conduct the Medical Outreach as well undertake this study. Verbal consent was also obtained the participants before the questionnaires were administered. Confidentiality of information collected was assured while participation was voluntary.

3. RESULT

A total of 414 participated in the study giving a response rate of 98.6%. There were no missing data as the questionnaires were interviewer administered.

3.1 Socio-Demographic Characteristics:

Table 1 shows that overall, four hundred and fourteen participants were involved in the study. Most of the participants 215(51.9%) were within the age group of (20-39) years with a mean of 37.2 ±19.5. More than half of the participants, 242(58.5%) were female and majority 280(67.6%) were married. The majority of participants, 256 (61.8%), had completed secondary education, while most, 346 (83.6%), were engaged in farming, Additionally, over two thirds, 269 (67%), earned a monthly income of less than ₹30,000 (Table 1).

3.2 Awareness of Lassa Fever by the Participants

Those that were aware of Lassa fever made up 25.6% (106) of the participants (Figure 1).

3.3 Sources of Information for Lassa

Most of the participants' source of information about Lassa fever 72(62.9%) was from television, radio and social media. This was followed by friends 14(13.3%) and dissemination of information from health workers was the least 4(3.8%) (Figure 1).

3.4 Summary of Awareness of Infected Individuals, Dietary Practices, Knowledge, and Preventive Measures Related to Lassa Fever

Majority of the participants 81(76.4%) were not aware of anyone affected by Lassa fever. Almost all the participants 100 (94.3%) consumed rat as a delicacy. More than half of the participants 57 (53.8%) demonstrated poor knowledge despite being aware of Lassa fever disease. Most of the participants 63(59.4%) who were

Table 3: Preventive Practices of Lassa Fever	
Variable (n=106)	Frequency (%)
Avoiding Contact with People Infected with Lassa	
Fever is Preventive	56 (52.8)
Yes*	42 (39.7)
No	08 (7.5)
Not Sure	
Avoiding Food Contaminated by Rats is Preventive	
Yes*	66 (62.3)
No	38 (35.8)
Not Sure	02 (1.9)
Preventing Food From Being Exposed to Rat Urine/	== (= 1 =)
Feaces	58 (54.7)
Yes*	45 (42.5)
No Not Cure	03 (2.8)
Not Sure	
Ensuring Good Environmental Hygiene Can Prevent Transmission	68 (64.1)
Yes*	68 (64.1) 34 (32.1)
No	04 (3.8)
Not Sure	04 (0.0)
Proper Treatment of Food Can Prevent Transmission	
Yes*	67 (63.2)
No	33 (31.1)
Not Sure	06 (5.7)
Destroying Rats Could Prevent Transmission	00 (017)
Yes*	63 (59.4)
No	34 (32.1)
Not sure	09 (8.5)
Clearing of Bushes Can Around the House Can Pre-	, ,
vent Lassa Fever	66 (62.3)
Yes*	32 (30.2)
No	08 (7.5)
Not sure	
Proper Refuse Disposal Can Prevent Lassa Fever.	
Yes*	68 (64.2)
No	33 (31.1)
Not sure	05 (4.7)
Avoiding Rat Consumption Can Prevent Lassa Fever	
Yes*	18 (8.0)
No	112 (49.8)
Not Sure	95 (42.2)
Avoiding Bush Burning Can Prevent Lassa Fever	
Yes*	53 (50.0)
No	43 (40.6)
Not Sure	10 (9.4)
Avoiding Bush Meat Consumption Can Prevent Las-	EO (40 4)
sa Fever	52 (49.1)
Yes No*	48 (45.3)
Not Sure	06 (5.7)
Fixing or Closing Holes in the House that Admit Rats	
Can Prevent Lassa Fever.	
Yes*	58 (54.7)
No	42 (39.6)
Not Sure	06 (5.7)
Drying Food Outside Can Cause Lassa Fever	30 (0.7)
Yes*	63 (59.4)
No	37 (34.9)
Not Sure	06 (5.7)
10 10	- 1 - 1

*Correct Response

aware of Lassa fever disease had good preventive practices (Table 4).

3.5 Association Between Socio-Demographic Characteristics, Relevant History and Knowledge Status of Lassa Fever

The association between sociodemographic characteristics, relevant history and preventive practices related to Lassa fever and knowledge status of Lassa fever among the participants is seen on Table 3. A higher proportion of those who were single had good knowledge while an equal higher proportion of those who were married had poor knowledge of Lassa fever and the relationship was statistically significant (χ 2=7.94, p=0.019). A higher proportion of those who do not consume rat as a delicacy had good

knowledge of Lassa fever and the relationship was statistically significant ($\chi 2=7.40$, p≤0.001). Most of those who had poor preventive practices had poor knowledge of Lassa fever disease and the relationship was statistically significant ($\chi 2=34.8$, p≤0.001) (Table 5).

4. DISCUSSION

This study set out to evaluate Lassa fever knowledge and preventive practices in a rural community, Benue State, North-Central, Nigeria at high risk of exposure due to their close contact with rodents and agrarian lifestyle. The majority were peasant farmers and earned monthly wages below \(\frac{1}{2}30,000\). This sociodemographic characteristic is in consonant with that of rural communities in most studies conducted in North-West, South-South and South-West of Nigeria.\(\frac{5}{9},\frac{9}{12}\)The low socio-economic characteristic depicts disadvantaged communities being more likely to present with high-risk factors for infectious diseases like Lassa fever\(\frac{13}{2}\).

The study revealed that only 25.6% of the participants were aware of Lassa fever disease. Several studies have recorded a higher proportion of Lassa fever awareness, although most were conducted in urban or semi-urban settings where the populace may have more awareness due to better access to education, social media and mass media. Studies in Abakaliki in Ebonyi State, Etsako in Edo State, Ondo State (Akure North, Akure South, Akoko South West, Ose, Owo, and Idanre), all in the Southern Nigeria and Kaduna State, North-West Nigeria reported awareness of 96.2%, 89%, 84.8% and 66.7% respectively^{12, 14-16}. Similarly, a high proportion of Lassa fever awareness was reported in a rural setting in Liberia, with a 65% awareness rate¹⁷. The very low rate of awareness in this study is a matter of great concern since rural communities are hotspots for the transmission of Lassa fever. This is because poverty and ignorance, which are prevalent in rural communities, and contribute to the spread of infectious diseases. Therefore, there is a need to raise awareness about Lassa fever in these communities.

The most employed source of information for Lassa fever awareness in this study was television, radio and social media which was 67.9%. Studies from Edo and Ebonyi States in Nigeria, and Liberia reveal that a high proportion of the participants were aware of Lassa fever through mass media and social media9,16,17. However, the finding in this study is in contrast to what was reported in Katsina State Nigeria where family and friends were the main source of information for Lassa fever awareness⁵. The role of mass media (television, radio) and social media in providing information to a rural community is evident in this study. Therefore, frequent broadcasting of health educational programs on Lassa fever awareness to achieve positive behavioral change regarding this infectious disease is advocated. Despite being expected to be one of the sources of Lassa fever education and awareness, healthcare workers in this study were the least involved in information dissemination, contributing only 3.8%. A similar finding was reported in a study conducted at Abakaliki in Ebonyi state which showed low information dissemination among hospital and health care workers about Lassa fever disease¹⁸. It becomes imperative that during consultation with patients, health care providers should educate patients on Lassa fever disease. When health care providers are granted the opportunities, they should capitalize on such offers to create awareness about this infectious dis-

Table 4: Summary of Awareness of Infected Individuals, Dietary Practices, Knowledge, and Preventive Measures Related to Lassa Fever (N=106)

sa rever (IN=106)		
Variables	Frequency	Percentage
Aware of anyone affected by Lassa		
Fever		
Yes	25	23.6
No	81	76.4
Do You Consume Rat as a Delicacy?		
Yes	100	94.3
No	6	5.7
Lassa Fever Knowledge Assessment		
Good Knowledge	49	46.2
Poor Knowledge	57	53.8
Lassa Fever Preventive Practices As-		
sessment		
Good Preventive Practices	63	59.4
Poor Preventive Practices	43	40.6

ease especially to those in rural communities.

This study revealed that most of the participants 76.4% were not aware of anyone infected with Lassa fever. On the contrary, reports from Ebonyi and Edo States in Nigeria, as well as from Liberia - regions with frequent confirmed cases, revealed lower proportions of participants who were unaware of anyone affected by the disease 12,16,17. Knowing people who are confirmed cases of Lassa fever with probable manifestation of life-threatening symptoms could be a motivation for behavioral changes toward preventive practices. Almost all the participants 93.4% in this study with knowledge of Lassa fever consumed rodents as a delicacy. The hunting of rodents for consumption increases human-rodent interaction resulting to risk of exposure to Lassa fever disease. The studies in Ebonyi, Ondo and Republic of Guinea in Africa also affirmed the increase risk attributed to consumption of rodents as a delicacy in rural communities 18-20.

Among those who were aware of Lassa fever (25.6%), more than half (53.8%) had poor knowledge of the disease. Several studies have revealed poor knowledge of Lassa fever both in urban and rural settings across the country 5,9,12,18. The low level of awareness combined with suboptimal knowledge of Lassa fever indicates a significant gap in effective health education. Without widespread awareness, it is difficult for individuals to fully grasp the importance of preventive measures or to seek timely medical help. This suggests that improving public awareness should be a priority, as it lays the foundation for enhancing knowledge and, ultimately, driving behavioural change in the population. Furthermore, this study revealed a statistically significant association between knowledge of Lassa fever with marital status. Most of those who were single had good knowledge of the infectious disease while married participants demonstrated poor knowledge. The study in Ebonyi and Edo state also affirmed that married participants were less likely to have good knowledge of Lassa fever disease. This finding may be because, being single connotes a sense of independence to explore various fields, including health, and broaden their knowledge. Additionally, many of the single participants were younger and may have interest in education, which likely increased their opportunities to access accurate, first-hand information about Lassa fever. There was no statistically significant relationship between education and knowledge of Lassa fever. This was consistent with a study in Ogun State where it was reported that even with secondary education, knowledge gaps persisted, particularly regarding transmission routes and preventive measures.9 In contrast, a Liberian study found a statistically significant relationship between higher educational levels and good knowledge of Lassa fever prevention¹⁷.

Those with poor knowledge of the infectious disease had poor preventive practices and vice-versa. Studies from the South-East, South-West, and Northern region of Nigeria, as well as other countries in Africa align with the outcome of this study^{4,5,8,15-16,19,20}. This finding suggests that good knowledge of Lassa fever is key to enhancing good preventive practices in rural communities.

Participants who did not consume rodents as a delicacy demonstrated better knowledge of Lassa fever, and it was statistically significant. Similar studies in the Republic of Guinea and Edo State, Nigeria, have shown a higher risk of Lassa fever among those who consume rodents as a delicacy^{12,20}. The findings in this study suggest that individuals with better knowledge of Lassa fever transmission may be more likely to avoid eating rodents, despite the fact that rodent delicacies are a traditional and cherished meal in the Mbasur rural community.

4.1 Conclusion

Lassa fever awareness in Mbasur community was low, with most individuals having limited knowledge and poor preventive practices. Those with better knowledge tended to be single and did not consume rodents as a delicacy. Health education on Lassa fever knowledge and prevention should be integrated into routine healthcare consultations, and policies should encourage healthcare workers to use mass media to disseminate information in rural areas.

Limitation:

The study was a cross- sectional study. Hence the causal relationship between knowledge and other variables like preventive practices of Lassa fever cannot be conclusively demonstrated. Consecutive sampling technique which is a non-probability sampling technique can introduce bias to the study.

Acknowledgement:

We acknowledge the Mbasur community leaders and the participants, whose valuable time and honest responses formed the basis of these findings. We also acknowledge state Ministry of Health in Benue Nigeria for an opportunity to conduct a medical outreach and a study of this proportion. Lastly, we appreciate the God Almighty and our mentors who kept us motivated during the study

Contributor Roles Taxonomy (CRediT) Statement

Conceptualization and methodology was by DAD, ANA Data curation, analysis and writing was by DAD Resources and funding acquisition were by DAD, ANA, AA, TJT, API, GAA, DFO

Validation and visualization were by DAD, ANA, AA, TJT, API, GAA, DEO, ECB

Writing of original draft and review were by DAD, ANA, AA, ECB

Data availability statement:

The dataset for the study is available in on Zenodo at https://zenodo.org/records/14671805

Conflict of Interest:

All the authors declare no conflict of interest.

Funding:

The authors received no external funding for this research.

Variable	Knowledge Status of Lassa Fever		χ²	df	p-Value
	Poor Knowledge	Good Knowledge			
Age (Years)			2.63	4	0.63
0-19	6(50)	6(50)			
20-39	33(49.3)	34(50.7)			
40-59	13(65)	7(35)			
60-79	3(75)	1(25)			
≥80	2(66.7)	1(33.3)			
Gender			0.54	1	0.816
Male	35(54.7)	29(45.3)			
Female	22(52.4)	20(47.6)			
Marital status			7.94	2	0.019
Single	15(37.5)	25(62.5)			
Married	40(62.5)	24(37.5)			
Widowed	2(100)	0(0)			
Level of education			1.46	3	0.691
Informal	3(60)	2(40)			
Primary	13(61.9)	8(38.1)			
Secondary	37(50)	37(50)			
Tertiary	4(66.7)	2(33.3)			
Aware of Anyone Affected by Lassa Fever					
Yes	14(56)	11(44)	0.65	1	0.798
No	43(53.1)	38(46.9)			
Consumption of Rat as a Delicacy	, ,	• •	7.40	1	≤ 0.001
Yes	57(57)	43(43)			
No	0(0)	8(100)			
Preventive Practices of Lassa Fever	• •	, ,	34.8	1	≤ 0.001
Poor Practices	38(88.4)	5(11.6)			
Good Practices	19(30.2)	44(69.8)			

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