



Knowledge, Attitudes, and Preventing Practices Regarding Lassa Fever in Edo State: Insights from Community and Healthcare Workers

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Lassa fever, an acute viral hemorrhagic illness endemic in West Africa, poses significant public health challenges in Nigeria, with Edo State as one of the epicenters. Despite the recurrent outbreaks, limited data exist on the knowledge, attitudes, and practices (KAP) of residents and healthcare personnel in affected areas, creating a critical research gap. This study aimed to assess these dimensions in Edo State to inform targeted interventions. Using cross-sectional study design, mixed sampling technique, data was collected using a well-structured questionnaire from 1,192 residents and 180 Primary Healthcare (PHC) personnel. The questionnaire was programmed and a

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Survey CTO software was used in the collection of the data and analyzed using SPSS version 23. The study highlights substantial gaps in awareness and preventive behaviors. Among residents, 80.1% recognized Lassa fever as a severe illness, yet only 6.9% had participated in awareness campaigns. Preventive measures such as storing food in rodent-proof containers (12.1%) and frequent environmental sanitation (25.4%) were underutilized. Misconceptions about transmission persisted, with only 3% aware of the 1–21 days incubation period and 0.3% acknowledging sexual transmission. Socioeconomic disparities significantly influenced practices, as higher-income households reported better compliance with sanitation measures ($p < 0.001$). Practices like using traps (14.5%) and participating in sanitation campaigns (6.8%) varied significantly by residence type ($p < 0.001$). PHC personnel demonstrated strong knowledge of Lassa fever, with a high Relative Importance Index (RII = 0.960) for facts such as its classification as a viral hemorrhagic illness and the role of rats as primary reservoirs. However, only 84% identified alternative reservoirs like bats and mosquitoes. PPE adherence was notably poor, particularly for facemasks and eye protection (RII = 0.217). The study's findings underscore the necessity for targeted education, strengthened training for healthcare personnel, and equitable resource distribution to bridge the identified gaps. Addressing these issues is crucial to reducing the burden of Lassa fever in Edo State and beyond.

Keywords: CTO software; facemasks; Lassa fever; incubation period; bats; mosquitoes.

1. INTRODUCTION

Lassa fever is a viral hemorrhagic illness endemic to West Africa, caused by the Lassa virus, with rodents, especially the multimammate rat (*Mastomys natalensis*), acting as the primary reservoir (World Health Organization (WHO), 2024). The high virulence, attendant significant mortality and morbidity as well as non-specific mode of presentation of Lassa fever have made it a disease of public health significance (Odeigha et al., 2020). The detection of Lassa fever has been a clog in the eye as it presents with nonspecific symptoms similar to many other endemic illnesses in West Africa like Ebola, Dengue, Yellow fever etc. thus making it difficult to diagnose clinically; therefore, laboratory testing is needed to confirm the diagnosis (National Institute of Allergy and Infectious Diseases (NIAID), 2016). Despite the epidemic and highly contagious nature of Lassa Fever in Nigeria and other African countries, the details of outbreaks and subsequent responses to contain it have not been well documented in several places, and it is difficult to learn from the experiences to improve the management of future outbreaks (Ajayi et al., 2013). The disease is transmitted to humans through contact with urine, feces, or saliva of infected rodents, or via person-to-person transmission, particularly in healthcare settings (Centers for Disease Control and Prevention (CDC), 2024). Symptoms of Lassa fever include fever, weakness, sore throat, and gastrointestinal issues, which can escalate to severe hemorrhagic manifestations and organ failure, often resulting in death and nonspecific symptoms of Lassa fever include fever, facial

swelling, and muscle fatigue, as well as conjunctivitis and mucosal bleeding (Tewogbola & Aung, 2020). Recent outbreaks in Nigeria, particularly in the southern and central regions, have raised concerns regarding control, prevention, and treatment strategies (WHO, 2024).

Despite extensive public health campaigns, knowledge gaps persist about Lassa fever and misconceptions about its transmission and prevention remain widespread (CDC, 2024). Olayinka et al. (2015) while studying the awareness of Lassa fever in a rural community in South Western Nigeria found that majority 82.2% of the respondents had not previously heard of the disease. Reuben and Gyar (2016) in their study in and around Lafia, North Central Nigeria, found out that 83% of the respondents had rats/rodents in and around their residence, of which 28% come into contact with urine/feces of the rodents and 24% consume foods contaminated by the rodents. However, 85% of the respondents do not believe in the existence of Lassa fever. The level of awareness that the rat is a vector of Lassa fever among the rural people in Ijebu-North Local Government, Ogun State, Nigeria was studied by Adefisan (2014), who reported that illiterate rural inhabitants were not aware that Lassa fever was carried by rat. It was reported that large number of the people did not attach any health importance to a common rat/rodent, let alone associate it within the deadly disease. In Edo State, a region severely affected by Lassa fever outbreaks, understanding the knowledge, attitudes, and practices (KAP) of both community members and healthcare

workers is crucial for improving disease prevention and management strategies (Tewogbola & Aung, 2020). Lassa fever continues to pose a significant public health threat in Nigeria; while interventions have been implemented to control the disease, evidence regarding their effectiveness in altering the population's KAP is limited (WHO, 2024).

Misconceptions about the disease persist alongside a lack of awareness about preventive measures such as rodent control and proper personal protective equipment (PPE) use among healthcare workers (Tewogbola & Aung, 2020). Healthcare workers play a vital role in controlling Lassa fever; however, their adherence to standard infection prevention protocols is often inconsistent (WHO, 2024). Educational programs targeting both the general population and healthcare workers have not been thoroughly evaluated, leaving a gap in understanding how knowledge and practices can be improved in high-risk areas like Edo State (CDC, 2024).

There is a notable lack of comprehensive studies assessing KAP regarding Lassa fever among community members and healthcare workers in Edo State. Previous studies have focused on either community or healthcare workers individually, failing to provide a holistic view of how these groups perceive and respond to Lassa fever (Tewogbola & Aung, 2020). Additionally, while awareness rates are documented as high, there is limited exploration of misconceptions that hinder preventive measure adoption. The impact of residence type—urban versus rural—on knowledge and practices related to Lassa fever remains underexplored (WHO, 2024).

The findings from this study will provide critical insights into awareness levels concerning Lassa fever among community members and healthcare workers in Edo State. By identifying knowledge gaps and misconceptions, the study aims to inform targeted educational interventions that can enhance preventive practices and reduce transmission risks (Tewogbola & Aung, 2020). Understanding factors such as residence type and healthcare worker practices is essential for tailoring public health campaigns effectively. Ultimately, this study aimed to assess the KAP on Lassa fever amongst community members and health workers in Edo State to inform targeted interventions as Edo State remains an epicenter of Lassa fever disease in Nigeria despite the interventions (NCDC, 2025). Thus, this research aims to contribute to reducing

Lassa fever transmission in Edo State and may serve as a model for similar studies in other endemic regions of Nigeria and West Africa.

2. MATERIALS AND METHODS

2.1 Edo State

Edo State also known Edo is a state in the South-South geopolitical zone of the Federal Republic of Nigeria. It is ranked as the 20th most populous state (5,250,000) in Nigeria in 2024 with the state population estimated around 4,777,000 in 2021 (Wikipedia, 2025). Edo State was formed in 1991 from the northern portion of Bendel state, the southern portion becoming Delta state. Prior to this, in 1963, the citizens of the territory had voted to separate from what was then the Western region, and the Mid-West region was created. This became Mid-Western state following the federal reorganization in 1967; from a second reorganization in 1976 until its division in 1991, it was first named Bendel State and now Edo State, southern Nigeria. Edo State lies roughly between longitudes 05° 04'E and latitudes 05°44'N and 07°34'N. The research was carried out in three (3) local government areas of Edo state which are Esan west, Esan north east and Etsako West and this was used based on the study conducted by Owoicho et al. (2021) on spatial analysis of confirmed LF cases in Edo State, Nigeria, 2008-2014 where the LGA's were found to be hotspot of Lassa fever incidences.

2.2 Sample Size and Sampling Technique

Based on the study areas as stated above, the study sampling technique adopted for this study is mixed sampling method with stratified random technique adopted for the community participants based on the population of each LGA using the 2006 Census data i.e Esan West (167,300), Estako West (260,700), Esan North East (183,634) and convenience sampling for the health workers. The sample size for this study was determined using the Cochran formula for calculating sample size for cross sectional studies when proportion is the parameter of study (Cochran, 1963).

$$n = Z^2 \frac{P(1-P)}{e^2},$$

Where, n = sample size $Z = 1.96$ for 95% level of confidence for at power of 80%

P = prevalence of the event of interest. In this case, P is the prevalence of Lassa fever in the

study area, and it is unknown. Therefore, a national sero-prevalence of 21.3% was used in this study (Tambo et al., 2018). e = margin of error or precision of 5%. Therefore, $n = [(1.96)^2 (0.213 \times 0.787)] / (0.05)^2$ $n = 257.5$

A response rate of 90% was assumed. After calculation for each LGA,

Sample Size of Esan West = 398

Sample Size of Estako West = 395

Sample Size of Esan North East = 399

Total = 1192

Also, convenience sampling technique was used to sample the numbers of PHCs and personnel due to availability of the personnel and numbers of PHCs available. Thus, twenty (20) PHC's was used in each LGA under study given a total of one hundred and sixty (60) while sixty (60) personnel were sampled from each LGA giving a total one hundred and eighty (180) in the three LGA under study.

2.3 Inclusion Criteria

Individuals within the selected communities within the LGAs and State who are residents for at least 6 months and above were the respondents interviewed and households' heads as well as members of the households conversant with everything about the household was interviewed in order to get the accurate and reliable information for the purpose of achieving the set objectives of this research.

2.4 Exclusion Criteria

All individuals not residing in the study areas were excluded including non-members of an households and those members of the households not conversant with the households' activities.

2.5 Method of Data Collection

Data was collected using a well-structured questionnaire tailored to answer study aim which is to assess the KAP on Lassa fever amongst community members and health workers in Edo State.

The questionnaire was programmed and a Survey CTO software was used in the collection of the data due to the large sample size and for efficiency as well as to maintain the reliability of the data set. Thus, the use of Computer Assisted

Personal Interview (CAPI) was used for the collection of the data. This helped in efficiently getting the required information needed in achieving the set-out objectives.

The questionnaire was programmed and divided into three (3) questionnaires for the purpose of achieving the set-out objectives.

2.6 Data Analysis

After the collection of data using CAPI-based questionnaire with the aid of Survey CTO software, the completed data was downloaded in Excel sheet and was analyzed using the SPSS version 23 for both the descriptive and inferential statistic. Relative Important Index (RII) was used to evaluate the sub-constructs of knowledge, attitude, and preventive practices regarding Lassa Fever as adopted by Vali et al. (2018) in their study which analyses the socioeconomic inequalities in health domain in Tehran; a population-based cross-sectional study. Also, this model helps to determine the exact sub-constructs to focus on in the enlightenment programmes in the future as well as to forecast the epidemiology of LF in the study areas as attitudinal change is a way to go in order to lessen to the barest minimum the endemic pattern of LF in Nigeria.

2.7 Ethical Consideration

This research was approved by Kwara State University Malete Institutional Review Board and necessary permissions were obtained from relevant authorities in each LGA, Healthcare facilities and participants before conducting the study. Most Importantly, the participants were assured that the information gathered during the course of the study will be treated with utmost confidentiality.

3. RESULTS

Table 1a provides demographic information of the respondents. Among the 1192 respondents, 637 (53.4%) male and 555 (46.6%) female.

The age distribution shows that 517 (43.3%) respondents are aged 15-30, 262 (21.9%) male and 255 (21.4%) female. Respondents aged 31-45 are 396 (33.2%), with 241 (20.2%) male and 155 (13.0%) female. Those aged 46 and above total 279 (23.4%), with 134 (11.2%) male and 145 (12.2%) female.

Table 1b Occupationally, 201 (16.8%) are in the private sector (91 male, 110 female), 512(42.9%) are government workers (284 male, 228 female), 337 (28.2%) are self-employed (172 male, 165 female), 63 (5.2%) are unemployed (35 male, 28 female), 27 (2.2%) are retired (23 male, 4 female), 37 (3.1%) are students (31 male, 6 female), and 15 (1.2%) are housewives (all female).

Marital status shows 282 (27.7%) single (150 male, 132 female), 711 (55.7%) married (411 male, 300 female), 183 (14.8%) divorced (82 male, 101 female), 0.9% separated (5 male, 2 female), and 9 (1%) widowed (2 male, 7 female).

Religious affiliation indicates 647 (54.2%) are Christian (283 male, 364 female), 426 (35.6%) Muslim (261 male, 165 female), and 119 (9.9%) traditionalists (74 male, 45 female).

Ethnically, 443 (37.1%) are Yoruba (220 male, 223 female), 31 (2.5%) Hausa (10 male, 21

female), 115 (9.6%) Igbo (50 male, 65 female) and 603 (50.1%) Esan (419 male, 184 female).

Educationally, 60 (5.0%) have no formal education, 472 (39.6%) hold First School Leaving certificates (198 male, 274 female), 52 (4.3%) have secondary school certificates (25 male, 27 female), 332 (28.0%) hold tertiary certificates (187 male, 145 female), and 276 (23.1%) have vocational training (193 male, 83 female). Majority hold primary school certificates and vocational training.

Table 2a shows the demographic information of respondents in Primary Health Center (PHC). Among the 180 respondents, 90 (50.0%) male and 90 (50.0%) female. Regarding local governments, among 180 respondents, 60(33.3%) respondents in Estako West, in which 29(16.1%) are male and 31(17.2%) are female, In Esan West out of 60(33.3%) respondents, 28 (15.6%) are male and 32(17.8%) are female, In Esan North out of 60 60(33.3%) respondents, 33(18.3%) are male and 27(15.0%) are female.

Table 1a. Demographic information of respondents (Modified)

Category	Male (%)	Female (%)	Total (%)	Total Count
State				
Edo	637 (53.4%)	555 (46.6%)	1192 (100%)	1192
Total	637 (53.4%)	555 (46.6%)	1192 (100.0)	1192
LGA				
Esan West	241 (6.7)	157 (4.4)	398 (11.1)	398
Esan North East	169 (4.7)	230 (6.4)	399 (11.1)	399
Estako West	227 (6.4)	168 (4.7)	395 (11.1)	395

Table 1b. Demographic information of respondents

AGE	15-30	262 (21.9)	255 (21.4)	517 (43.3)
	31-45	241 (20.2)	155 (13.0)	396 (33.2)
	46 and above	134 (11.2)	145 (12.2)	279 (23.4)
Total		637 (53.3)	555 (46.7%)	1192 (100.0)
Occupation	Private sector	91 (7.6)	110 (9.2)	201 (16.8)
	Government	284 (23.8)	228 (19.1)	512 (42.9)
	Self Employed	172 (14.4)	165 (13.8)	337 (28.2)
	Unemployed	35 (2.9)	28 (2.3)	63 (5.2)
	Retired	23 (1.9)	4 (0.3)	27 (2.2)
	Student	31	6	37

AGE	15-30	262	255	517
		(21.9)	(21.4)	(43.3)
	Housewives	(2.6) 0	(0.5) 15	(3.1) 15
		(0.0)	(1.2)	(1.2)
Total		636 (53.3)	556 (46.6)	1192 (100.0)
Marital Status	Single	150 (12.5)	132 (11.1)	282 (27.7)
	Married	411 (34.4)	300 (25.1)	711 (55.7)
	Divorced	82 (6.8)	101 (8.4)	183 (14.8)
	Separated	5 (0.4)	2 (0.1)	7 (0.9)
	Widowed	2 (0.1)	7 (0.5)	9 (1.0)
Total		650 (54.5)	542 (45.4)	1192 (100.0)

Field Survey, 2023

Table 1c. Demographic information of respondents

Religion	Christianity	283	364	647
		(23.7)	(30.5)	(54.2)
	Islam	261 (21.8)	165 (13.8)	426 (35.6)
	Traditional	74 (6.2)	45 (3.7)	119 (9.9)
Total		618 (51.8)	574 (48.2)	1192 (100.0)
Tribe	Yoruba	220 (18.4)	223 (18.7)	443 (37.1)
	Hausa	10 (0.8)	21 (1.7)	31 (2.5)
	Igbo	50 (4.1)	65 (5.5)	115 (9.6)
	Esan	419 (35.1)	184 (15.4)	603 (50.1)
Total		699 (58.6)	493 (41.4)	1192 (100.0)
Education	No formal Education	32 (2.6)	28 (2.4)	60 (5.0)
	Primary	198 (16.6)	274 (23.0)	472 (39.6)
	Secondary	25 (2.1)	27 (2.2)	52 (4.3)
	Tertiary	187 (15.7)	145 (12.2)	332 (28.0)
	Vocational Training	193 (16.1)	83 (7.0)	276 (23.1)
Total		635 (53.3)	557 (46.7)	1192 (100.0)

Field Survey, 2023

Table 2a. Demographic information of respondents in Primary Health Care (PHC)

Category	Male (%)	Female (%)	Total (%)	Total Count
State				
Edo	90 (50.0)	90 (50.0)	180 (33.4)	180
Total	90 (50.0)	90 (50.0)	180 (100.0)	180
LGA				
Estako West	29 (16.1)	31 (17.2)	60 (33.3)	60
Esan West	28 (15.6)	32 (17.8)	60 (33.3)	60
Esan North	33 (18.3)	27 (15.0)	60 (33.3)	60

Table 2b. Demographic information of respondents in Primary Health Care (PHC)

Designation	Category	Male 6	Female 8	Total 14
	Medical doctor	(3.3)	(4.4)	(7.7)
	Nurse/Midwife	11 (6.1)	24 (13.3)	35 (19.4)
	Environmental Health officers	4 (2.2)	5 (2.8)	9 (5.0)
	Health Information Officers	18 (10.0)	17 (9.4)	35 (19.4)
	Laboratory scientist/ laboratory technician	17 (9.4)	11 (6.1)	28 (15.6)
	Community health worker	34 (18.9)	25 (13.9)	59 (32.7)
Total		90 (50.0)	90 (50.0)	180 (100.0)
Marital status	Single	28 (15.6)	18 (10.0)	46 (25.6)
	Married	57 (31.7)	63 (35.0)	120 (66.7)
	Divorced	5 (2.8)	6 (3.3)	11 (6.1)
	Separated	0 (0.0)	2 (1.1)	2 (1.1)
	Widowed	0 (.4)	1 (0.6)	1 (0.6)
Total		90 (50.0)	90 (50.0)	180 (100.0)

Table 2c. Demographic information of respondents in Primary Health Care (PHC)

Working experience	1-10	46	49	95
		(25.6)	(27.2)	(52.8)
	11-20	43 (23.9)	34 (18.9)	77 (42.8)
	21-30	1 (0.6)	6 (3.3)	7 (3.9)
	>31	0 (0.0)	1 (0.6)	1 (0.6)
Total		90 (50.0)	90 (50.0)	180 (100.0)

Table 2b Also, the designation distribution shows that 180(100%) PHC respondents, 14(7.7%) are medical doctor out of which 6(3.3%) are male and 8(4.4%) are female. 35(19.4%) of the

respondents are Nurse/Midwife, in which 11(6.1%) are male and 24(13.3%) are female. Out of 9(5.0%) respondents who are Environmental Health Officers, 4(2.2%) are male

and 5(2.8%) are female. Out of 35(19.4%) respondent who are health information Officers, 18(10.0%) are male and 17(9.4%) are female. 28(15.6%) respondents are also Laboratory scientist/ laboratory technician, in which 17(9.4%) are male and 11(6.1%) are female. Lastly, 59(32.7%) respondents are Community Health Workers, in which 34(18.9%) are male and 25(13.9%) are female. Majority of the respondents are community health workers.

It can be deduced from the cross tabulation of marital status of PHC and gender of respondents that out of 180(100%) respondents, 46(25.6%) were single, (28 male, 18 female), 120(66.7%) are married (57males, 63 females), 11(6.1%) divorced, (5 male, 6 female). Also, 2(1.1%) were separated, in which there was no male and 2(1.1%) are female. Furthermore, 1(0.6%) was a widow (1 female).

Table 2c the working experience shows that 180(100%) respondents, 95(52.8%) has an experience between 1 to 10 years, 46(25.6%)

are male and 49(27.2%) are female. 77(42.8%) of the respondents also have experience between 11 to 20 years, in which 43(23.9%) are male and 34(18.9%) are female. In the same vein, 7(3.9%) of the respondents have experience of 21 to 30 years, in which 1(0.4%) is male and 6(3.3%) are female. Finally, 1(1.2%) of the respondents have experience of more than 30 years, in which is a female.

Table 3a Shows Observational Checklist of the Presence and Practice of Infectious and Prevention Control (IPC) measures, It can be understood that out of 60(100%) PHC centers visited, 34(56.7%) have an isolation ward or room while 26(43.3%) did not. Similarly, 32(53.3%) facilities have a changing room while 28(46.7%) did not. 22(36.7%) facilities did not have restricted access room and only 38(63.3%) did. In the same vein, 20(33.3%) facilities did not have soap for hand washing, only 40(66.7%) facilities did. 23(38.3%) facilities did not have wash hand basin while only 37(61.7%) did.

Table 3a. Observational Checklist of Presence and Practice of Infectious and Prevention Control (IPC) measures

Is an isolation ward or room available	Yes	34 (56.7)
	No	26 (43.3)
Total		60 (100.0)
Does the facility has a changing room	Yes	32 (53.3)
	No	28 (46.7)
Total		60 (100.0)
Does the facility has restricted access room	Yes	22 (36.7)
	No	38 (63.3)
Total		60 (100.0)
Does the facility has soap for hand washing	Yes	20 (33.3)
	No	40 (66.7)
Total		60 (100.0)
Is wash hand basin available in the facility	Yes	23 (38.3)
	No	37 (61.7)
Total		60 (100.0)

Table 3b. Observational checklist of presence and practice of infectious and prevention control (IPC) measures

Are gloves available in the facility	Yes	35 (58.3)
	No	25 (41.7)
Total		60 (100.0)
Is face shield or goggles available	Yes	2 (3.3)
	No	58 (96.7)
Total		60 (100.0)
Is apron available in the facility	Yes	11 (18.3)
	No	49 (81.6)
Total		60 (100.0)
Is there full body PPE in the facility	Yes	23 (38.3)
	No	37 (61.7)
Total		180 (100.0)
Are boots available in the facility	Yes	18 (30.0)
	No	42 (70.0)
Total		60 (100.0)
Is there red color coded waste bin in the facility	Yes	2 (3.3)
	No	58 (96.7)
Total		60 (100.0)

Field Survey, 2023

Table 3b 35(58.3%) facilities have gloves, while 25(41.7%) facilities did not. 2(3.3%) facilities have face shield or goggles and 58(96.7%) facilities have not face shield or google, 11(18.3%) facilities did have apron and 49(81.6%) do not have apron. 23(38.3%) facilities had full body PPE and 37(61.7%) had not full body PPE, 18(30.0%) facilities had boots available while 42(70.0%) had not boot available. only 2(3.3%) facilities have red color-coded waste bin, 58(96.7%) facilities had not red color code waste bin.

Table 4 shows the attitude toward usage of PPE while treating for Lassa fever patient in Edo State

is display on table 4.4, this reveal that 100% of the respondents report rarely using gowns and boots. 16.7% never dispose of sharps in proper bins, while 83.3% do so rarely. 91.7% rarely use them, with 30% never using them, 16.7% never wash hands, while 83.3% rarely do so. 100% of respondents use gloves rarely. However, in Edo State, the attitude towards PPE use is also poor, with almost all healthcare workers using protective gear rarely, showing a significant gap in PPE usage practices.

Table 5 shows the Knowledge of PHC personnel on Lassa Fever in Edo State. This table shows uniformity across responses in Edo State:-

Health workers in Edo State demonstrate excellent knowledge, with 100% agreement that Lassa fever is a deadly, acute viral hemorrhagic illness, and that rats are the reservoir. The only area of lower agreement concerns alternative reservoirs, with only 66.7% agreeing, while 25% remain neutral or uncertain.

Table 6a reveals Cross-tabulation of Edo State Respondents on Knowledge and Educational qualifications. It shows that Minority (234/19.6%) of the respondents out of 1192 respondents are aware that there is an outbreak of Lassa fever, of which (134/11.2%) are respondents with Vocational training, followed by those with Tertiary Education (64/5.4%), and the respondents with Secondary Education

(14/1.2%) are the least aware. Contrarily, out of the 1186 respondents, 99.5% are not aware that contact with an infected person can lead to Lassa fever, of which the highest respondents (35.4%) are those with no Primary Education and the least respondents (2.5%) are those with Secondary Education. Of 1192 respondents, 97.1% do not know that the incubation period of Lassa Fever is between 1 - 21 days, 80.1% indicate that Lassa fever is severe viral and fever like, 99.7% believe that Lassa fever cannot be transmitted during sexual intercourse.

Table 6b shows that, majority of respondents do not know that the symptoms of Lassa fever resemble other viral and consumption of rodent bush meats increase the chances.

Table 4. Attitude toward usage of PPE while treating for Lassa fever patient in Edo State

		Have you attended training or sensitization workshop on		Total
		Yes	No	
I use gown and boot during procedure likely to generate splashes	Rarely	58 32.2%	122 67.8%	180 100.0%
Total		58 32.2%	122 67.8%	180 100.0%
I dispose all sharps in sharps bin	Never	10 5.6%	20 11.1%	30 16.7%
	Rarely	48 26.7%	102 56.7%	150 83.3%
Total		58 32.2%	122 67.8%	180 100.0%
I use nose masks and eye protection during procedures	Never	54 30.0%	111 61.7%	165 91.7%
	Rarely	4 2.2%	11 6.1%	15 8.3%
Total		58 32.2%	122 67.8%	180 100.0%
I wash hands before and after a procedure	Never	9 5.0%	21 11.7%	30 16.7%
	Rarely	49 27.2%	101 56.1%	150 83.3%
Total		58 32.2%	122 67.8%	180 100.0%
I use gloves when handling body secretions and contaminated items	Rarely	58 32.2%	122 67.8%	180 100.0%
Total		58 32.2%	122 67.8%	180 100.0%

Field Survey, 2023

Table 5. Knowledge of PHC personnel on lassa fever and epidemiological features of lassa fever in Edo State

		Have you attended training or sensitization workshop on		Total	p-value
		Yes	No		
Lassa fever is a common deadly disease	Agree	58 32.2%	122 67.8%	180 100.0%	0.000
Total		58 32.2%	122 67.8%	180 100.0%	
It is an acute viral hemorrhagic illness	Agree	58 32.2%	122 67.8%	180 100.0%	0.000
Total		58 32.2%	122 67.8%	180 100.0%	
The reservoir of the causative agent of Lassa fever is rat	Agree	58 32.2%	122 67.8%	180 100.0%	0.000
Total		58 32.2%	122 67.8%	180 100.0%	
The reservoir of the causative agent of Lassa fever is rat	Agree	58 32.2%	122 67.8%	180 100.0%	0.000
Total		58 32.2%	122 67.8%	180 100.0%	
Bat monkey mosquito and fry are also reservoirs	Agree	39 21.7%	81 45.0%	120 66.7%	0.981
	Neutral	14 7.8%	31 17.2%	45 25.0%	
	Disagree	5 2.8%	10 5.6%	15 8.3%	
Total		58 32.2%	122 67.8%	180 100.0%	

*Field Survey, 2023***Table 6a. Cross-tabulation of Edo State respondents on knowledge and educational qualifications**

		Education				Total	P-values
		Primary	Secondary	Tertiary	Vocational Training		
Do you know that there is an outbreak of Lassa fever	Yes	22 1.8%	14 1.2%	64 5.4%	134 11.2%	234 19.6%	0.000
	No	402 33.7%	38 3.3%	196 16.4%	322 27.0%	958 80.4%	
Total		424 35.5%	52 4.4%	260 21.8%	456 38.3%	1192 100.0%	0.072
Can contact with infected persons lead to Lassa fever	Yes	1 .1%	1 .1%	2 .2%	2 .2%	6 .5%	
	No	423 35.4%	51 4.3%	384 32.2%	328 27.5%	1186 99.5%	
Total		424 35.5%	52 4.4%	386 32.4%	330 27.7%	1192 100.0%	

		Education				Total	P-values
		Primary	Secondary	Tertiary	Vocational Training		
Do you know the incubation period of Lassa fever is between 6_21 days	Yes	1 .1%	1 .1%	6 .5%	27 2.3%	35 2.9%	0.012
	No	423 35.4%	51 4.3%	380 31.9%	303 25.4%	1157 97.1%	
	Total	424 35.5%	52 4.4%	386 32.4%	330 27.7%	1192 100.0%	
Can Lassa fever be transmitted during sexual intercourse	Yes	0 0.0%	1 .1%	1 .1%	1 .1%	3 .3%	0.047
	No	424 35.5%	51 4.4%	385 32.3%	329 27.6%	1189 99.7%	
	Total	424 35.5%	52 4.4%	386 32.4%	330 27.7%	1192 100.0%	
Do you know consumption of rodent bush meats increase the chances	Yes	1 .1%	0 0.0%	1 .1%	0 0.0%	2 .2%	0.095
	No	423 35.4%	52 4.4%	385 32.3%	330 27.7%	1190 98%	
	Total	424 35.5%	52 4.4%	386 32.4%	330 27.7%	1192 100.0%	

Field Survey, 2023

Table 6b. Cross-tabulation of Edo State respondents on knowledge and educational qualifications

Do you know that the symptoms of Lassa fever resemble other viral	Yes	0 0.0%	0 0.0%	1 .1%	0 0.0%	1 .1%	0.148
	No	424 35.5%	52 4.4%	385 32.3%	330 27.7%	1190 99.9%	
	Total	424 35.5%	52 4.4%	386 32.4%	330 27.7%	1192 100.0%	
Lassa fever is severe viral and fever like	Yes	404 33.9%	23 1.9%	345 28.9%	183 15.4%	955 80.1%	0.000
	No	100 8.4%	4 .3%	23 1.9%	110 9.2%	237 19.9%	
	Total	504 42.3%	27 2.3%	368 30.8%	293 24.6%	1192 100.0%	

Field Survey, 2023

Table 7a Cross-tabulation of Edo State Respondents on Attitude and Educational qualifications. Displays. According to the Educational qualifications of the respondents, majority (96.6%) do not believe that Lassa fever exists, and 97.7% of the respondents believe that Lassa fever is not a life-threatening illness, of which the highest respondents are those with Primary Education and the least is those with Secondary Education. Furthermore, out of 1192 respondents, 97.4% thinks Lassa fever cannot

be cured, 98.8% do not advocate proper environmental sanitation and 99.2% do not practice Environmental sanitation, personal hygiene and putting food in a rodent proof container.

Table 7b Similarly, 99.5% out of the 1192 respondents eat bush meats and spreads foods on the road sides while 99.5% respondents believe that a strong and healthy person can be infected with Lassa fever.

Table 7a. Cross-tabulation of Edo State respondents on attitude and educational qualifications

		Education				Total	P-values
		Primary	Secondary	Tertiary	Vocational Training		
Do you believe Lassa fever exists	Yes	0 0.0%	0 0.0%	3 .3%	2 .2%	5 .4%	0.004
	No	424 35.5%	52 4.4%	383 32.1%	328 27.5%	1187 99.6%	
	Total	424 35.5%	52 4.4%	386 32.4%	330 27.7%	1192 100.0%	
Lassa fever is life threatening illness	Yes	2 ..2%	0 0.0%	7 .6%	19 1.6%	28 2.3%	0.008
	No	422 35.3%	52 4.4%	379 31.8%	311 26.1%	1164 97.7%	
	Total	424 35.5%	52 4.4%	386 32.4%	330 27.7%	1192 100.0%	
Lassa fever can be cured	Yes	0 0.0%	3 .3%	7 .6%	21 1.8%	31 2.6%	0.000
	No	424 35.5%	49 4.1%	379 31.8%	309 25.9%	1161 97.4%	
	Total	424 35.5%	52 4.4%	386 32.4%	330 27.7%	1192 100.0%	
Advocacy proper environmental sanitation	Yes	1 .1%	1 .1%	4 .3%	8 .7%	14 1.2%	0.018
	No	423 35.4%	51 4.3%	382 32.0%	322 27.0%	1178 98.8%	
	Total	424 35.5%	52 4.4%	386 32.4%	330 27.7%	1192 100.0%	
Environmental sanitation personal hygiene putting food in a rodent proof	Yes	1 .1%	0 0.0%	4 .3%	4 .3%	9 .8%	0.425
	No	423 35.4%	52 4.4%	382 32.0%	326 27.3%	1183 99.2%	
	Total	424 35.5%	52 4.4%	386 32.4%	330 27.7%	1192 100.0%	

Field Survey, 2023

Table 7b. Cross-tabulation of Edo State respondents on attitude and educational qualifications

Not eating bush meats and spreading of foods on the roadsides	Yes	1 .1%	0 0.0%	1 .1%	4 .3%	6 .5%	0.176
	No	423 35.4%	52 4.4%	385 32.3%	326 27.3%	1186 99.5%	
	Total	424 35.5%	52 4.4%	386 32.4%	330 27.7%	1192 100.0%	
A strong and healthy person can be infected with Lassa fever	Yes	424 35.5%	52 4.4%	385 32.3%	325 27.2%	1186 99.5%	0.000
	No	0 0.0%	0 0.0%	1 .1%	5 .4%	6 .5%	
	Total	424 35.5%	52 4.4%	386 32.4%	330 27.7%	1192 100.0%	

Field Survey, 2023

Table 8a. Cross-tabulation of Edo State respondents on practice and education qualifications

		Education				Total	P-values
		Primary	Secondary	Tertiary	Vocational Training		
Do you eat rodents	Yes	0 0.0%	0 0.0%	1 .1%	0 0.0%	1 .1%	0.681
	No	424 35.5%	52 4.4%	385 32.3%	330 27.7%	1191 99.9%	
Total		424 35.5%	52 4.4%	386 32.4%	330 27.7%	1192 100.0%	
Do you feed on rodents contaminated foods	Yes	0 0.0%	0 0.0%	1 .1%	1 .1%	2 .2%	0.816
	No	424 35.5%	52 4.4%	385 32.3%	329 27.6%	1190 99.8%	
Total		424 35.5%	52 4.4%	386 32.4%	330 27.7%	1192 100.0%	
Do you spread foods on the road sides and your house surroundings	Yes	0 0.0%	0 0.0%	1 .1%	1 .1%	2 .2%	0.000
	No	424 35.5%	52 4.4%	385 32.3%	329 27.6%	1190 99.8%	
Total		424 35.5%	52 4.4%	386 32.4%	330 27.7%	1192 100.0%	
Do you store your food in rodent proof containers	Yes	20 1.7%	1 .1%	53 4.4%	68 5.7%	142 11.9%	0.000
	No	404 33.9%	52 4.4%	333 27.9%	262 21.9%	1050 88.1%	
Total		424 35.5%	53 4.4%	386 32.4%	330 27.7%	1192 100.0%	
Do you frequently engage in environmental sanitation	Yes	34 2.9%	34 2.9%	89 7.5%	167 14.0%	324 25.8%	0.012
	No	390 32.7%	18 1.5%	297 24.9%	163 13.7%	868 74.2%	
Total		424 35.5%	52 4.4%	386 32.4%	330 27.7%	1192 100.0%	

Field Survey, 2023

Table 8b. Cross-tabulation of Edo State respondents on practice and educational qualifications

Do you use traps in and around your house	Yes	25 2.1%	6 .5%	40 3.4%	102 8.6%	173 14.5%	0.001
	No	399 33.5%	46 3.8%	346 29.0%	228 19.1%	1019 85.5%	
Total		424 35.5%	52 4.4%	386 32.4%	330 27.7%	1192 100.0%	
Have you participated in any Lassa fever campaign	Yes	6 .5%	2 .2%	19 1.6%	54 4.5%	81 6.8%	0.000
	No	418 35.1%	50 4.2%	367 30.8%	276 23.2%	1111 93.2%	
Total		424 35.5%	52 4.4%	386 32.4%	330 27.7%	1192 100.0%	
Do you share towels clothes and other personal	Yes	1 .1%	0 0.0%	2 .2%	3 .3%	6 .5%	0.424
	No	423 35.5%	52 4.4%	384 32.4%	327 27.7%	1186 100.0%	

belongings with family		35.4%	4.4%	32.2%	27.4%	99.5%	
Total		424	52	386	330	1192	
		35.5%	4.4%	32.4%	27.7%	100.0%	
If you experience any signs and symptoms of Lassa fever	Yes	0	1	3	11	15	0.000
		0.0%	.1%	.3%	.9%	1.3%	
	No	424	51	383	319	1177	
		35.4%	4.3%	32.1%	26.8%	98.7%	
Total		424	52	386	330	1192	
		35.5%	4.4%	32.4%	27.7%	100.0%	

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Table 8a shows Cross-tabulation of Edo State Respondents on Practice and Educational qualifications. According to their experience and educational background, out of 1192 respondents, majority 1191(99.9%) of the respondents do not consume rodents, 1190(99.8%) do not feed on rodents and contaminated foods, 1190(99.8%) do not spread foods on the road sides and their house surroundings. Contrarily, minority of the respondents store their food in rodent proof containers, 324(25.8%) do not frequently engage in environmental sanitation.

Table 8b shows that 173(14.5%) use traps in and around their house. Conclusively Majority have not participated in any Lassa fever campaign, share towels clothes and other personal belongings with family and have not experience any signs and symptoms of Lassa fever.

Table 9a shows Cross-tabulation of Edo State Respondents on Knowledge and Total Monthly Income. According to the Monthly income of respondents, it can be deduced that majority of the respondents which represents 80.4% are not aware that there is an outbreak of Lassa fever, of which the highest respondents are those who earn between #11,000 - 20,000 (53.5%) while the least respondents are those who earn between #21,000 - #30,000 (1.0%). Additionally, out of 1192 respondents, 1186 (99.5%) respondents believe that contact with an infected person cannot lead to Lassa fever, 1157(97.1%) respondents do not know the incubation period of Lassa fever is between 1_21days, 1189(99.7%) respondents think Lassa fever cannot be transmitted during sexual intercourse.

Table 9b shows that, Majority of the respondents do not know consumption of rodent bush meats increase the chances, do not know that the symptoms of Lassa fever resemble other viral and Lassa fever is severe viral and fever like.

Table 10a reveals Cross-tabulation of Edo State Respondents on Attitude and Total Monthly Income. It can be deduced that out of 1192 respondents, majority (99.6%) do not believe that Lassa fever exists, of which the highest respondents are those who earn between #11,000 - #20,000 and the least is respondents earning between #21,000 - #30,000, and 97.6% of the respondents believe that Lassa fever is not a life threatening illness, which 54.7% of the respondents are those earning between #11,000 - # 20,000, followed by 20.1% of the respondents earning between #50,000 - above and 17.1% of the respondents who earn between #41,000 - #50,000 are the least. Furthermore, out of 1192 respondents, 99.7% thinks Lassa fever cannot be prevented, 97.4% thinks Lassa fever cannot be cured, 98.8% do not advocate proper environmental sanitation.

Table 10b shows that 99.2% do not practice Environmental sanitation, personal hygiene and putting food in a rodent proof container. In addition, 99.5% out of the 1192 respondents eat bush meats and spreads foods on the road sides while 99.5% respondents believe that a strong and healthy person can be infected with Lassa fever.

Table 11a shows Cross-tabulation of Edo State Respondents on Practice and Total Monthly Income. According to the monthly income earned by the respondents, 1191(99.9%) of the respondents do not consume rodents, 1190(99.8%) do not feed on rodents and contaminated foods. The highest respondents are those earning between #11,000 - #20,000 and the least respondents are those earning between #21,000 - #30,000. Additionally, majority of the respondents do not store their food in rodent proof containers, 890(74.7%) do not frequently engage in environmental sanitation and 1019(85.5%) do not use traps in and around their house.

Table 9a. Cross-tabulation of Edo State respondents on knowledge and total monthly income

		Total Monthly Household Income					Total	P-values
		#11000-20000	#21000-30000	#31000-40000	#41000-50000	#51000 and above		
Do you know that there is an outbreak of Lassa fever	Yes	26 2.2%	12 1.0%	34 2.9%	77 6.5%	85 7.1%	234 19.6%	0.000
	No	626 53.5%	28 2.3%	21 1.8%	127 10.7%	156 13.0%	958 80.4%	
Total		652 54.7%	40 3.4%	55 4.6%	204 17.1%	241 20.2%	1192 100.0%	
Can contact with infected persons lead to Lassa fever	Yes	0 0.0%	0 0.0%	0 0.0%	4 .3%	2 .2%	6 .5%	0.000
	No	652 54.7%	40 3.4%	55 4.6%	200 16.8%	239 20.0%	1186 99.5%	
Total		652 54.7%	40 3.4%	55 4.6%	204 17.1%	241 20.2%	1192 100.0%	
Do you know the incubation period of Lassa fever is between 1_21days	Yes	1 .1%	0 0.0%	1 .1%	9 .8%	24 2.1%	35 2.9%	0.000
	No	651 54.6%	40 3.4%	54 4.5%	195 16.4%	217 18.2%	1157 97.1%	
Total		652 54.7%	40 3.4%	55 4.6%	204 17.1%	241 20.2%	1192 100.0%	
Can Lassa fever be transmitted during sexual intercourse	Yes	0 0.0%	1 .1%	0 0.0%	1 .1%	1 .1%	3 .3%	0.000
	No	652 54.7%	39 3.3%	55 4.6%	203 17.0%	240 20.1%	1189 99.7%	
Total		652 55.7%	40 3.4%	55 4.6%	204 17.1%	241 20.2%	1192 100.0%	

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Table 9b. Cross-tabulation of Edo State respondents on knowledge and total monthly income

Do you know consumption of rodent bush meats increase the chances	Yes	0 0.0%	0 0.0%	0 0.0%	2 .2%	0 0.0%	2 .2%	0.082
	No	652 54.7%	40 3.4%	55 4.6%	202 16.9%	241 20.2%	1190 99.8%	
	Total	652 54.7%	40 3.4%	55 4.6%	204 17.1%	241 20.2%	1192 100.0%	
Do you know that the symptoms of Lassa fever resemble other viral	Yes	0 0.0%	0 0.0%	0 0.0%	1 .1%	0 0.0%	1 .1%	0.165
	No	652 54.7%	40 3.4%	55 4.6%	203 16.9%	241 20.2%	1191 99.9%	
	Total	652 54.7%	40 3.4%	55 4.6%	204 17.1%	241 20.2%	1192 100.0%	
Lassa fever is severe viral and fever like	Yes	647 54.3%	34 2.8%	38 3.2%	201 16.8%	127 10.7%	1047 87.8%	0.000
	No	5 .5%	2 .2%	9 .8%	53 4.4%	76 6.4%	145 12.2%	
	Total	652 54.7%	36 3.0%	47 3.9%	254 21.3%	203 17.0%	1192 100.0%	

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Table 10a. Cross-tabulation of Edo State respondents on attitude and total monthly income

		Total Monthly Household Income					Total	P-values
		#11000-20000	#21000-30000	#31000-40000	#41000-50000	#51000 and above		
Do you believe Lassa fever exists	Yes	0 0.0%	0 0.0%	0 0.0%	2 .2%	3 .3%	5 .4%	0.011
	No	652 54.7%	40 3.4%	55 4.6%	202 16.9%	238 20.0%	1187 99.6%	
Total		652 54.7%	40 3.4%	55 4.6%	204 17.1%	241 20.2%	1192 100.0%	
Lassa fever is life threatening illness	Yes	0 0.0%	1 .1%	0 0.0%	11 .9%	16 1.3%	28 2.4%	0.000
	No	652 54.7%	39 3.3%	55 4.6%	193 16.2%	225 18.9%	1164 97.6%	
Total		652 54.7%	40 3.4%	55 4.6%	204 17.1%	241 20.2%	1192 100.0%	
Lassa fever can be prevented	Yes	0 0.0%	0 0.0%	0 0.0%	1 .1%	2 .2%	3 .3%	0.434
	No	652 55.7%	40 3.4%	55 4.6%	203 17.0%	239 20.1%	1189 99.7%	
Total		652 55.7%	40 3.4%	55 4.6%	204 17.1%	241 20.2%	1192 100.0%	
Lassa fever can be cured	Yes	0 0.0%	4 .3%	2 .2%	10 .9%	15 1.3%	31 2.6%	0.000
	No	652 54.7%	36 3.0%	53 4.4%	194 16.3%	226 19.0%	1161 97.4%	
Total		652 54.7%	40 3.4%	55 4.6%	204 17.1%	241 20.2%	1192 100.0%	
Advocacy proper environmental sanitation	Yes	0 0.0%	2 .2%	1 .1%	3 .3%	8 .7%	14 1.2%	0.000
	No	652 54.7%	38 3.2%	54 4.5%	201 16.9%	233 19.5%	1178 98.8%	
Total		652 54.7%	40 3.4%	55 4.6%	204 17.1%	241 20.2%	1192 100.0%	

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Table 10b. Cross-tabulation of Edo State respondents on attitude and total monthly income

Environmental sanitation personal hygiene putting food in a rodent proof	Yes	0 0.0%	0 0.0%	1 .1%	4 .3%	4 .3%	9 .8%	0.011
	No	652 55.7%	40 3.4%	54 4.5%	200 16.8%	237 19.9%	1183 99.2%	
Total		652 54.7%	40 3.4%	55 4.6%	204 17.1%	241 20.2%	1192 100.0%	
Not eating bush meats and spreading of foods on the roadsides	Yes	0 0.0%	0 0.0%	0 0.0%	5 .4%	1 .1%	6 .5%	0.001
	No	652 54.7%	40 3.4%	55 4.6%	199 16.7%	240 20.1%	1186 99.5%	
Total		652 54.7%	40 3.4%	55 4.6%	204 17.1%	241 20.2%	1192 100.0%	

A strong and healthy person can be infected with Lassa fever	Yes	652 54.7%	40 3.4%	54 4.5%	203 17.0%	237 19.9%	1186 99.5%	0.000
	No	0 0.0%	0 0.0%	1 .1%	1 .1%	4 .3%	6 .5%	
Total		652 54.7%	40 3.4%	55 4.6%	204 17.1%	241 20.2%	1192 100.0%	

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Table 11a. Cross-tabulation of Edo State respondents on practice and total monthly income

		Total Monthly Household income					Total	P-values
		#11000-20000	#21000-30000	#31000-40000	#41000-50000	#51000 and above		
Do you eat rodents	Yes	0 0.0%	0 0.0%	0 0.0%	1 .1%	0 0.0%	1 .1%	0.416
	No	652 54.7%	40 3.4%	55 4.6%	203 17.0%	241 20.2%	1191 99.9%	
Total		652 54.7%	40 3.4%	55 4.6%	204 17.1%	241 20.2%	1192 100.0%	
Do you feed on rodents contaminated foods	Yes	0 0.0%	0 0.0%	0 0.0%	1 .1%	1 .1%	2 .2%	0.832
	No	652 54.7%	40 3.4%	55 4.6%	203 17.0%	240 20.1%	1190 99.8%	
Total		652 54.7%	40 3.4%	55 4.6%	204 17.1%	241 20.2%	1192 100.0%	
Do you store your food in rodent proof containers	Yes	1 .1%	4 .3%	18 1.5%	54 4.6%	65 5.6%	142 12.1%	0.000
	No	651 54.6%	36 3.0%	37 3.1%	150 12.6%	176 14.8%	1050 88.1%	
Total		652 54.7%	40 3.4%	55 4.6%	204 17.1%	241 20.2%	1192 100.0%	
Do you frequently engage in environmental sanitation	Yes	27 2.3%	54 1.1%	29 2.5%	118 10.1%	115 9.8%	302 25.3%	0.001
	No	625 52.4%	5 .4%	48 4.0%	86 7.2%	126 10.6%	890 74.7%	
Total		652 54.7%	59 4.9%	77 6.5%	204 17.1%	241 20.2%	1192 100.0%	
Do you use traps in and around your house	Yes	3 .3%	8 .7%	13 1.1%	49 4.2%	100 8.5%	173 14.5%	0.005
	No	649 54.4%	32 2.7%	42 3.5%	155 13.0%	141 11.8%	1019 85.5%	
Total		652 54.6%	40 3.4%	55 4.7%	204 17.4%	241 20.2%	1192 100.0%	

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Table 11b. Cross-tabulation of Edo State respondents on practice and total monthly income

Have you participated in any Lassa fever campaign	Yes	1 .1%	2 .2%	7 .6%	28 2.4%	43 3.7%	81 6.9%	0.000
	No	651 54.6%	38 3.2%	48 4.0%	176 14.8%	198 16.6%	1111 93.1%	
Total		652 54.7%	40 3.4%	55 4.6%	204 17.1%	241 20.2%	1192 100.0%	

Do you share towels	Yes	0 0.0%	0 0.0%	1 .1%	3 .3%	2 .2%	6 .5%	0.062
clothes and other personal belongings with family	No	652 54.7%	40 3.4%	54 4.6%	201 16.9%	239 20.1%	1186 99.5%	
Total		652 54.7%	40 3.4%	55 4.7%	204 17.1%	241 20.2%	1192 100.0%	
If you experience any signs and symptoms of Lassa fever	Yes	1 .1%	0 0.0%	0 0.0%	6 .5%	8 .7%	15 1.3%	0.001
	No	651 54.6%	40 3.4%	55 4.6%	198 16.6%	233 19.5%	1177 98.7%	
Total		652 54.7%	40 3.4%	55 4.6%	204 17.1%	241 20.2%	1192 100.0%	

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Table 11b shows that majority have not participated in any Lassa fever campaign, share towels clothes and other personal belongings with family and have not experience any signs and symptoms of Lassa fever.

Table 12a displays the Cross-tabulation of Edo State Respondents on Knowledge and Type of Residence. It shows that Majority (958/80.4%) of the respondents out of 1192 respondents are not aware that there is an outbreak of Lassa fever, of which (680/57.0%) live in semi-detached houses, followed by those who live in bungalow houses (121/10.2%), and the respondents who live in face-me-i-face-you (57/4.8%) are the least aware. Additionally, out of the 1192 respondents, 99.5% are not aware that contact with an infected person can lead to Lassa fever, of which the highest respondents (64.%) live in Semi-detached houses and the least respondents (7.0%) live in face-me-i-face-you houses. Furthermore, 97.0% of the respondents do not know that the incubation period of Lassa fever is between 1 - 21 days and 99.7% believe that Lassa fever cannot be transmitted during sexual intercourse.

Table 12b shows that majority of respondents do not know that consumption of rodent bush meats increases the chances, the symptoms of Lassa fever resemble other viral and that Lassa fever is severe viral and fever like.

Table 13a display Cross-tabulation of Edo State Respondents on Attitude and Type of Residence. It can be deduced that out of 1192 respondents, majority (98.8%) do not believe that Lassa fever exists, and 97.6% of the respondents believe that Lassa fever is not a life-threatening illness, of

which the highest respondents are respondents who live in Semi-detached houses and the least is those living in face-me-i-face-you houses. Furthermore, 99.7% thinks Lassa fever cannot be prevented, 96.4% thinks Lassa fever cannot be cured, 97.8% do not advocate proper environmental sanitation.

Table 13b shows that 98.2% do not practice Environmental sanitation, personal hygiene and putting food in a rodent proof container. Similarly, 99.5% out of the 1192 respondents eat bush meats and spreads foods on the road sides while 99.5% respondents believe that a strong and healthy person can be infected with Lassa fever and the highest respondents live in semi-detached houses and the least respondents live in face-me-i-face-you houses.

Table 14a reveals Cross-tabulation of Edo State Respondents on Practice and Type of Residence. According to the type of residence the respondents lives in, out of 1192 respondents, 1191(99.9%) of the respondents do not consume rodents, 1190(99.8%) do not feed on rodents and contaminated foods, 1190(99.8%) do not spread foods on the road sides and their house surroundings. The highest respondents are those who live in semi-detached houses and the least respondents are those living in face-me-i-face-you houses. Additionally, majority of the respondents do not store their food in rodent proof containers, 890(87.9%) do not frequently engage in environmental sanitation and 1019(85.5%) do not use traps in and around their house.

Table 14b shows that majority have not participated in any Lassa fever campaign, share towels clothes and other personal belongings

with family and have not experience any signs and symptoms of Lassa fever.

Table 15 shows that According to respondents in Edo State, PHC personnel's primary knowledge about Lassa fever is that it is a common, fatal disease that is caused by a viral hemorrhagic illness. The respondents also stated that the Lassa virus is the causative agent of Lassa fever and that rats, with RIs of 0.960, are the main reservoirs of the causative agent of Lassa fever, ranking first, second, and third, respectively. In contrast, PHC personnel's least knowledge about Lassa fever is that bats, monkeys, mosquitoes, and flies are also reservoirs of the causative agent of Lassa fever, with RIs of 0.840.

4. DISCUSSION

The findings presented across the various tables provide a comprehensive overview of demographic, occupational, and health-related factors among respondents from Edo State. The research reveals the gender distribution of participants, with males making up 53.4% (637 respondents) and females 46.6% (555 respondents). This relatively balanced participation across genders is consistent across the local government areas (LGAs), with Esan West, Esan North East, and Estako West showing similar gender distributions, underscoring equitable gender representation in the survey.

Table 12a. Cross-tabulation of Edo State respondents on knowledge and type of residence

		Type of residence				Total	P-values
		Bungalow	face-me-i-face-you	Semi-detached	Others		
Do you know that there is an outbreak of Lassa fever	Yes	76	27	93	38	234	0.000
		6.5%	2.3%	7.9%	3.2%	20.0%	
	No	121	57	680	100	958	
		10.2%	4.8%	57.0%	8.4%	80.4%	
	Total	197	84	773	138	1192	
		16.5%	7.0%	64.8%	11.6%	100.0%	
Can contact with infected persons lead to Lassa fever	Yes	1	1	3	1	6	0.690
		.1%	.1%	.3%	.1%	.5%	
	No	196	83	770	137	1186	
		16.4%	6.9%	64.6%	11.5%	99.5%	
	Total	197	84	773	138	1192	
		16.5%	7.0%	64.8%	11.6%	100.0%	
Do you know the incubation period of Lassa fever is between 1_21days	Yes	19	1	8	7	35	0.000
		1.6%	.1%	.7%	.6%	3.0%	
	No	178	83	765	131	1157	
		14.9%	6.9%	64.2%	11.0%	97.0%	
	Total	197	84	773	138	1192	
		16.5%	7.0%	64.8%	11.6%	100.0%	
Can Lassa fever be transmitted during sexual intercourse	Yes	1	0	1	1	3	0.590
		.1%	0.0%	.1%	.1%	.3%	
	No	196	84	772	137	1189	
		16.4%	7.0%	64.7%	11.5%	99.7%	
	Total	197	84	773	138	1192	
		16.5%	7.0%	64.8%	11.6%	100.0%	
Do you know consumption of rodent bush meats increase the chances	Yes	0	0	2	0	2	0.794
		0.0%	0.0%	.2%	0.0%	.2%	
	No	197	84	771	138	1190	
		16.5%	7.0%	64.7%	11.6%	99.8%	
	Total	197	84	773	138	1192	
		16.5%	7.0%	64.8%	11.6%	100.0%	

Field Survey, 2023

Table 12b. Cross-tabulation of Edo State respondents on knowledge and type of residence

Do you know that the symptoms of Lassa fever resemble other viral	Yes	0	0	1	0	1	0.916
	No	197	84	772	138	1191	
		0.0%	0.0%	.1%	0.0%	.1%	
		16.5%	7.0%	64.7%	11.6%	99.9%	
Total		197	84	773	138	1192	0.000
		16.5%	7.0%	64.8%	11.6%	100.0%	
Lassa fever is severe viral and fever like	Yes	119	40	683	113	955	
	No	57	27	63	90	237	
		10.0%	3.4%	57.3%	9.5%	80.1%	
		4.8%	2.3%	5.3%	7.5%	19.9%	
Total		176	67	746	246	1192	
		14.8%	5.6%	62.6%	20.6%	100.0%	

*Field Survey, 2023***Table 13a. Cross-tabulation of Edo State respondents on attitude and type of residence**

		Type of residence				Total	P-values
		Bungalow	face-me-i-face-you	Semi-detached	Others		
Do you believe Lassa fever exists	Yes	2	10	2	0	14	0.284
	No	203	66	771	138	1165	
		0.2%	0.8%	0.2%	0.0%	1.2%	
		17%	5.5%	64.7%	11.6%	98.8%	
Total		204	76	773	138	1192	
		16.9%	6.3%	64.8%	11.6%	100.0%	
Lassa fever is life threatening illness	Yes	12	1	14	1	28	0.000
	No	189	69	769	137	1164	
		1.0%	.1%	1.2%	.1%	2.4%	
		15.9%	5.8%	64.5%	11.5%	97.6%	
Total		197	70	787	138	1192	
		16.8%	5.3%	66.1%	11.8%	100.0%	
Lassa fever can be prevented	Yes	0	1	2	0	3	0.231
	No	197	61	771	138	116	
		0.0%	.1%	.2%	0.0%	.3%	
		16.8%	5.2%	65.9%	11.8%	99.7%	
Total		197	62	773	138	1192	
		16.8%	5.3%	66.1%	11.8%	100.0%	
Lassa fever can be cured	Yes	17	15	10	1	43	0.000
	No	180	67	765	137	1149	
		1.4%	1.3%	.8%	.1%	3.6%	
		15.1%	5.6%	64.2%	11.5%	96.4%	
Total		197	82	775	138	1192	
		16.8%	5.3%	66.1%	11.8%	100.0%	
Advocacy proper environmental sanitation	Yes	5	12	7	2	26	0.463
	No	199	65	766	136	1166	
		.4%	1%	.6%	.2%	2.2%	
		16.7%	5.5%	64.2%	11.4%	97.8%	
Total		204	77	773	138	1192	
		17.1%	6.5%	64.8%	11.6%	100.0%	

Field Survey, 2023

Table 13b. Cross-tabulation of Edo State respondents on attitude and type of residence

Environmental sanitation personal hygiene putting food in a rodent proof	Yes	12 1%	4 0.3%	4 .3%	1 .1%	21 1.8%	0.114
	No	195 16.4%	70 5.8%	769 64.6%	137 11.5%	1171 98.2%	
Total		209 17.4%	74 6.2%	773 64.8%	138 11.6%	1192 100.0%	
Not eating bush meats and spreading of foods on the roadsides	Yes	1 .1%	1 .1%	3 .3%	1 .1%	6 .5%	0.921
	No	196 16.4%	83 7.0%	770 64.6%	137 11.5%	1186 99.5%	
Total		197 16.5%	84 7.1%	773 64.8%	138 11.6%	1192 100.0%	
A strong and healthy person can be infected with Lassa fever	Yes	194 16.3%	83 7.0%	771 64.7%	138 11.6%	1186 99.5%	0.072
	No	3 .3%	1 .1%	2 .2%	0 0.0%	6 .5%	
Total		197 16.5%	84 7.1%	773 64.8%	138 11.6%	1192 100.0%	

Field Survey, 2023

Table 14a. Cross-tabulation of Edo state respondents on practice and type of residence

		Type of residence				Total	P-values
		Bungalow	face-me-i- face-you	Semi- detached	Others		
Do you eat rodents	Yes	0 0.0%	0 0.0%	1 .1%	0 0.0%	1 .1%	0.622
	No	197 16.5%	84 7.1%	772 64.7%	138 11.6%	1191 99.9%	
Total		197 16.5%	84 7.1%	773 64.8%	138 11.6%	1192 100.0%	
Do you feed on rodents contaminated foods	Yes	0 0.0%	0 0.0%	1 .1%	1 .1%	2 .2%	0.341
	No	197 16.5%	84 7.1%	772 64.7%	137 11.5%	1190 99.8%	
Total		197 16.5%	84 7.1%	773 64.8%	138 11.6%	1192 100.0%	
Do you spread foods on the road sides and your house surroundings	Yes	0 0.0%	1 .1%	1 .1%	0 0.0%	2 .2%	0.011
	No	197 16.5%	83 7.0%	772 64.7%	138 11.6%	1190 99.8%	
Total		197 16.5%	84 7.1%	773 64.8%	138 11.6%	1192 100.0%	
Do you store your food in rodent proof containers	Yes	61 5.1%	23 2.0%	53 4.5%	5 .4%	142 12.1%	0.000
	No	136 11.4%	61 5.1%	720 60.4%	133 11.2%	1050 87.9%	
Total		197 16.5%	84 7.1%	773 64.8%	138 11.6%	1192 100.0%	
Do you frequently engage in environmental sanitation	Yes	112 9.4%	25 1.8%	126 10.6%	39 3.3%	302 25.4%	0.000
	No	85 7.1%	59 4.9%	647 54.3%	99 8.3%	890 74.6%	
Total		197 16.5%	84 7.1%	773 64.8%	138 11.6%	1192 100.0%	

Field Survey, 2023

Table 14b. Cross-tabulation of Edo State respondents on practice and type of residence

Do you use traps in and around your house	Yes	79 6.8%	26 2.2%	55 4.6%	13 1.1%	173 14.5%	0.013
	No	118 10.0%	58 4.9%	718 60.2%	125 10.5%	1019 85.5%	
Total		197 16.5%	84 7.1%	773 64.8%	138 11.6%	1192 100.0%	
Have you participated in any Lassa fever campaign	Yes	44 3.8%	7 .6%	27 2.3%	3 .3%	81 6.8%	0.000
	No	153 12.8%	77 6.5%	746 62.6%	135 11.3%	1111 93.2%	
Total		197 16.5%	84 7.1%	773 64.8%	138 11.6%	1192 100.0%	
Do you share towels clothes and other personal belongings with family	Yes	2 .2%	1 .1%	3 .3%	0 0.0%	6 .5%	0.335
	No	195 16.4%	83 7.1%	770 64.5%	138 11.6%	1186 99.5%	
Total		197 16.5%	84 7.1%	773 64.8%	138 11.6%	1192 100.0%	
If you experience any signs and symptoms of Lassa fever	Yes	10 .9%	1 .1%	3 .3%	1 .1%	15 1.3%	0.000
	No	187 16.0%	83 7.1%	770 64.6%	137 11.5%	1177 98.7%	
Total		197 16.8%	84 7.1%	773 64.8%	138 11.6%	1192 100.0%	

*Field Survey, 2023***Table 15. Edo State knowledge of PHC personnel on lassa fever**

Responses	Sum	RII	Rank
Lassa Fever is a common deadly disease	48	0.960	2.5
Viral Hemorrhagic illness	48	0.960	2.5
Causative agent of Lassa Fever is Lassa Virus	48	0.960	2.5
The reservoir of the causative agent of Lassa Fever is rat	48	0.960	2.5
Bat, Monkey, Mosquito and Fly are also reservoirs of the causative agent of Lassa Fever	42	0.840	5

Field Survey, 2023

Age distribution, as highlighted in Table 1b, shows a predominance of individuals in the 15-30 age group, comprising (517)43.3% of the respondents (262 males and 255 females), followed by the 31-45 age group at 396(33.2%) (241 males and 155 females). Marital status, revealing that 55.7% of respondents are married, religious affiliations show Christianity as the most prevalent faith (54.7%) this similar to the research conducted Bali LGA, by Solomonnyamsoh et al. (2024) which state the ages group of the majority of the respondent 38-47 years 83 (21.6%) and 196 (50.9%) of the respondents are female,

Majority of the respondents are married, 231 (60%).

In terms of educational attainment, Table 1c reveals that primary education is the most common level (39.6%), followed by tertiary education (28.0%) and vocational training (23.1%). This distribution suggests that while a significant proportion of respondents have access to foundational education, there is also a notable percentage with higher education, particularly in vocational and tertiary training, indicating diverse educational backgrounds which is inconsistent with study conducted in

southwest, Nigeria by Olowookere et al. (2017). revealed that 58.5% of the participants had tertiary education.

Looking at Tables 2a, 2b, and 2c which focuses on professional designations and working experience. Table 2b highlights that community health workers make up the largest professional group, with 32.7% of respondents (34 males and 25 females). This is followed by nurses and midwives (19.4%) and laboratory scientist/ laboratory technicians (15.6%), showing a strong representation of healthcare professionals among the respondents. Table 2c further reveals that the majority (52.8%) of respondents have 1–10 years of experience, suggesting that a substantial proportion of the workforce is relatively young and active in the field. The result from the study conforms with part of the research conducted by Dalhat et al. (2021) where 53.6% (67) are nurses, 5.6% (7) are doctors, and 11.2% (14) are laboratory scientists while 29.6% (37) are attendants. Also, the majority of the respondents (44%) had 11-21 years of working experience, while only 24% had 22-33years of experience.

Results from Tables 3a and 3b shed light on Infection Prevention and Control (IPC) measures, revealing that while basic facilities like isolation wards (56.7%) and changing rooms (53.3%) are widely available, critical components such as soap for handwashing (33.3%) and wash hand basins (38.3%) are less common. Similarly, the availability of personal protective equipment (PPE) is skewed, with gloves being the most available (58.3%), but items like face shields (3.3%) and boots (30.0%) are notably lacking. These findings suggest gaps in IPC infrastructure that could impact the effectiveness of infection control efforts. This result is consistent with a study conducted by several researchers with notable one conducted by Dalhat et al. (2021) state that the finding shows that respondents state that only face masks and gloves available in the primary health facility. we have aprons available for use. On the availability and the types of PPE in the workplace, the findings revealed that there is inadequate PPE in the facility.

Result from table 4.4 shed light on the attitude toward the usage of PPE while treating patient with Lassa Fever in Edo which reveal that 100% of the respondents report rarely using gowns and boots with 83.3% rarely dispose their sharps in proper bin the attitude towards PPE use is also

poor, with almost all healthcare workers using protective gear rarely, showing a significant gap in PPE usage practices which in tandem with Dalhat et al, (2021) state that on the availability and the types of PPE in the workplace, the findings revealed that there is inadequate PPE as well as study conducted by Ireye et al. (2019) on Knowledge, Attitude, Infection Prevention and Control Practices regarding Lassa fever among Healthworkers in Edo State where majority were reported not to be using PPE.

Results from Tables 4.6a-4.6b explore healthcare workers' attitudes and knowledge of Lassa fever. While most healthcare workers agree that Lassa fever is a deadly disease, misconceptions about its transmission, such as sexual intercourse or consumption of rodent bushmeat, persist. Educational qualifications correlate with knowledge, as those with tertiary education display a better understanding of Lassa fever's symptoms and epidemiology, highlighting the importance of targeted training and sensitization efforts (Table 4.2). This is in tandem with similar study conducted in Edo State by Ireye et al. (2019) in International Journal of Prevention and Treatment where the study found out that over three-fifth of 294 healthcare workers had at least fair knowledge of Lassa fever but had misconceptions about its transmission and also the study showed that educational qualifications correlated with knowledge, indicating that better educated healthcare workers had a better understanding of Lassa fever symptoms and epidemiology.

In terms of preventive practices, Table 4.7 reveal minimal adherence to measures like avoiding bushmeat or practicing personal hygiene related to rodent-proofing food. However, there is some evidence of proactive behavior in terms of food storage and engagement in environmental sanitation, particularly among those with tertiary or vocational training. This result conforms with study done by Ogundipe and Adeyemi (2017) in Lassa town which states low adherence to preventive measures despite having knowledge of Lassa fever transmission as they fail to avoid bush meat and practicing of personal hygiene and rodent-proofing food was low. However, the study also indicated that individuals with tertiary or vocational studies were more likely to engage in proactive behaviors such as proper food storage and environmental sanitation.

Data from Table 4.9a highlights that higher-income respondents are more aware of the

Lassa fever outbreak, yet significant knowledge gaps remain, particularly regarding the incubation period and modes of transmission. Table 5.1a indicates that preventive practices, such as using rodent-proof containers and engaging in frequent sanitation, are more prevalent among wealthier households, demonstrating an income-related disparity in preventive behavior. This result is in tandem with results from the study conducted by Abdulkadir and Mohammed (2019) which shows that individuals with higher income s tend to have better knowledge of Lassa fever outbreaks. However, despite this better knowledge, significant gaps remain in understanding the incubation period and modes of transmission.

Results from Table 6a and 6b further emphasize the importance of residence type and income in influencing awareness and preventive practices. Residents in bungalows and semi-detached houses demonstrate higher awareness of the outbreak, but knowledge gaps about Lassa fever's incubation period and transmission modes persist across residence types. However, recognition of Lassa fever as a severe illness is highest among semi-detached residents, suggesting that residential factors may influence awareness levels. Looking at a study conducted in 2020 by Eghafona and Okokhere in Edo State investigating the socioeconomic factors influencing knowledge among 420 rural residents in Edo State shows that living in better quality houses like bungalows and those with higher incomes demonstrated higher awareness of Lassa fever outbreaks but still has knowledge gap regarding incubation period and transmission mode.

Table 6b: Knowledge and Lassa Fever Characteristics While most respondents recognize Lassa fever as a severe viral illness (80.1%), misconceptions about its similarity to other viral symptoms persist, with only 0.1% of respondents acknowledging this. The p-value of 0.916 suggests no significant association between this knowledge and residence type. However, the widespread acknowledgment of Lassa fever as a severe illness indicates partial awareness, which may provide a basis for targeted education. This result is in tandem with studies conducted by Ossai et al. (2020) and Olayiwola and Bakarey (2019) which opined that the widespread acknowledgment of Lassa fever as a severe illness indicates partial awareness, which may provide a basis for targeted education.

The cross-tabulation analysis of respondents in Edo State reveals notable attitudes and misconceptions about Lassa fever, varying by type of residence. Belief in the existence of Lassa fever is low, with only 1.2% of respondents affirming its presence, showing no significant association with residence type ($p=0.284$). However, the perception of Lassa fever as a life-threatening illness is significantly associated with residence type ($p<0.001$), although it is acknowledged by only 2.4% of respondents. Preventive measures, such as hygiene practices and advocacy for environmental sanitation, are poorly adopted, with no significant variations across residence types ($p>0.05$). Similarly, most respondents (99.5%) believe strong, healthy individuals can still contract Lassa fever, irrespective of their residence type. Despite these associations, the majority of respondents exhibit misconceptions, with only 3.6% believing Lassa fever can be cured ($p<0.001$).

The cross-tabulation analysis of Table 7 highlights the influence of residence type on Lassa fever-related practices among respondents in Edo State. Practices like eating rodents, consuming rodent-contaminated food, and spreading food near the roadside are generally rare, with negligible associations to residence type ($p>0.05$). However, significant differences emerge in more proactive measures such as food storage in rodent-proof containers ($p<0.001$) and frequent engagement in environmental sanitation ($p<0.001$), where semi-detached residents demonstrate higher compliance. The use of traps is also significantly associated with residence type ($p=0.013$), with bungalow residents showing greater usage. Participation in Lassa fever campaigns is notably low across all residence types but significantly varies ($p<0.001$), indicating a disparity in awareness initiatives. Sharing personal items like towels or clothing is rare and not significantly related to residence type ($p=0.335$). Similarly, only 1.3% of respondents reported experiencing Lassa fever symptoms, with significant differences across residence types ($p<0.001$).

The analysis of Table 8a demonstrates that PHC personnel in Edo State exhibit a strong knowledge of Lassa fever, as evidenced by a high Relative Importance Index ($RII = 0.960$) for key facts such as its classification as a deadly viral hemorrhagic illness, its causative agent (Lassa virus), and the primary reservoir (rats). However, there is less consensus ($RII = 0.840$) regarding other potential reservoirs, such as

bats, monkeys, mosquitoes, and flies, highlighting a need for clarification in training programs.

Table 8b reveals a concerning gap in adherence to personal protective equipment (PPE) usage among Edo State personnel. Practices like using gowns, boots, and gloves during procedures with potential exposure are moderately ranked (RII = 0.400), while critical measures such as using facemasks and eye protection rank lowest (RII = 0.217). Similarly, practices like sharp disposal and handwashing after procedures are underutilized (RII = 0.367). These findings suggest the need for improved training and stricter enforcement of PPE protocols to enhance safety and infection control practices.

Overall, the findings underscore the complex interplay of demographic, occupational, and socioeconomic factors in shaping knowledge, attitudes, and practices related to Lassa fever in Edo State. These results suggest that while there is some level of awareness and proactive behavior, significant gaps remain, particularly in transmission knowledge and preventive practices, especially among lower-income and less-educated individuals. Targeted interventions, including education campaigns tailored to specific demographic groups, are crucial for improving understanding and mitigating the risks associated with Lassa fever.

5. CONCLUSION

The study reveals significant gaps in knowledge, attitudes, and practices related to Lassa fever among residents and PHC personnel in Edo State. Socioeconomic disparities further compound these gaps, necessitating targeted education, resource allocation, and healthcare system strengthening to reduce the burden of Lassa fever in endemic regions. Future interventions should prioritize addressing misconceptions, promoting preventive behaviors, and improving healthcare worker compliance with standard protocols.

6. RECOMMENDATIONS

1. Implement campaigns to correct misconceptions about Lassa fever, especially for lower-income and less-educated groups.
2. Enhance training on PPE use and infection prevention in healthcare settings.

3. Tailor training for community health workers, nurses, and medical professionals to improve Lassa fever knowledge and infection control.
4. Address gaps in infection prevention facilities, particularly in rural areas.
5. Promote preventive practices like food storage and sanitation across different socioeconomic groups.
6. Design interventions based on factors like income and residence type to maximize impact.
7. Increase funding for healthcare infrastructure and enforce stricter infection control guidelines.
8. Continuously assess knowledge, attitudes, and practices to improve interventions and identify new gaps.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

CONSENT AND ETHICS APPROVAL

The ethical approval for the study was given by Kwara State University ethical committee and all the community head and head of units of health facilities gave approval for the study to be carried while inform consent form was issued to all participants where their confidentiality was assured and that the results of the study shall be used only for educational purposes (research).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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