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KNOWLEDGE, AWARENESS, AND RISK ASSESSMENT OF LASSA FEVER AMONG RESIDENTS OF ESAN WEST LOCAL GOVERNMENT AREA, EDO STATE, NIGERIA

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ABSTRACT

Background:

Lassa fever is endemic in Esan West Local Government Area (LGA), Edo State, Nigeria, yet community-level data on awareness, knowledge, and behavioural risk remain scarce. This study assessed the awareness, knowledge, and risk level of Lassa fever among residents of Esan West LGA and identified their sociodemographic determinants.

Materials and Methods:

A descriptive cross-sectional study was conducted among 300 residents selected across all 10 wards of Esan West LGA between July and December 2013. Multi-stage sampling was employed. Knowledge was assessed using a 28-item scale and graded as good (≥75%), fair (50–74%), or poor (<50%). Risk level was assessed using a 20-item scale and graded as high (>75%), moderate (50–74%), or low (<50%). Chi-square test was used to evaluate associations between outcomes and sociodemographic characteristics at a significance level of 0.05. SPSS version 25 was used to analyse all data.

Results:

The mean age of respondents was 43.6 ± 21.6 years. Awareness of Lassa fever was recorded in 44.0% of respondents, with the ISTH Outreach Team and electronic media as the leading information sources. Only 7.0% had good knowledge, while 33.7% had poor knowledge. Educational level was the sole significant predictor of both awareness ($\chi^2 = 11.14$, $p = 0.011$) and knowledge ($\chi^2 = 19.8$, $p = 0.011$). High behavioural risk was identified in 37.0% of respondents. Female gender, employment in skilled and unskilled occupations, community of residence, and longer duration of stay were significant determinants of high risk ($p < 0.05$ to $p < 0.001$).

Conclusion:

Awareness and good knowledge of Lassa fever were low among residents of Esan West LGA. We recommend a shift from passive information delivery to peer-driven, structural, and incentivised interventions that embed health education into daily survival and cultural routines.

Lassa fever awareness knowledge risk assessment

Lassa fever is an acute viral haemorrhagic fever caused by the Lassa virus, a member of the Arenaviridae family, first described in 1969 in Borno State, Nigeria.[1] The disease accounts for an estimated 300,000 to 500,000 cases and 5,000 to 10,000 deaths annually across West Africa, with an at-risk population of approximately 59 million people spanning Nigeria, Sierra Leone, and Guinea.[2,3] Nigeria bears a disproportionate share of this burden, and Edo State consistently ranks among the most affected states in the country, with Esan West Local Government Area (LGA) recognised as one of its endemic zones.[4,5]

Transmission occurs primarily through contact with excretions of the multimammate rat (*Mastomys natalensis*), the principal reservoir host, and through direct contact of broken skin or mucous membranes with infected blood or body fluids.[6] Person-to-person transmission, including nosocomial spread, has been well documented, and control of the disease is compounded by the diagnostic non-specificity of its early clinical presentation, the absence of a licensed vaccine, and limitations in health worker capacity at the primary care level.[7,8] In the absence of effective biomedical countermeasures, community-level knowledge of transmission routes, recognition of risk behaviours, and adherence to preventive practices remain the most accessible and actionable targets for public health intervention.

Despite the endemicity of Lassa fever in Esan West LGA and its surrounding communities, population-level data on awareness, knowledge, and behavioural risk have remained limited. Available evidence from comparable West African settings, including Sierra Leone and Liberia, consistently reports low community awareness and persistent high-risk behaviours, suggesting that disease endemicity does not translate into adequate health literacy.[9,10] Within Nigeria, studies among caregivers in Edo State have reported moderate knowledge levels, but below what would be expected given occupational exposure, raising further concern about the adequacy of community-level understanding. [11,12]

Understanding the specific gaps in awareness and knowledge, and identifying the sociodemographic determinants of behavioural risk, is essential for designing targeted and context-appropriate interventions. This study therefore reports the awareness, knowledge, and risk assessment findings among residents of Esan West LGA to provide an empirical basis for community-directed Lassa fever control efforts in this endemic area.

MATERIALS AND METHODS

Study area

Esan West Local Government Area (LGA) is located in Edo State, Nigeria, with a projected population of 147,655 and administrative headquarters at Ekpoma. The LGA is organised into 10 wards spanning both semi-urban and rural communities. Environmental conditions in the area, including mud housing construction, open-air grain drying, and the practice of bush burning, are conducive to commensal rodent activity and facilitate sustained contact between residents and the *Mastomys natalensis* reservoir host. The Institute of Viral and Emergent Pathogens Control and Research (IVEPCR), located at the Irrua Specialist Teaching Hospital (ISTH) in the adjoining Esan Central LGA, serves as the regional reference centre for Lassa fever diagnosis and surveillance.

Study design and sampling technique

A descriptive cross-sectional study was conducted among residents of Esan West LGA over a 6-month interval. Multi-stage sampling was employed. In the first stage, the 10 wards of the LGA were enumerated, and respondents were allocated proportionally across all wards based on ward population size. In the second stage, where a ward comprised more than one community, a single community was selected by simple random sampling. In the third stage, households within each selected community were identified using the World Health Organisation Expanded Programme on Immunisation (WHO EPI) cluster sampling method, and eligible respondents were recruited from selected households.

Study population and selection criteria

The target population comprised permanent residents of Esan West LGA. Individuals were eligible for inclusion if they were aged five years or older, had resided in the LGA for at least six months preceding the study, and provided written informed consent. Individuals who were critically ill or unable to communicate were excluded.

Sample size determination

The minimum sample size was calculated using the Fisher formula: $n = Z^2pq/d^2$, where Z = 1.96 (at 95% confidence), p = 0.21 (prior Lassa fever seropositivity rate in the study area),[13] $q = 1 - p = 0.79$, and d = 0.05 (margin of error). This yielded a minimum of 255, which was adjusted upward using a design effect correction to 280, and further rounded to 300 to account for potential non-response.

Data collection and measurement

Data were collected using a structured interviewer-administered questionnaire developed by the investigators. The instrument captured sociodemographic characteristics, awareness of Lassa fever, and sources of information. The questionnaire was pretested among 50 residents of Etsako West LGA, a non-study area with comparable characteristics, and necessary revisions were made before deployment.

Data analysis

Data were entered and analysed using IBM SPSS Statistics version 25.0. Frequencies and percentages were computed for categorical variables. Associations between sociodemographic characteristics and the outcome variables of awareness, knowledge grade, and risk level were assessed using the Pearson chi-square test at a significance level of 0.05. Fisher's exact test was applied where any expected cell frequency was less than five.

Ethical considerations

Ethical approval for this study was obtained from the Research Ethics Committee of the Irrua Specialist Teaching Hospital. Written informed consent was obtained from all adult participants before enrolment. For participants below the age of 18 years, written consent was obtained from a parent or legal guardian, with assent obtained from the participant where applicable. Participation was entirely voluntary, and confidentiality of all data was maintained throughout.

RESULTS

Sociodemographic Characteristics of Respondents (Table 1, Figure 1)

A total of 300 respondents participated. The mean age was 43.6 ± 21.6 years. The largest age group was 21 to 40 years (111, 37.0%), followed by 41 to 60 years (79, 26.3%), over 60 years (69, 23.0%), 20 years and below (41, 13.7%). The sex distribution was nearly equal: 153 females (51.0%) and 147 males (49.0%). Three-quarters (75.7%) had at least a primary education, while 23.3% had no formal education. Most respondents were Christian (97.7%), Esan (94.0%), in unskilled occupations (66.7%), and married (64.0%). About three-fifths (59.7%) were from Ekpoma communities. The mean (SD)

duration of residence was 24.8 (2.6) years; 80.0% had been resident for at least 6 years.

Table 1: Sociodemographic characteristics of respondents (N = 300)

Characteristic	Frequency (N = 300)	Percentage (%)
Age group (years)		
≤20	41	13.7
21 to 40	111	37.0
41 to 60	79	26.3
>60	69	23.0
Sex		
Male	147	49.0
Female	153	51.0
Educational status		
None	70	23.3
Primary	90	30.0
Secondary	90	30.0
Tertiary	50	16.7
Occupation		
Unemployed	48	16.0
Unskilled	200	66.7
Skilled	52	17.3
Religion		
Christianity	293	97.7
Islam and African Traditional	7	2.3
Tribe		
Esan	282	94.0
Other Edo	3	1.0
Deltan	3	1.0
Others	12	4.0
Marital status		
Married	192	64.0
Single	95	31.7
Widowed, divorced or separated	13	4.3
Community		
Ogua	20	6.7
Ujogba	15	5.0
Ukhun	20	6.7
Ebhuoakhua	65	21.7
Ihumudumu	32	10.7
Iruekpen	34	11.3
Ujoelen	48	16.0
Urohi	13	4.3
Ehianle	35	11.7
Illeh	18	6.0
Duration of stay (years)		
1 to 5	60	20.0
6 to 10	122	40.7
More than 10	118	39.3

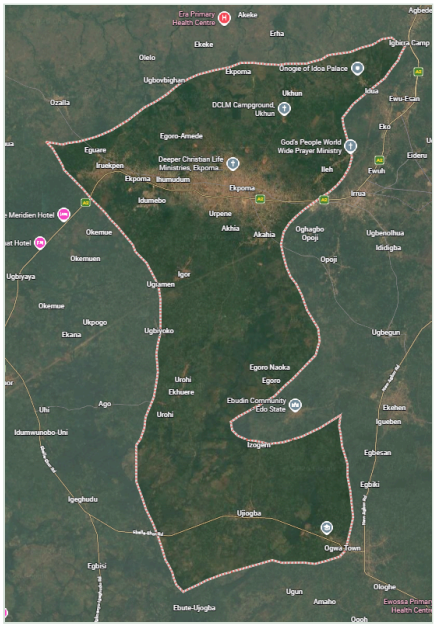

Figure 1. Map of Esan West LGA, Edo State

Awareness of Lassa Fever and Sources of Information (Table 2, Figure 2)

One hundred and thirty-two respondents (44.0%) were aware of Lassa fever, while 168 (56.0%) were not. Among those aware, the ISTH Outreach Team was the most common source (21.4%), followed by radio (20.2%), television (19.6%), and other health workers (14.9%). Print media was the least cited source (1.8%). Other sources included schools (5.5%), friends (4.2%), hospitals (3.6%), and churches (1.2%). Awareness was significantly associated with educational level (χ^2 = 11.14, p = 0.011) and occupation (χ^2 = 15.05, p = 0.001). No significant association was found with age group (χ^2 = 0.01, p >0.999), sex (χ^2 = 2.07, p = 0.150), community type (χ^2 = 0.00, p >0.999), duration of stay (χ^2 = 5.85, p = 0.054), or marital status (χ^2 = 1.44, p = 0.487).

Table 2: Awareness of Lassa fever by sociodemographic characteristics of respondents

Variable	Aware N (%)	Not Aware N (%)	Total	p-value / χ^2
Age group (years)				
≤20	18 (43.9)	23 (56.1)	41	
21 to 40	49 (44.1)	62 (55.9)	111	
41 to 60	35 (44.3)	44 (55.7)	79	
>60	30 (43.5)	39 (56.5)	69	>0.999 / 0.01
Sex				
Male	58 (39.5)	89 (60.5)	147	
Female	74 (48.4)	79 (51.6)	153	0.150 / 2.07
Educational level				
None	22 (31.4)	48 (68.6)	70	
Primary	36 (40.0)	54 (60.0)	90	
Secondary	44 (48.9)	46 (51.1)	90	
Tertiary	30 (60.0)	20 (40.0)	50	0.011* / 11.14
Occupation				
Unemployed	12 (25.0)	36 (75.0)	48	
Unskilled	87 (43.5)	113 (56.5)	200	
Skilled	33 (63.5)	19 (36.5)	52	0.001** / 15.05
Community type				
Semi-urban (Ekpoma)	79 (44.1)	100 (55.9)	179	
Rural villages	53 (43.8)	68 (56.2)	121	>0.999 / 0.001
Duration of stay (years)				
1 to 5	20 (33.3)	40 (66.7)	60	
6 to 10	51 (41.8)	71 (58.2)	122	
More than 10	61 (51.7)	57 (48.3)	118	0.054 / 5.85
Marital status				
Married	89 (46.4)	103 (53.6)	192	
Single	37 (38.9)	58 (61.1)	95	
Widowed, divorced or separated	6 (46.2)	7 (53.8)	13	0.487 / 1.44

Percentages add across rows. * p < 0.05.

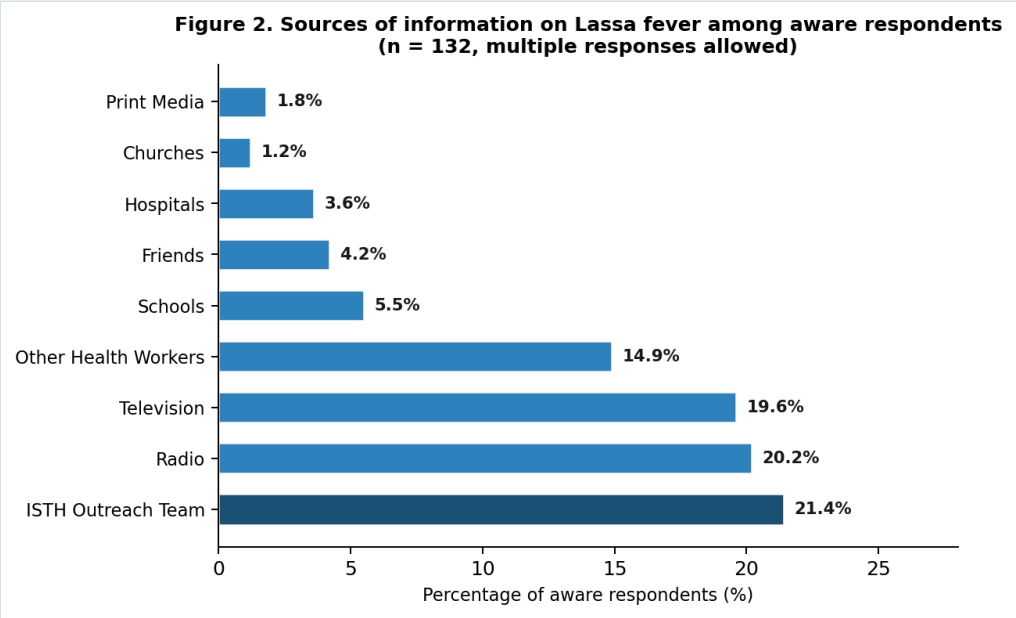

Figure 2. Sources of information on Lassa fever among aware respondents (n = 132, multiple responses allowed)

Knowledge of Lassa Fever (Table 3, Figure 3)

Overall, 21 respondents (7.0%) had good knowledge, 178 (59.3%) had fair knowledge, and 101 (33.7%) had poor knowledge. Educational level was the only significantly associated variable (χ^2 = 19.8, p = 0.011): the proportion with good knowledge rose from 4.2% (no education) to 5.6% (primary), 8.9% (secondary), and 10.0% (tertiary). The relationship of knowledge of Lassa fever with occupation approached significance (χ^2 = 8.08, p = 0.080), with skilled workers having the highest rate of good knowledge (15.4%). Age group (χ^2 = 3.37, p = 0.762), sex (χ^2 = 2.23, p = 0.327), religion (p = 0.893), marital status (p = 0.362), community (χ^2 = 9.26, p = 0.953), and duration of stay (χ^2 = 7.94, p = 0.094) were not significantly associated.

Table 3: Knowledge of Lassa fever by sociodemographic characteristics of respondents

Variable	Poor N (%)	Fair N (%)	Good N (%)	p-value / χ^2
Age group (years)				
≤20	14 (34.1)	23 (56.1)	4 (9.8)	
21 to 40	41 (36.9)	61 (55.0)	9 (8.1)	
41 to 60	25 (31.6)	51 (64.6)	3 (3.8)	
>60	21 (30.4)	43 (62.3)	5 (7.2)	0.762 / 3.37
Sex				
Female	46 (31.3)	93 (63.3)	8 (5.4)	
Male	55 (36.4)	85 (56.3)	13 (8.6)	0.327 / 2.23
Educational level				
None	24 (34.3)	43 (61.4)	3 (4.2)	
Primary	37 (41.1)	48 (53.3)	5 (5.6)	
Secondary	25 (27.8)	57 (63.3)	8 (8.9)	
Tertiary	15 (30.0)	30 (60.0)	5 (10.0)	0.011* / 19.8
Occupation				
Unemployed	16 (33.3)	28 (58.4)	4 (8.3)	
Unskilled	31 (35.5)	120 (60.0)	9 (4.5)	
Skilled	14 (26.9)	30 (57.7)	8 (15.4)	0.080 / 8.08
Religion				
Christianity	99 (33.7)	174 (59.2)	21 (7.1)	
Islam and African Traditional	2 (40.0)	4 (60.0)	0	0.893
Marital status				
Married	65 (33.9)	117 (60.9)	10 (5.2)	
Single	33 (34.7)	51 (53.7)	11 (11.6)	
Widowed, divorced or separated	3 (23.1)	10 (76.9)	0	0.362
Community				
Ogua	8 (40.0)	10 (50.0)	2 (10.0)	
Ujogba	5 (33.3)	8 (53.3)	2 (13.3)	
Ukhun	6 (30.0)	14 (70.0)	0	
Ebhuoakhua	20 (30.8)	40 (61.5)	5 (7.7)	
Ihumudumu	12 (37.5)	19 (59.4)	1 (3.1)	
Iruekpen	11 (32.4)	20 (58.8)	3 (8.8)	
Ujoelen	13 (27.1)	32 (66.7)	3 (6.3)	
Urohi	6 (46.2)	7 (53.8)	0	
Ehianle	13 (37.1)	18 (51.4)	4 (11.4)	
Illeh	7 (38.9)	10 (55.6)	1 (5.6)	0.953 / 9.26
Duration of stay (years)				
1 to 5	41 (68.3)	7 (11.7)	12 (20.0)	
6 to 10	43 (35.2)	70 (57.4)	9 (7.4)	
More than 10	17 (14.4)	94 (79.7)	7 (5.9)	0.094 / 7.94

Percentages add across rows. * $p < 0.05$.

Figure 3. Distribution of knowledge of Lassa fever among respondents

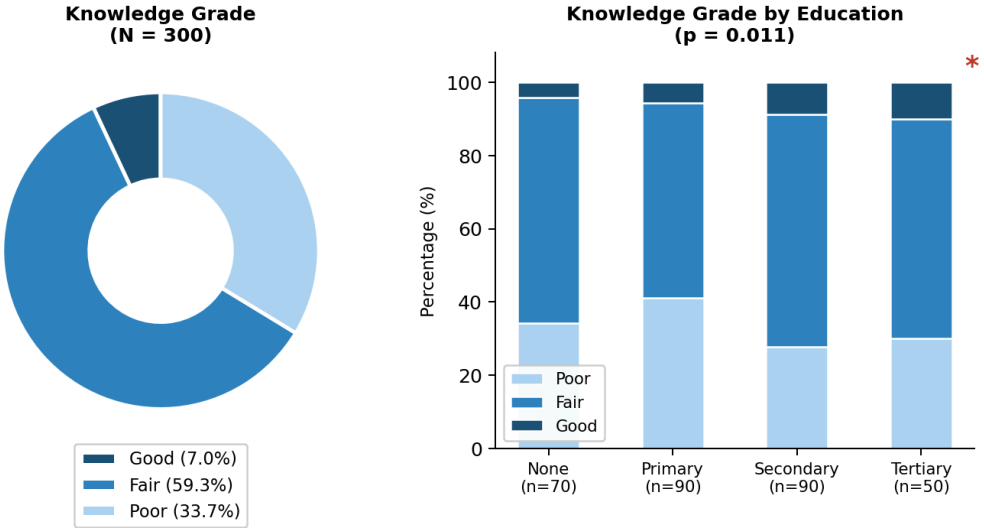

Figure 3. Distribution of knowledge grade (left) and knowledge grade by educational level (right)

Risk Assessment of Lassa Fever (Table 4, Figure 4)

High risk was recorded in 111 respondents (37.0%), moderate risk in 77 (25.7%), and low risk in 112 (37.3%). Sex was significantly associated ($\chi^2 = 7.67$, $p = 0.022$): 44.4% of females were high risk compared with 29.3% of males. Occupation was strongly significant ($\chi^2 = 8.91$, $p < 0.001$): high-risk classification was present in 46.2% of skilled and 41.5% of unskilled workers versus only 8.3% of the unemployed. Community of residence ($\chi^2 = 16.51$, $p < 0.001$) showed marked variation: Ukhun had the highest proportion of high-risk respondents (65.0%) and Ogua the lowest (0.0%). Duration of

residence was also significant (χ^2 = 65.65, p = 0.001): high-risk proportions rose from 25.4% (less than 6 years) to 52.5% (6 to 10 years) and 46.7% (more than 10 years). Age group (χ^2 = 4.83, p = 0.565), educational level (χ^2 = 7.77, p = 0.256), religion (p = 0.420), and marital status (p = 0.734) were not significantly associated.

Table 4: Risk level of Lassa fever by sociodemographic characteristics of respondents

Variable	Low N (%)	Moderate N (%)	High N (%)	p-value / χ^2
Age group (years)				
≤20	11 (26.8)	9 (22.0)	21 (51.2)	
21 to 40	45 (40.5)	28 (25.2)	38 (34.2)	
41 to 60	31 (39.2)	22 (27.8)	26 (32.9)	
>60	25 (36.2)	18 (26.1)	26 (37.7)	0.565 / 4.83
Sex				
Female	52 (34.0)	33 (21.6)	68 (44.4)	
Male	60 (40.8)	44 (29.9)	43 (29.3)	0.022* / 7.67
Educational level				
None	27 (38.6)	21 (30.0)	22 (31.4)	
Primary	28 (31.1)	29 (32.2)	33 (36.7)	
Secondary	35 (38.9)	16 (17.8)	39 (43.3)	
Tertiary	22 (44.0)	11 (22.0)	17 (34.0)	0.256 / 7.77
Occupation				
Unemployed	39 (81.3)	5 (10.4)	4 (8.3)	
Unskilled	33 (16.5)	84 (42.0)	83 (41.5)	
Skilled	23 (44.2)	5 (9.6)	24 (46.2)	<0.001*** / 8.91
Religion				
Christianity	110 (37.4)	77 (26.2)	107 (36.4)	
Islam and African Traditional	2 (40.0)	0	4 (60.0)	0.420
Marital status				
Married	74 (38.5)	52 (27.1)	66 (34.6)	
Single	34 (35.8)	21 (22.1)	40 (42.1)	
Widowed, divorced or separated	4 (30.8)	4 (30.8)	5 (38.5)	0.734
Community				
Ogua	13 (65.0)	7 (35.0)	0 (0.0)	
Ujogba	6 (40.0)	7 (46.7)	2 (13.3)	
Ukhun	5 (25.0)	2 (10.0)	13 (65.0)	
Ebhuoakhua	28 (43.1)	15 (23.1)	22 (33.8)	
Ihumudumu	9 (28.1)	11 (34.4)	12 (37.5)	
Iruekpen	13 (38.2)	12 (35.3)	9 (26.5)	
Ujoelen	14 (29.2)	10 (20.8)	24 (50.0)	
Urohi	8 (61.5)	0 (0.0)	5 (38.5)	
Ehianle	8 (22.9)	13 (37.1)	14 (40.0)	
Illeh	8 (44.4)	0 (0.0)	10 (55.6)	<0.001*** / 16.51
Duration of stay (years)				
1 to 5	59 (76.6)	32 (28.6)	31 (25.4)	
6 to 10	12 (15.6)	54 (48.2)	70 (52.5)	
More than 10	6 (7.8)	26 (23.2)	28 (46.7)	0.001** / 65.65

Percentages add across rows. * p < 0.05; ** p < 0.01; *** p < 0.001.

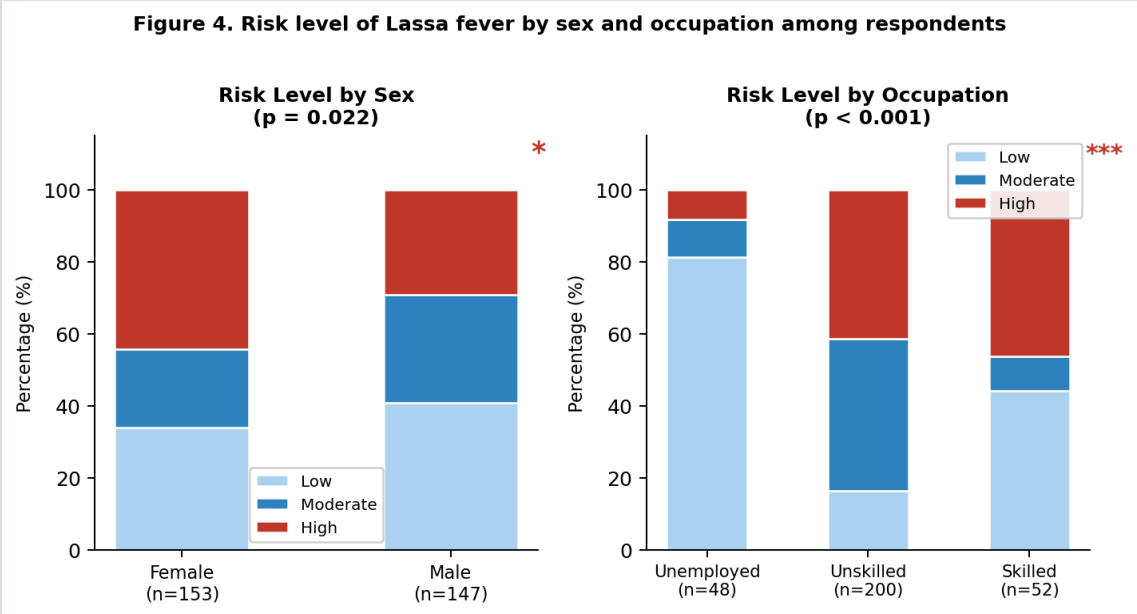

Figure 4. Risk level of Lassa fever by sex (left) and occupation (right) among respondents

Summary of Significant Associations (Table 5)

Educational level and occupation were predictors of both awareness and knowledge. Sex, occupation, community of residence, and

duration of stay were the principal determinants of risk level.

Table 5: Summary of significant associations between sociodemographic characteristics and awareness, knowledge, and risk level

Outcome variable	Predictor	p-value	Direction
Awareness	Educational level	0.011*	Higher education → more aware
Awareness	Occupation	0.001**	Skilled workers → more aware
Knowledge grade	Educational level	0.011*	Higher education → better knowledge
Knowledge grade	Occupation	0.080 (trend)	Skilled workers → better knowledge
Risk level	Sex	0.022*	Females → higher risk
Risk level	Occupation	<0.001***	Unskilled and skilled > unemployed
Risk level	Community	<0.001***	Ukhun highest (65.0% high risk)
Risk level	Duration of stay	0.001**	Longer residence → higher risk

* p < 0.05; ** p < 0.01; *** p < 0.001.

DISCUSSION

This study found low awareness (44.0%) and very low rates of good knowledge (7.0%) of Lassa fever among residents of Esan West LGA, alongside a substantial burden of high-risk behaviour (37.0%). These findings are consistent with reports from Ondo state, Nigeria, by *Olowookere et al.*[14] and *Tobin et al.*[15] in Edo state, confirming a persistent gap between disease endemicity and community health literacy in West Africa. Education was the sole significant predictor, consistent with a similar study carried out by *Saka et al.*[11] in Edo state, where the tertiary level of education was significantly associated with increased knowledge of Lassa fever. The non-significant age group effect indicates knowledge does not accumulate meaningfully with age, reinforcing the primacy of formal education over lived experience. Specific deficits in knowledge of person-to-person transmission and safe rat disposal represent particularly dangerous gaps.

The ISTH Outreach Team and electronic media were dominant awareness channels, but do not necessarily reflect their effectiveness in low-literacy rural settings. Print media accounted for only 1.8%, expected given 23.3% had no formal education. The significant associations of awareness with education and occupation confirm that information access is driven by literacy and occupational proximity to formal communication.[16,17] The near-significant trend for duration of stay suggests incremental accumulation of awareness with time in the community, though this did not translate into better knowledge.

The gender disparity in risk reflects domestic roles in rural African communities, bringing women into frequent contact with rodent-contaminated surfaces.[18] The unemployed had the lowest high-risk rate (8.3%), while skilled workers had the highest (46.2%), partly explained by employment in health facilities where nosocomial transmission occurs. Marked spatial variation in risk reflects heterogeneity in housing quality and sanitation. The progressive rise in risk with duration of residence is consistent with cumulative exposure and entrenchment of risk behaviours. Age group was not a significant predictor of risk.

Limitations of this study include the cross-sectional design, researcher-developed scoring tool, potential social desirability bias, and data from 2013. Awareness estimates for collapsed age groups were proportionally derived, as fine age-stratified awareness counts were not provided in the original dataset.

CONCLUSION

Awareness and good knowledge of Lassa fever were low among residents of Esan West LGA. Education was the primary determinant of both awareness and knowledge, while sex, occupation, community of residence, and duration of stay were the principal predictors of risk level. We recommend a shift from passive information delivery to peer-driven, structural, and incentivised interventions that embed health education into daily survival and cultural routines. This may include: Market-day “Clean and Earn” Competitions. This leverages intense peer pressure and commercial pride, turning market leaders into enforcement figures. Another approach is the “True Story” Cinema & Comedy Caravan. Gathering for free nighttime screening creates a communal event. Hearing direct testimonies from neighbours strips away the myth that the disease is spiritual or fake. Other recommended approaches are: Religious “Scripture and Health” Integration, Primary School “Child-to-Parent” Knowledge Pipelines, and Point-of-Sale (POS) and Mill dissemination of infographics on Lassa fever transmission.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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