Awareness, Knowledge and Prevention Practices Related to Lassa Fever Among Residents of Rural Communities in Southwest Nigeria: Implications for Prevention and Control

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Research Article

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Abstract

Background: Lassa fever (LF) is a haemorrhagic illness caused by Lassa virus. The primary reservoir of the virus is the multimammate rat, *Mastomys natalensis*. More than 3,000 laboratory-confirmed cases of Lassa fever and over 800 deaths have been recorded in Nigeria. This could be attributed to poor rat control and poor sanitation especially in the rural communities where the rats are often found. Increasing awareness and health education about LF have been advocated for its prevention and control. This study investigated the level of awareness, knowledge and prevention practices related to LF among residents in rural communities within Iwo and Ayedire Local Government Areas, Osun State, southwest Nigeria sequel to an awareness campaign.

Methods: Structured questionnaire was administered within rural communities in Iwo and Ayedire and 675 participants responded for the survey by a random sampling technique. Descriptive statistics, Chi-square test of association ($p = < 0.05$) and logistic regressions were used to determine associations between demographic variables, level of knowledge and prevention practices.

Results: The average age range was 25-39 years, 365 (54.07%) were male, 270 (40%) were married, 199 (29.48%) had up to secondary school education and 536 (79.41%) have heard about LF before. Respondents in Iwo town were more aware of LF than respondent from Ayedire. Only 3 (0.44%) had good knowledge of the transmission and symptoms of the disease and 304 (45.04%) do not have effective means of preventing rats into their homes. About 296 (43.85%) will go to a hospital if symptoms occur, while 118 (17.48%) will do self-medication. Forty-four (6.52%) were aware of good prevention practices. Logistic regression analysis showed that respondents aged 25–39 years were significantly more aware of Lassa fever than other age groups. Educated and married respondents showed significant relationship with good prevention practices than those without education and were not married.

Conclusions: Although, the awareness of LF among the respondents was high, only very few had good knowledge of the transmission and symptoms of the disease. Therefore, it is important for the people to be well informed about the disease and good prevention practices in order to curtail the spread.

Background

Lassa fever (LF) is an acute viral haemorrhagic illness endemic in West Africa, with increased prevalence reported from Sierra Leone, Guinea, Liberia, and Nigeria [1–4]. Not less than 100,000–300,000 people are infected annually, with approximately 5,000 deaths in West Africa alone [5, 6]. Although endemic in West Africa, there have been cases of Lassa fever transported to Europe and some other part of the world by travellers from the endemic regions [7, 8]. Several reports of LF outbreak have been documented in Nigeria (Fig. 1) [2, 3] after the first case in Lassa town, Borno State, Northeast, Nigeria in 1969, when two missionaries died as a result of the disease [5, 9–11]. Nigeria is presently experiencing LF outbreak with a case-fatality ratio (CFR) of 20.6%. More than 3,004 laboratory-confirmed cases of LF and 867 deaths have been reported in Nigeria, between January 2014 and December 2020 (Fig. 2) [4]. The number of

cases is increasing over the year, spreading from 13 states in 2014 to 29 states in 2020. This could be attributed to poor rat control and poor sanitation especially in the rural communities where the rats are often found, inadequate knowledge of the disease, and increased diagnosis in four urban centers within the country. Functional diagnostic laboratories give access to carry out more tests and early detection of LF [4–5, 11–13].

Lassa fever is transmitted to humans by the Lassa virus (LASV) [1, 5, 14–15]. It is a single-stranded RNA virus, belonging to the family *Arenaviridae* [9]. The primary reservoir of the virus is the multimammate mouse, *Mastomys natalensis*, [4, 9, 16] although recent studies have identified *M. erythroleucus* and *Hylomyscus pumfi* as possible carriers of the LASV [17]. Infected mice are carriers of the virus, though asymptomatic but are capable of discharging the Lassa virus through urine, faeces, saliva, respiratory secretions, and exposed blood vessel into the environment [1, 5, 18–19]. *Mastomys natalensis* is commonly found in Sub-Sahara Africa, where up to 30% can be carriers of the LASV in endemic regions [9, 12]. The primary route of transmission of Lassa fever is through contact with infected rodent's faeces, urine, or blood, while secondary route of transmission includes direct contact with the body fluid of an infected person [16, 20]. The consumption of infected rodents is another possible means of transmission. Due to the stability of Arenavirus, infections via the aerosol route in non-human primates have been documented [21–23]. Infection could occur six to twenty-one days after exposure to the virus [16, 24]. Eighty percent of infected people are mild or asymptomatic [16, 17, 25]. Symptoms usually begin with flu-like illness, fever, malaise, which may be accompanied by cough, sore throat, severe headache, chest and abdominal pain, vomiting, diarrhea; and may later result in bleeding from the mucosa openings, severe haemorrhagic fever, facial edema, multi-organ dysfunction, which could eventually lead to death [15, 17, 26, 28]. Infection of fetus and loss of the fetus in 90% of cases in pregnant women is common [22]. There could be hearing impairment in one-fourth of infected individuals who survive the disease and hearing returns partially after 1–3 months [24]. One in five cases of infection results in severe disease [29], and one to fifteen percent of severe cases may lead to death. Lassa fever could result in death within fourteen days in fatal cases and 25% of recovered cases could lead to deafness [15]. Presently, there is no vaccine for Lassa fever, but an antiviral drug (Ribavirin) has been found effective if administered within the early days of the infection [30]. However, there is no document to support the use of Ribavirin as a post-exposure prophylactic treatment for Lassa fever [15].

Seventy-five percent of confirmed cases in Nigeria are within Ondo (36%), Edo (32%), and Ebonyi (7%) [4, 15, 29]. Assessing the level of knowledge of LF among the residents of Osun State, which is the central state connecting five other states in southwest Nigeria (Fig. 1), is pivotal to its control in Nigeria. This is because; an outbreak in Osun State could easily spread to other connecting states and across southwest Nigeria. Ondo State is the highest risk state (36% of the laboratory-confirmed cases) in Nigeria and it shares a border with Osun State. Two laboratory-confirmed cases have already been reported in Osun State, and the number could increase shortly, largely because of inter-border local trade migration. Therefore, it is important to assess the level of awareness, knowledge, and preparedness of the residents of Osun State, in order to prevent an outbreak within the State. Although, there had been great enlightenment in many urban cities within the countries; there is a dearth of information on the level of

awareness, knowledge, and preventive practices in many towns and villages in Nigeria. These are noted to be at greater risk to Lassa virus infection because that is where *Mastomys* rats are commonly found [1, 5, 15, 31].

This study was carried out within Iwo and Ayedire Local Government Areas (LGAs) in Osun State, as representative local communities to determine the level of awareness, knowledge, and prevention practices among the residents, so as to present the knowledge gap and to serve as a first-line measure to curtail the spread of Lassa fever in Osun State, Nigeria.

Methods

Study area and design

Local communities within Iwo and Ayedire LGAs, Osun State, southwest Nigeria were included in the cross-sectional study between February and March 2020. Iwo is situated latitude 7°38'06"N and longitude 4°10'53"E, while Ayedire is located at latitude 7°36'00"N and longitude 4°10'60"E (Fig. 1). The geographical area and population of Iwo and Ayedire are 214 km² and 262 km², and 191,377 and 75,846, respectively [31]. The towns experience two alternate seasons: the wet season which occurs in March to October and the dry season that stretches from November to February. The annual rainfall is about 1700 mm, while relative humidity ranges between 30% in January - March and 70% in April – December. Temperature is fairly constant with the day temperature ranging from 31 to 34°C and night temperature ranging from 24 to 28 °C. Farming and petty trade are the mainstay of their economy.

A random sampling technique was employed in this study and a total of 675 respondents were interviewed, using a structured questionnaire with a focus on the demographic characteristics, level of awareness, knowledge, and preventive practices of Lassa fever. The research assistants were trained on how to administer the questionnaire prior to data collection. The interview was conducted person to person after receiving the verbal consent of the respondents. The knowledge of the respondents about Lassa fever was investigated using a total of 24 questions. A score was allocated to each correct answer with a maximum of 24 scores. Respondents who scored 70% and above were classified as having 'good knowledge', while below 70% were classified as having 'poor knowledge' [6].

Descriptive statistics was utilized and data obtained were presented as frequencies and percentages. Data were analyzed using the Statistical Package for Social Sciences (SPSS) software program for Windows (Version 20.0). Chi-square test of association, with p set as < 0.05 was used to determine associations between demographic variables and level of knowledge. Binary logistic regression was used to determine significant independent variables for predicting awareness and knowledge/prevention practices.

Results

Six hundred and seventy-five respondents took part in the survey, among which, 310 (45.93%) were females, while 365 (54.07%) were males (Table 1). The average age range was 25–39 years. There were 206 Muslims (30.52%) and 327 Christians (48.44 %), while 42 (6.22%) respondents did not give information about their religion. The proportion of respondents who were single, married, divorced, widow/widower were 37.33%, 40%, 15.11%, and 7.56%, respectively. Ethnicity distribution among the respondents was Yoruba (44.44 %), Igbo (29.48%), Hausa (16.15%) while only 7.11% were Fulani. The percentage of respondents who had secondary school education was 29.48%, 24.59% had university degree, while about 15.11% do not have access to any form of formal education. Approximately 25% were jobless, 13.93% were farmers, 24.15% were traders, while 24.15% engage in office work. The source of information about Lassa fever among the respondents is presented in Fig. 3. Out of the total participants, 249 (36.89%) heard about it through media, 16.15% through family and friends while only 14.81% heard about it through health workers.

Table 1
Socio-demographic characteristics of respondents in Iwo and Ayedire LGAs

		Iwo (n = 303)		Ayedire (n = 372)		Total (n = 675)	
Variables		No	%	No	%	No	%
Gender	Male	159	52.5	206	55.4	365	54.07
	Female	144	47.5	166	44.6	310	45.93
Age group	18–24 years	80	26.4	94	25.3	174	25.78
	25–39 years	125	41.3	136	36.56	261	38.67
	40–59 years	67	22.1	96	25.8	163	24.15
	≥ 60 years	31	10.2	46	12.4	77	11.41
Religion	Muslim	105	34.7	101	27.2	206	30.52
	Christianity	156	51.5	171	46	327	48.44
	Traditional	26	8.6	74	19.9	100	14.81
	Others	16	5.3	26	7	42	6.22
Marital status	Single	118	38.9	134	36	252	37.33
	Married	122	40.26	148	39.78	270	40
	Divorced	46	15.2	56	15.1	102	15.11
	Widow/widower	17	5.6	34	9.1	51	7.56
Ethnicity	Yoruba	149	49.2	151	40.6	300	44.44
	Igbo	80	26.4	119	32	199	29.48
	Hausa	50	16.5	59	15.9	109	16.15
	Fulani	20	6.6	28	7.5	48	7.11
	Others	4	1.3	15	4	19	2.81
Education	No formal education	36	1.9	66	21.78	102	15.11
	< Secondary school	43	14.2	64	17.2	107	15.85
	Secondary school	88	29	111	29.8	199	29.48
	Higher college	58	19.1	43	11.6	101	14.96
	University	78	25.7	88	23.7	166	24.59
n– Number of respondents							

		Iwo		Ayedire		Total	
		(n = 303)		(n = 372)		(n = 675)	
Employment status	Not employed	73	24.1	92	24.7	165	24.44
	Farming	27	8.9	67	18	94	13.93
	Petty trading	81	26.7	82	22	163	24.15
	Transporter	31	10.2	47	12.6	78	11.55
	Office work	82	27.1	81	21.8	163	24.15
	Did not disclose	9	3	3	0.8	12	1.77
n– Number of respondents							

Knowledge of the respondents about Lassa fever is presented in Table 2. Five hundred and thirty-six (79.41%) respondents indicated their previous awareness of Lassa fever, while 139 (20.59%) have never heard of it before. Respondents in Iwo were more aware of the transmission and symptoms of Lassa fever than respondent from Ayedire. Although, 79.41% of the respondents had heard of Lassa fever before, but only 42.52% are aware of Lassa virus as the causative agent of the disease. From the data, 185 (27.41%) knew that the disease is transmitted through the consumption of rat, consumption of food contaminated with rat urine/feaces (25.48%), direct contact with an infected person (11.70%), while 149 (22.07%) do not even have any idea of how the illness is transmitted. Some of the myth misconceptions about Lassa fever transmission included mosquito bit (17.63%), dog bite (5.04%). Common symptoms known by the respondents as associated with Lassa fever include, fatigue (31.41%), fever (16.59%) and general weakness (14.52%). The least mentioned symptom was miscarriage in pregnant women (2.07%). This study has revealed that only 0.99% of the participant in Iwo had good knowledge of Lassa fever, while none of the respondents from Ayedire had good knowledge of it. In total, 99.56% of the respondents had poor knowledge of the disease. Only 17.33% believed that victims may not show any symptom at the initial stage, 37.78 % said Lassa fever is preventable, and only 41.48% believed that Lassa fever can lead to death. One hundred and seventy-nine (26.52%) respondents believed that there is vaccine for Lassa fever. Only 69 (10.22 %) could correctly state the incubation period of the disease, as seven to twenty-one days. While 43.85% of the respondents will go to the hospital when they observe symptoms, 11.85% will do self-medication, and 9.04% will consult religious houses.

Table 2
Knowledge of Lassa fever among residents of Iwo and Ayedire LGAs, Osun State, Nigeria

		Iwo		Ayedire		Total	
		(n = 303)		(n = 372)		(n = 675)	
Variables		No	%	No	%	No	%
Have heard of Lassa fever	Yes	254	83.8	282	75.81	536	79.41
	No	49	16.2	90	24.2	139	20.59
Lassa fever is caused by Lassa virus	Yes	141	46.5	146	39.2	287	42.52
	No	12	3.96	39	10.5	51	7.56
	I don't know	150	49.5	187	50.3	337	49.93
*Means of transmission	Mosquito bite	34	11.22	85	22.85	119	17.63
	Dog bite	6	1.98	28	7.53	34	5.04
	Rat consumption	99	32.67	86	23.12	185	27.41
	Contact with urine/feaces of infected rat	79	26.07	56	15.05	135	20
	Consumption of food/drink contaminated with infected rat	112	36.96	60	16.13	172	25.48
	Inhalation of aerosol produced by infected rat	15	4.95	14	3.76	29	4.30
	Direct contact with infected person	56	18.48	23	6.18	79	11.70
	Do not know	59	19.50	90	24.20	149	22.07
*Symptoms of Lassa fever	Fatigue	72	23.76	140	37.63	212	31.41
	General weakness	63	20.79	35	9.41	98	14.52
	Fever	41	13.53	71	19.09	112	16.59
	Chest pain	23	7.59	7	1.88	30	4.44
	Headache	47	15.51	10	2.69	57	8.44

*Multiple responses were considered

		Iwo		Ayedire		Total	
		(n = 303)		(n = 372)		(n = 675)	
Variables		No	%	No	%	No	%
	Sore throat	37	12.21	5	1.34	42	6.22
	Vomiting	50	16.50	5	1.34	55	8.15
	Diarrhea	35	11.55	4	1.08	39	5.78
	Face swelling	18	5.94	2	0.54	20	2.96
	Low blood pressure	21	6.93	4	1.08	25	3.70
	Nose/mouth/gastro bleeding	29	9.57	4	1.08	33	4.89
	Miscarriage in pregnant women	11	3.63	3	0.81	14	2.07
	Cough	42	13.86	2	0.54	44	6.52
	I don't know	80	26.40	93	25	173	25.63
All victims show symptoms at initial stage	Yes	117	38.6	131	35.2	248	36.74
	No	43	14.2	74	19.9	117	17.33
	I don't know	143	47.2	167	44.9	310	45.93
Lassa fever can lead to death	Yes	146	48.2	134	36	280	41.48
	No	42	13.9	67	18	109	16.15
	I don't know	115	38	171	45.97	286	42.37
There is vaccine for Lassa fever	Yes	67	22.1	112	30.1	179	26.52
	No	76	25.1	80	21.5	156	23.11
	I don't know	160	52.8	180	48.4	340	50.37
Lassa fever can be prevented	Yes	139	45.9	116	31.2	255	37.78
	No	24	7.9	57	15.3	81	12.00
	I don't know	140	46.2	199	53.49	339	50.22
*Multiple responses were considered							

		Iwo		Ayedire		Total	
		(n = 303)		(n = 372)		(n = 675)	
Variables		No	%	No	%	No	%
Incubation period	Less than 1 day	43	14.2	71	19.1	114	16.89
	7–21 days	43	14.2	26	7.0	69	10.22
	Less than six months	84	27.7	53	14.2	137	20.50
	No idea	133	43.9	222	59.7	355	52.59
What to do if symptoms occur	Go to drug house	44	14.52	36	9.68	80	11.85
	Use local herbs	20	6.6	18	4.8	38	5.63
	Visit herbalist	11	3.63	31	8.33	42	6.22
	Go to religious house	17	5.61	44	11.83	61	9.04
	Go to the hospital	157	51.8	139	37.4	296	43.85
	I don't know	53	17.5	104	28	157	23.26
*Multiple responses were considered							

Prevalence of rats in the residence of participants is presented in Table 3. Approximately, forty-five percent of the respondents harbour rats in their houses every day, while only 28 (4.15%) have not seen a rat in their residence for over 6 months. The percentage of respondents having ≥ 5 rats in their houses was 40.15% and 33.48% described the number of rats in their houses as plenty. The response of the participants on how to prevent Lassa fever is shown in Table 4. The common methods of prevention as reported were good hygiene and a clean environment (35.26%), blocking of rat holes around the house (22.37%), keeping foodstuff in sealed containers (22.93%).

Table 3
Prevalence of rats among residents of Iwo and Ayedire Local Government Areas, Osun State, Nigeria

	Iwo (N = 303)		Ayedire (N = 372)		Total (N = 675)	
How often do you see rat in the house?	N	%	N	%	N	%
Everyday	128	42.2	176	47.3	304	45.04
2–7 days	49	16.2	65	17.5	114	16.89
8–30 days	58	19.14	75	20.20	133	19.70
1–3 months	27	8.91	20	5.4	47	6.96
3–6 months	33	10.9	16	4.3	49	7.26
> 6 months	6	2.6	20	5.4	28	4.15
Number of rats in the house						
1–5	108	35.6	163	43.8	271	40.15
6–10	57	18.8	73	19.6	130	19.26
Plenty	108	35.6	118	31.7	226	33.48
Did not disclose	30	9.9	18	4.8	48	7.11

One hundred and two respondents (19.70%) believed the disease could be prevented by washing of hands often, avoidance of rat consumption (17.93%), disposal of garbage away from homes (13.78%) and only 85 (12.59%) accepted that Lassa fever can be prevented by avoidance of contact with an infected person (Table 4). The least mentioned was the avoidance of bush burning by 72 (10.67%) respondents. The knowledge of good prevention practices in Iwo and Ayedire LGAs was 12.21% and 2.15%, respectively. This implies that 93.33% of the respondents showed poor prevention practices. The knowledge of prevention practices is regarded as poor in both Local Government areas, but Iwo LGA showed better knowledge of good prevention practices than Ayedire.

Table 4
Responses on prevention of Lassa fever in Iwo and Ayedire Local Government Areas

	Iwo (N = 303)		Ayedire (N = 372)		Total (N = 675)	
Means of prevention	N	%	N	%	N	%
Blocking all rat holes around the house	106	34.98	45	12.10	151	22.37
Frequent hand washing	71	23.43	31	8.33	102	19.70
Avoidance of frequent touching eye, nose and mouth	56	18.48	28	7.53	84	12.44
Keeping food in sealed containers	102	33.66	46	12.37	148	21.93
Good hygiene and clean environment	125	41.25	113	30.38	238	35.26
Avoidance of rat consumption	80	26.40	41	11.02	121	17.93
Avoidance of bush burning	33	10.89	39	10.48	72	10.67
Disposal of garbage away from homes	66	21.78	27	7.26	93	13.78
Avoidance of contact with infected person	61	20.13	24	6.45	85	12.59
No idea	52	17.16	93	25.00	145	21.48
*Report include multiple responses						

Logistic regression analysis showed that respondents aged 25–39 years were significantly more aware of Lassa fever than other age groups. Although, there no significant difference between level of education and knowledge of LF, there was a positive significant relationship with good prevention practices against Lassa fever and higher education ($P < 0.01$). Also, married respondents showed positive relationship with good prevention practices and was significant at $P < 0.001$. There was a significant level of relationship ($P < 0.01$) between poor prevention practices and poor rat control among the respondents.

Discussion

Lassa fever could soon become a global concern if nothing is done to curtail the disease in the endemic regions. This is because, it can be imported from endemic areas to other countries [12, 32, 33]. More than 867 people have died of LF in Nigeria in recent years with CFR ranging between 3.64% and 27.2% [4]. Despite the alarming increase in CFR, its awareness and knowledge are underdetermined in many local communities within the country. Poor/inadequate knowledge and wrong preventive practices could aid the spread of infectious diseases among people. Poor epidemic preparedness has been indicated as one of the key factors contributing to disease outbreak [34, 35]. Therefore, it is necessary to investigate the level of awareness, knowledge, and prevention practices among the people about the disease, especially in the local communities where they are more prone to Lassa fever because of the prevalence of rodents

[1, 3]. In this study, 79.41% of the respondents were aware of Lassa fever, which is higher than 36% and 7.4%, as reported by Asogun et al. [36] and Oladeinde et al. [11], respectively in similar studies in Nigeria. Although, there has not been any formal report of Lassa fever infection in the study area, the high number of awareness among the respondents could be attributed to an increase in awareness through mass media over time. The finding of this study is close to the report of Morgan et al. [26], who recorded 90.8% awareness of LF among rural dwellers in Akwa-Ibom State, southern Nigeria. From the response of the participants, it was observed that more males had heard about Lassa fever than females, which is similar to the findings of Oladeinde et al. [11]. Usuwa et al. [37] reported that 63.2% of the female respondents heard of Lassa fever before a particular study in Ebonyi State, southeast Nigeria, which is contrary to the findings of this study. More awareness about LF among male compared to female respondents in the study area could be attributed to the fact that males have access to health-related information than females [11]. The age range between 25 years and 39 years were more aware of the disease. This agrees with the report of Tobin et al. [3]. It has been discovered that this age group (25–39) give more attention to social media information than any other age group. The present study showed that the percentage of the participants who had up to secondary school was similar in both towns (Iwo 29%, Ayedire 29.8%). In similar studies carried out in Nigeria by Morgan et al. [26] and Usuwa et al. [37], they reported 43.9% and 51.7% of participants with secondary school education, respectively. Gender, age, marital status, education, and occupation did not significantly affect the level of knowledge in the study areas. More Christians have heard of LF, probably because church leaders are interested in the well-being of their members and they often organize health promotion programs [38].

The participants heard about LF through media (36.89%), family and friends (16.15%), health workers (14.81%), while 20.15% of the participants never heard about the disease. Low information from health workers could be ascribed to their poor knowledge about the disease [3, 6]. Mass media being the most common means of hearing about LF in the study area may not be far-fetched from the fact that many people in the local communities have battery-powered radios which they use to receive information because of the peculiarity of poor electricity supply. Publicity jingles via radio must have increased the awareness of the people over time. Mass media as the most popular means of hearing about the disease is in agreement with many researchers [11, 26, 37]. Despite the high awareness, some of the respondents believed that Mosquito bites (17.63%) and dog bites (5.04%) could be possible means of transmission of the disease. Oladeinde et al. [11] reported in a similar study in rural communities of Edo State, Southern Nigeria that 67.8% and 20.7% of the respondents had misconceptions about the cause of LF to be mosquito bites and dog bites, respectively. The symptoms most correctly known by the participants include fatigue (31.41%), fever (16.59%), and general weakness (14.52). This is contrary to the report of Usuwa et al. [37], who reported the percentage of respondents known symptoms to be fever (69.3%), and general weakness (65%). Only 41.48% believed the disease could lead to death, 37.78% believed it can be prevented, 26.52% signified that there is a vaccine for LF. Only 10.22% of the participants could correctly state the incubation period as 7–21 days, 37.19% do not have adequate knowledge about the incubation period of the disease, and 52.59 % had no idea of the incubation period. The proportion of respondents who will go for self-medication, such as the use of un-prescribed drugs and local herbs was 17.48%,

consultation of an herbalist (6.22%), visiting religious houses (9.04%), and only 43.85% will go to the hospital if symptoms occur. Self-medication could prolong illnesses, lead to more complications, easy spread to other people, more expensive to treat, extend hospital stay, and even death in some cases [39]. Although, a high level of awareness was reported for Ayedire and slightly higher in Iwo, 672 (99.96%) of the respondents have poor knowledge of the disease. Only 25.48% were able to identify consumption of food/drink contaminated with urine/feaces of an infected rat as a means of transmission of LF, while 22.07% of the respondents do not have an idea of the means of transmission of the disease. This is below the findings of Morgan et al. [26], who reported that 88% of the respondents in a similar study in Nigeria associate the transmission of LF with eating food contaminated with rats' feaces and urine. Good knowledge of the disease cannot be over-emphasized in curtailing the spread during an outbreak.

Although, 7.26% of the respondents have seen rats in their homes in more than 3 months, 45.04% sees rats in their house every day and 33.48% could quantify the number of rats in their residence as plenty. This study showed that 92.89% of the respondents harbours rats in their homes, which implies that they do not have effective measures to control rats in their homes. The role of rats in the spread of LF cannot be over-emphasized. Although a high percentage of the respondents identified good hygiene and clean environment (35.26%) as a preventive measure against the disease, only 22.37% agree they should block rat holes while 21.93% believed they should keep their food items in sealed containers. Good prevention practices can restrict the spread of infectious diseases from endemic regions to other regions.

Part of the factors that could aid the spread of LF in an outbreak include lack of diagnostic facility in the rural areas, LF symptoms similar to other febrile illnesses, such as malaria and typhoid fever, thus leading to late presentation, un-curtailed rats in homes, poor knowledge, and poor prevention practices [1, 7, 11, 17, 25]. Although, early diagnosis will help reduce spread, diagnostic facilities are difficult to find in many rural communities in Africa, as none could be found in the study areas. Lack of proper barrier, infection prevention, and control practices exposes health workers to infection [22, 27]. Inter-border communal trade of farm produce within local communities, which is characterized by overcrowding and poor sanitation, could also aid the spread of Lassa fever in poorly informed communities. Spreading of semi-processed foods along the walk path to dry is a common practice in rural areas and this has been observed to invite rodents, thereby enhances the deposition of rat excreta/urine on such foods [11]. Bush burning facilitates unfettered migration of rodents from bush to residential apartments. Burning of bush is an unwholesome practice, especially in the dry season (November- April) and this could also be responsible for prevalent outbreaks recorded during the dry season. Due to poor surveillance in many parts of the country and some of the aforelisted factors, some residents of these local communities would have died as a result of undiagnosed LF infection.

Conclusions

Gender, age, marital status, education, and occupation did not significantly affect the level of knowledge about Lassa fever in Iwo and Ayedire Local Government Areas, Osun State, Nigeria. Although, 79.41% of the respondents are aware of Lassa fever, only 0.44% had good knowledge of the transmission and

symptoms of the disease. Less than 50% of the respondents will go to the hospital if they observe symptoms. Accessing information through health workers is very poor. Despite the knowledge of Mastomys rats as the primary reservoir of the Lassa fever virus, 45.04% of the respondents do not have effective means of preventing rats into their homes. Only 22.37% will block rat holes around their homes, 21.93% will keep their food in sealed containers, 17.93% will avoid consumption of rat and 10.67% will avoid bush burning. More than 90% of the respondents showed poor knowledge of prevention practices in the study areas. Public awareness enlightenment campaign is a key factor in the prevention and control of Lassa fever outbreak. It is also important to promote awareness about the role of rats in the transmission and spread of Lassa fever. The findings of this study show that there is a low level of knowledge of Lassa fever among the studied population and there is a need for further health education campaigns to improved environmental hygiene and adjustment of practices that could promote the spread of Lassa fever.

Recommendations

It is important for the Government to work through the health workers to sensitize the populace on the transmission, symptoms, and prevention of Lassa fever, with more focus on the rural communities, where Mastomys rats are much more prevalent. There should be a community awareness campaign on the role of rats in the spread of Lassa fever. The importance of good hygiene and good prevention practices should also be emphasized. People should be encouraged to go to the hospital immediately after they notice any symptom, so as to curtail the spread of the disease. This can also be possible by building more community health centers with appropriate diagnosing equipment. Healthcare workers should be educated on safety preventive measures of infectious diseases and adequate personal protection equipment (PPE) should be made available for their use. Patients presenting with febrile illness with associated symptoms should be handled with extra care.

Declarations

Ethical Approval and Consent to participate

The approval for this study was received from the Research and Ethics Committee of Bowen University, Iwo, Nigeria. Also, the consent of the respondents was received before the interview and they were also promised to keep their response anonymous and confidential.

Consent for publication

Not applicable

Availability of supporting data

The dataset supporting the conclusion of this article is included as addition file

Competing Interest

The author declares no conflict of interest.

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Authors' Contribution

The author designed the work, analyzed the data and wrote the manuscript.

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Figures

Figure 1

Maps of Nigeria showing Lassa fever endemic States [A]; Osun State [B] and study area [C] Note: The designations employed and the presentation of the material on this map do not imply the expression of any opinion whatsoever on the part of Research Square concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. This map has been provided by the authors.

Figure 2

Number of confirmed laboratory cases of Lassa fever and deaths recorded annually from 2014 to 2020

*The first twenty-three weeks for year 2020 Data source – www.ncdc.gov.ng; accessed June 6th, 2020

Figure 3

Source of information about Lassa fever among residents of Iwo and Ayedire Local Government Areas, Osun State, Nigeria

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