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Original Research Article

Knowledge, attitude and practice of Lassa fever prevention by students of the University of Benin

Stephena U Ighedosa[1], Amienwanlen E Odigie[2]*, Stella F Usifoh[3], Osadolor Asemota[4], Daniel O Asemota[2], Isoken T Aighewi[5]
[1]Department of Community Health, [2]Department of Veterinary Medicine, [3]Department of Clinical Pharmacy and Pharmacy Practice, [4]Health Services, [5]Department of Environmental Management and Toxicology, University of Benin, Benin City, Nigeria

*****For correspondence: *Email:* eugene.odigie@uniben.edu. *Tel:* +23408053362858

Abstract

Purpose: This study assessed the knowledge, attitude and practice of prevention of Lassa fever, amongst students resident in the campuses of University of Benin.
Methods: A cross-sectional epidemiological study was conducted in the two campuses (Ugbowo and Ekenhuan) of the University of Benin, Benin City, Edo State, Nigeria. Three hundred students were selected by stratified random sampling technique. Pretested structured questionnaires were used to obtain socio-demographic data, knowledge, attitude and preventive practices against LF amongst students. Data obtained from consenting respondents were analyzed using SPSS v22.
Results: The knowledge of the majority 276 (91.7%) of the study population about Lassa fever disease was poor. Good preventive practices were reported by 28 (73.3%) of respondents and fair practices was reported by 10 (24.3%) of respondents with good knowledge. It was found that preventive practices were significantly associated with level of study of students (p=0.033).
Conclusion: Continued dissemination of accurate information on Lassa fever disease is indicated at all levels of study in the University system to improve preventive practices and reduce risk of Lassa fever disease amongst student population.

Keywords: Lassa fever virus, preventive practices, Knowledge, Attitude and Practice, *Mastomysnatalensis*, endemicity

Indexing: Index Copernicus, African Index Medicus

Introduction

Lassa fever (LF) remains a public health challenge in endemic areas in West Africa. LF is an acute and sometimes fatal viral haemorrhagic disease which occurs along the Lassa belt in West Africa. Lassa fever was first identified in Nigeria in 1969, when two Nurses died of a seemingly mysterious disease in Lassa village, Borno State, Nigeria.[1,2,3] LF is caused by Lassa virus (LASV), a bi-segmented single stranded RNA virus of the family,*Arenavividae*. The reservoir of LF, *Mastomysnatalensis*, is known to exhibit asymptomatic infection but excrete the virus in copious amount in the urine, saliva and blood. Symptoms of LF in manare similar to that of Ebola, Lujoand Crimean-Congo Haemorrhagic Fever but are rarely associated with bleeding from orifice. LF disease is known to be endemic in Guinea, Liberia, Nigeria and Sierra Leone with recurrent seasonal epidemics. Studies have shown that the seroprevalence of Lassa fever virus in human populations ranges from 8-22% in Sierra Leone, 4-55% in Guinea and 7-22% in Nigeria,[4] LF is known to account for some 300,000-500,000 cases annually and 5000 deaths.

LF is a zoonotic disease of public health importance with several reported outbreaks over

the years. In August 2015, there was a reported outbreak of Lassa fever epidemic in Nigeria, as of February, 2016 the Nigeria Centre for Disease Control (NCDC) had reported a total number of confirmed and reported cases to be 175 with a total of 101 deaths from 19 States (including the Federal Capital Territory).[5]Humans become infected by exposure to the excreta and body secretions of the reservoir *Mastomysnatalensis* (the multimamate rat) or in some areas by eating them.[6,7] *Mastomysnatalensis*, the ubiquitous and highly commensal host of LASV, exhibits persistent asymptomatic infection with profuse virus excretion in itsurine and feaces.[8,9] Other proposed reservoirs of the Lassa virus include *M.erythroleucus* and *M.hildbrandtii*.[10,11] The primary mode of transmission of LASV to man is through contact with infected rodent excretions and secretions such as blood, saliva, feaces or urine in human food; or during hunting and processing of rats for consumption. Secondary person-to-person transmission can occur through exposure to infected persons' blood or bodily secretion of infected cases (dead or alive).[6]

Case definition of suspected Lassa fever consists of known exposure to a person who has had LF, fever >38^{o}C for less than three weeks with absenceof signs of local inflammation, and anytwo major signs (Bleeding, swollen neck or face, conjunctival or sub conjunctival haemorrhage, spontaneous abortion, pectechial or haemorrhagic rash, new onset tinnitus or altered hearing, persistent hypotension) or one major and two minor signs (headache, sore throat, vomiting, diffuse abdominal pain/tenderness, chest/retrosternal pain, cough, diarrhea, generalized myalgia or arthralgia or profuse weakness)[4]. Swollen face and neck are classic signs of Lassa fever but only occur in about 10% cases. Currently, Ribavirin® is the only effective drug of choice for LF treatment; though the use of ethnomedicinal remedies in treatment of people and animals infected with viral infections have been documented.[12,13,14,15]

Various studies on the knowledge, attitude and practices of LF have been conducted in Nigeria.[16,17,18,19,20].These ranged from assessment of knowledge of LF amongst health workers (physicians and nurses) in rural communities in South-south zone of Nigeria including Edo State [16,18,20,21] to LF awareness amongst rural community dwellers in southwest [19] and central Nigeria.[22] Edo State is known as a LF epicenter in Nigeria, with several reported outbreaks including the recent 2015/2016 epidemic.[20]Studies on knowledge, attitude and practice (KAP) on LF in Edo State have mainly focused on health care providers. Although Bamigboye[17] investigated rat infestation in halls of residence in the ObafemiAwololo University, there is paucity of information on the KAP on LF amongst students of Federal institutions in Nigeria. This study therefore assesses the Knowledgeof LF prevention amongst students resident in the campuses of the University of Benin, Edo State, Nigeria.

The goal of this study is to assess the knowledge, attitude and practice of prevention of Lassa fever, amongst students resident in the campuses of University of Benin. Specifically, the knowledge and transmission of LF and prevention practices to reduce risk of LF will be evaluated.

Methods

Study area

The study was conducted at the University of Benin, Benin City, Edo State which is located in Nigeria's South-South geopolitical zone. The University of Benin is one of the first generation Federal Universities and has about 18 faculties and schools with two campuses located at Ugbowo and Ekenhuan Road in Benin. The University offers courses at postgraduate, undergraduate, diploma and certificate levels. A total of over 80,000 students are currently enrolled in various full-time or part-time programmes with about 8000academic and non-academic staff. The University has eight hostels in Ugbowocampus and two hostels in Ekenhuan campus respectively and the total population of students resident in all hostels (10) is about 15,000.

Study design

This was a cross-sectional study using a stratified random sampling of students of the University of Benin resident in the hostels.

Sampling Technique

A sample size of 225 respondents was calculated

using the Cochran formula.[23] A LF prevalence of 21% and an attrition rate of 10% was used to obtain a required final minimum sample size of 284. However, a total of 300 respondents were finally sampled to make room for non response. Sampling frame for students was the total student population resident in all hostels (10) in both campuses. A sampling fraction was determined by dividing the calculated sample size by the sampling frame. The sampling fraction was applied to population of students resident in each hostel of residence to determine the effective sample size for the stratum. The number of rooms to be sampled was determined by dividing the number of rooms per hostel by the effective sample size. The selection of sampling unit (respondents) was done by balloting.

Inclusion and Exclusion Criteria

Only registered students resident in the hostels of the University were eligible to be included in the study. Students that were squatters in the halls of residence were excluded from the study.

Study instrument

The study instrument was a pre-tested structured questionnaire divided into sections to obtain socio-demographics, knowledge, attitude and preventive practices amongst students. The questionnaire was administered to and retrieved from consenting respondents. Ethical approval was obtained from the ethics committee of the University of Benin Teaching Hospital and all information was kept confidential.

Data analysis

Data were collated, sorted and screened for accuracy on Microsoft Excel (Microsoft Corporation, Redmond Washington). This was later exported to SPSS (Statistical Package for Social Sciences version 22) and analyzed. Results of descriptive analysis were presented in charts and tables. Chi-square was conducted to determine any significant association between variables and the p-value<0.05 was considered significant.

Transmission, prevalence and predisposing factors were assessed as indicators of knowledge while attitude indicator was assessed based on respondents' attitude towards cases of LF, to risk perception, and treatment options. Practice to hand washing and rodent control was used to score preventive practices. Specific questions to assess knowledge of respondents were obtained and a score assigned to each correct response. Similarly, selected questions targeted at the attitude and practices of the respondents respectively were sorted and a maximum score calculated. The scores were summed and a scale was developed for knowledge, attitude and preventive practices. A scale for practices and attitude of respondents towards LF was ranked as either poor, good or excellent. Chi square was used to test significant association between socio-demographics (level of education, and level of study, age, gender and income)and knowledge, attitude and practices of respondents.

Results

There was a higher proportion of female 160(53.2%) than male 139(46.2%) with age range between 15-24 years (n=268, 89.9%) and above 25 years (n=30, 10.1%) (Table 1). Married students accounted for 2% (n=6) of total respondents and the predominant religion was Christianity 292(97%). Undergraduate students in the first year of their programme constituted 162(60.2%) of residents in the halls while 8(3.0%) of students resident in the hostels were on a postgraduate programme. About 230(76.4%) of respondents had basic level education having obtained WASSCE/GCE/ NECO and 39(14.5%) had obtained some form of higher education degree (Diploma, Bachelor of Science, Master of Science and Doctor of Philosophy) or were on course to doing so. Table 1. There were more residents per room in the hostels than officially assigned. As shown in Figure 1, respondents were distributed across the various halls of residences within campus: 156 (51.8%) in undergraduate halls, 4(1.3%) in postgraduate halls, 3(1.0%) in staff quarters and 130(43.2%) resides off campus.

Lassa fever is not new to 289 (96%) of respondents.The most frequent source of information about LF were radio/television 110(36.5%) and friends/family 101(33.6%). were the most frequent source of information amongst respondents. In comparison, newspapers 20(6.6%) and campus campaign 29 (9.6%) respectively were less frequent sources of

Table 1: Distribution of respondents (students) according to demography (N=300)*

Respondents	N (%)
Sex	
Male	139(46.2)
Female	160 (53.2)
Age Group (years)	
Young adult (15-24)	268 (89.9)
Adult (25->55)	30 (10.1)
Marital status	
Single	291 (96.7)
Married	6 (2.0)
Religion	
Christian	292 (97.0)
Muslim	4 (1.3)
Traditional	1 (0.3)
Level of study	
100	162 (60.2)
>200	99 (36.8)
Postgraduate	8 (3.0)
Highest level of Education	
WASSCE/GCE/NECO	230 (76.4)
Diploma	6 (3.0)
B.Sc.	27 (9.0)
M.Sc.	4 (1.3)
PhD	1 (0.3)
Postdoctoral	1 (0.3)
Number of students officially allocated to rooms in hostels	
1-4	96 (49.5)
5-8	90 (46.4)
>8	8 (4.1)
Actual number of students resident in hostels	
1-4	75 (61.0)
5-8	24 (19.5)
>8	24 (19.5)
Source of information of Lassa fever amongst respondents	
When did you first hear of Lassa fever	
2016	77 (25.6)
2015	88 (29.2)
2014	25 (8.3)
Before 2014	104 (34.6)
How did you first hear of Lassa fever	
Newspaper	20 (6.6)
Radio/television	110 (36.5)
Internet	35 (11.6)
Campus campaign	29 (9.6)
Friends/family	101(33.6)

**total number of responses for each variable varied from total number of respondents due to non-response*

information on LF (Table 1). However, majority of the respondents 104 (34.6%) and 77 (25.6%) heard aboutthe disease quite recently in 2014 and 2016 respectively.

Though respondents knew about some non-specific signs associated with the disease such as fever (75.1%), malaise 258(85.7%), headache 148(49.2%), sorethroat 105(34.9%) and vomiting 156(51.8%) (Figure 2), the general knowledge about the disease was poor. While 31% acknowledged the availability of vaccine, 44% of respondents were not sure (Figure 3). Respondents did not know that LF can be transmitted through infected rat secretion 98(32.6%), infected rat feces 96(31.9%), eating bush meat 248(82.4%), sexual intercourse 270(89.7%), inhalation of viral particles 237(78.7%) or exposure to body fluid of infected patents 162 (53.8%) (Table 2). In addition, 18(6.0%) opined that LF can be induced through a curse or spell while others opined that residence or visit to rural areas 256(88.0%), poor compliance to standard precaution 180(59.8%), traditional handling of corpse 258(85.7%) and insanitary disposal of waste 189(62.8%) did not predispose an individual to the disease.

Table 3 shows that knowledge of LF, attitude and preventive practices was not significantly associated with socio-demographics except for preventive practices which was found to be significantly associated with level of education (p=0.033). Knowledge was generally poor amongst respondents and was not significantly associated with level of study (p=0.793), level of education (p=0.299), gender (p=0.387), age (p=0.331) and income (p=0.332). Young adults 33(86.8%) demonstrated good knowledge than adults 5(13.2%) and students in 200 level of study and above showed better knowledge 9(9%) than new students to the university 22(13.6%). Respondents with higher education 4(12.1%)had good knowledge compared with 19(7.9%) of respondents with basic education (p>0.05).All respondents with high income (7/7) demonstrated good preventive practices while respondents who are low income earners 92(65.7%) had poor preventive practices. Amongst students in their first year of study, 24(28.4%) and 109(67.3%) were assessed as having fair and good preventive practice respectively. In comparison 18(18.2%) and 70(70.7%) of respondents in the second year of study and above showed fair and good preventive practices respectively (p=0.03). Respondents with good knowledge demonstrated good 28(73.3%) and fair 10(26.3%) preventive practices respectively. Good preventive practices were observed amongst respondents with higher

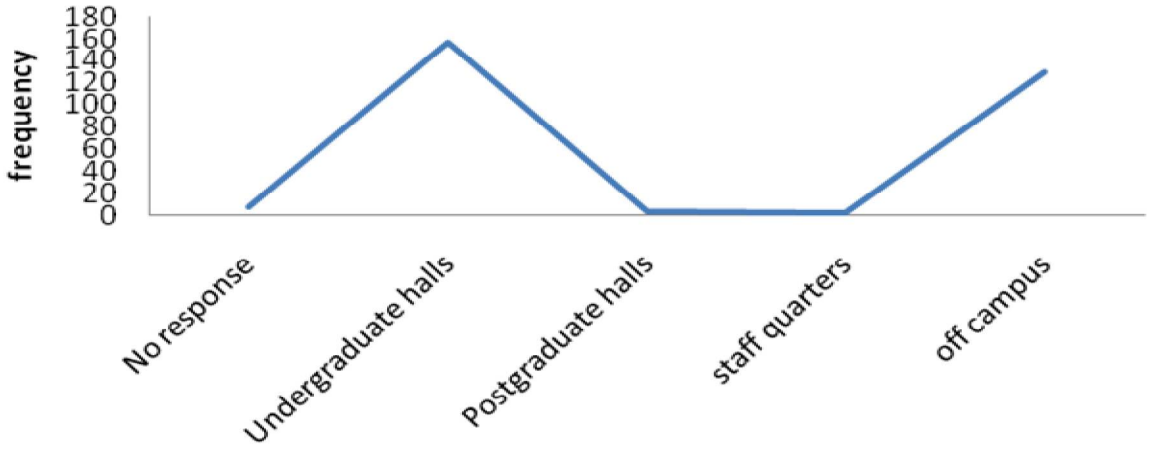

Figure 1: Distribution of respondents based on residence

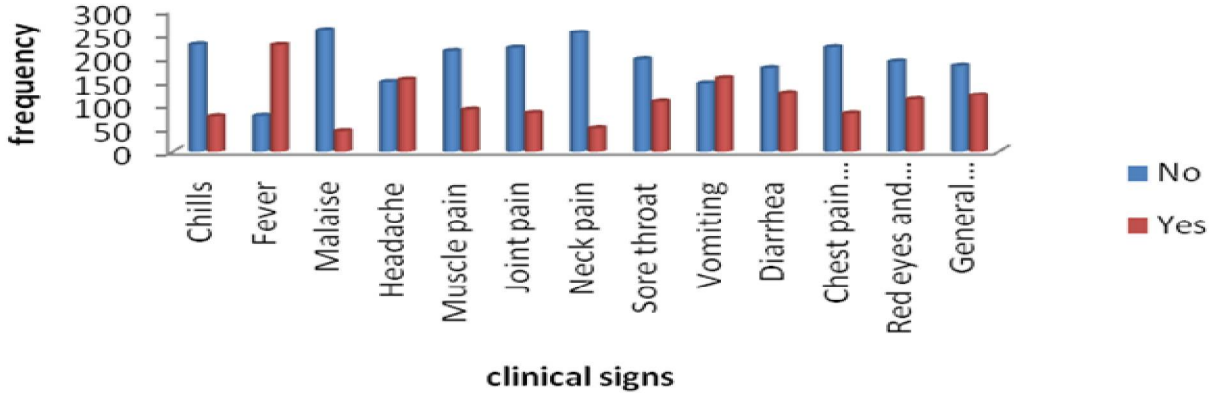

Figure 2: Knowledge of respondents about clinical signs and symptoms

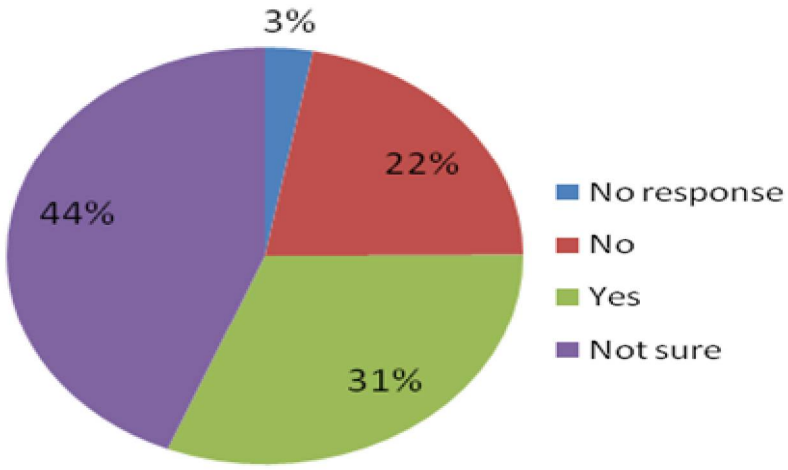

Figure 3: knowledge of respondents on availability of vaccines

education 27(81.8%) in comparison to those with basic education 157(65.7%) (p>0.05). Risky behavior represented by poor attitude was demonstrated by more respondents in first year in the university 18(11.1%), had basic education 25(10.5%), and poor knowledge 36(94.7%) compared to those in their second year or above 14(14.1%), with higher education 7(21.2%), and good knowledge 1(2.6%) respectively.

Table 2: Knowledge of Lassa fever prevalence, transmission and predisposing factors amongst respondents

Respondents	N (%)
Knowledge of Lassa fever prevalence	
Heard of Lassa fever	289 (96.0)
What causes Lassa fever	
virus	240 (79.7)
bacterium	12 (4.0)
animal	1 (0.3)
witches/wizard	3(1.0)
Reservoir of Lassa fever virus	
All rats	49 (16.3)
Long nose rat	68 (22.6)
House rat	8 (2.7)
Mastomys rat	146 (48.5)
Rat can transmit Lassa fever to man	242(80.4)
Knowledge of transmission of lassa fever	
Lassa fever can be transmitted through	
contact with blood/secretions of infected rat	203 (67.4)
Contact with urine/feces of infected rats	205 (68.1)
Eating bush meat	53 (17.6)
Eating rat meat	100 (33.2)
Exposure to infectious body fluid and secretion	139 (46.2)
Curses and spells	18 (6.0)
Sexual intercourse	31 (10.3)
Caring for Lassa fever patient	68 (22.6)
Inhalation of viral particles	64 (21.3)
Handling of corpses	53 (17.6)
Knowledge of respondents on the predisposing factors to lassa fever	
What factors predispose to Lassa fever?	36 (12.0)
Residence or visit to rural areas	121 (40.2)
Poor compliance to standard precautions	43 (14.3)
Traditional handling of corpses	116 (38.5)
Contact with persons infected with the disease	58 (19.3)
Eating of rodent	112 (37.2)
Insanitary disposal of waste	
Age group is at risk	18 (6.0)
Children	1 (0.3)
Adult	2 (0.7)
Elderly	261 (86.7)
All age group	

Discussion

Lassa fever has remained endemic with recurrent epidemics in Nigeria, since Lassa fever was first reported in 1969. The result of this study revealed that after 48 years of the first case of LF in Nigeria, the knowledge and understanding of LF disesease, transmission, prevalence and prediaposing factors were poor amongst students of the University. However, the respondents knew about some non-specific signs such as fever, malaise, headache, sorethroat and vomiting.Poor knowledge has also been reported amongst health care workers.[24,16,18,20] In this study, more than half of the respondents only recently (2014 and 2015) heard about LF diseasedespite the fact that the disease has posed health challenge forso many years. Some respondents learned about LF from newspaper and curent campus campaign on LF. This findings support the need for continuous campaigns and news items in the public media to sustain thedissemination of information on LF. Effective surveillance of LF could predict an outbreak and provide opportunity for massive public mobilization for 'Heallth Action', to break the chain of transmision of LF in the community.Tomori [25] rightly noted that improvement and upgrading of disease surveillance is key to prevention of future outbreaks not only of Lassa fever but other epidemics.

Inadequate knowledge about the disease may reflect the information source where knowledge of the disease was first obtained.Remarkably, high number of respondents heard about LF from radio/television and friends/family which is similar to the finding reported amongst health workers.[24] However, in another study amongst health workers in Edo State,the most common source of information was fellow health workers[16] compared with those whose source of information was radio and television. Information sourced from public media may be limited both in scope and accuracy. The value of information sourced from peers and family may be influenced by the individual's knowledge, experience and communication skills. The individual's capacity to benefit from information is determined by intelligence (ability to understand knowledge), previous bias, level of education and socio-cultural factors. Public media could impact positively on knowledge of LF transmission to the extent thatthe news items

Table 3: Association of Knowledge, attitude and practices with socio-demographics of respondents (N=301)

Demographics		**Knowledge**		**Attitude**			**Practice**		
		Good	Poor	Excellent	Good	Poor	Poor	Fair	Good
Level of study	100	22	140	91	53	18	7	46	109
	≥200	9	90	49	36	14	11	18	70
Total		31	230	140	89	32	18	64	179
		χ = 0.793, P = 0.187		**χ = 1.211, P = 0.546**			**χ = 6.827, P = 0.033**		
Level of education	Basic	19	220	133	81	25	16	66	157
	Higher	4	29	13	13	7	2	4	27
Total		23	249	146	94	32	18	70	184
		χ = 0.224, P = 0.299		**χ = 4.531, P = 0.104**			**χ = 3.837, P = 0.147**		
knowledge	Good			25	12	1	0	10	28
	poor			135	92	36	19	64	180
Total				160	104	37	19	74	208
				χ = 4.719, P = 0.094			**χ = 2.930, P = 0.231**		
gender	Male	15	124	76	47	16	13	32	96
	female	23	137	83	57	20	6	42	112
Total		38	261	159	104	36	19	74	208
		χ = 0.568, P = 0.387		**χ = 0.240, P = 0.887**			**χ = 3.978, P = 0.137**		
age	Young adult	33	235	144	91	33	16	67	185
	adult	5	25	15	12	3	3	7	20
Total		38	260	159	103	36	19	74	205
		χ = 0.152, P = 0.331		**χ = 0.475, P = 0.789**			**χ = 0.739, P = 0.691**		
Income	Low	21	119	72	53	15	48	-	92
	High	0	7	4	1	2	0	-	7
Total		21	126	76	54	17	48		99
		χ = 0.29, P = 0.332		**χ =2.889, P = 0.236**			**χ = 0.07, P = 0.058**		

are accurate and also adequate in scope. Dissemination of information on LF should include timely and intense social mobilization and awareness campaigns.[26]

The association between preventive practices and level of study was significant. More respondents in their first year of study reported good preventive practices in comparison to those in second year and above. Respondents in their first year of study in the University may still be influenced by family values andsecondary school instructions regarding disease preventive practices. Good value systems are first and best acquired at home and strengthened by good tutelage in the primary and secondary schools. By 200 level, basic value systems may be modified by the impact of peer pressure, environmental permissiveness due to lack of direct supervision and poor self management including specific disease prevention practices.

Knowledge of the LF transmission process is key to breaking the chain of infection. In this study, it was found that over 50% of respondents did not know the mode of transmission of LASV which include direct and direct contact through blood or body fluids, urine and faeces of infected rat;unprotected handling of corpses or caring for Lassa fever patients without Viral hemorrhagic Fever (VHF) Infection Precautions. Ignorance of risk factros is likely to be associated with 'risky behaviours' that sustains the chain of LF infection. Bias or corrupt information can predispose to ignorance to believe that LF disease can occur through a curse or spell. Such suspicion can lead to stigma. Fear of stigma can influence health-seeking behaviours by promoting engagement in self-medication or other unorthodox therapeutic alternatives with consequence of being lost to surveillance.

Conclusion

Knowledge of the mode of transmission, prevalence and predisposing risk factors of Lassa fever, amongst students of the University of Benin, Benin City, Edo State, Nigeria, was poor.

Lassa fever preventive practices were significantly associated with the level of study of respondents, in the University community, suggesting that prolonged exposure to peer pressure and permissiveness of campus life, has the potential to erode good preventive practices of the 100 level students most probably acquired from family, primary and secndary school seetings.

Continued dissemination of accurate information on Lassa fever disease is indicated at all levels of study in the University system to improve preventive practices and reduce risk of Lassa fever disease amongst student population.

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Conflict of interest

No conflict of interest associated with this work.

Authors' contribution

We declare that this work was done by the authors named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors. All authors made significant contributions to the conception, design and execution of the study. AEO and SFU performed the statistical analyses and interpretation of results, SUI and ITA wrote the protocol, AEO wrote the first draft of the manuscript. AEO, DOA and OA supervised data collection and data entering of the study. SFU and ITA proofread and edited the manuscript. All authors saw and approved the final version of the paper and agreed to its submission for publication.

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