



## Knowledge of Lassa Fever among Students of a College of Education: Call for Inclusion in Curriculum

Akinbodewa Ayodeji Akinwumi<sup>1\*</sup>, Adejumo Oluseyi Ademola<sup>1</sup>,  
Alli Emmanuel Oladimeji<sup>1</sup>, Olarewaju Cecilia Abiodun<sup>2</sup>,  
Akinbodewa Gladys Oghenevo<sup>3</sup>, Adejumo Oludamilola Adebola<sup>3</sup>,  
Osho Patrick Olarewaju<sup>4</sup>, Akinfiresoye Aanuoluwapo Olayinka<sup>1</sup>  
and Balogun Folorunso Ojo<sup>2</sup>

<sup>1</sup>Kidney Care Centre, Ondo State, P.M.B. 542, Ondo, Nigeria.

<sup>2</sup>Adeyemi College of Education, Ondo State, Nigeria.

<sup>3</sup>University of Medical Sciences, Ondo State, P.M.B. 542, Ondo, Nigeria.

<sup>4</sup>Department of Public Health, Ministry of Health, Ondo State, Nigeria.

### Authors' contributions

This work was carried out in collaboration between all authors. Authors AAA, Adejumo Oluseyi Ademola, AAO and AEO designed the study. Authors AAA and AAO performed the statistical analysis. Author AAA wrote the protocol, and wrote the first draft of the manuscript. Authors OCA, BFO and AAO collected data on-field. Authors AGO and Adejumo Oludamilola Adebola managed the analyses of the study. Author AAA managed the literature searches. All authors read and approved the final manuscript.

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### ABSTRACT

**Aims:** To determine the level of knowledge of Lassa fever among students of a Federal College of Education.

**Study Design:** A descriptive, cross-sectional study.

**Place and Duration of Study:** Adeyemi College of Education, Ondo State.

\*Corresponding author: E-mail: [ayoakinbodewa@yahoo.com](mailto:ayoakinbodewa@yahoo.com);

**Methodology:** Knowledge of Lassa fever was assessed using semi-structured, self-administered questionnaires. Respondents were classified into Biology students and others. Their knowledge of Lassa fever was assessed using a set of multiple-choice questions drawn from the fact sheet published by the Centre for Disease Control of Lassa fever. The respondents were then grouped into three classes: Below average (< 50%), good (50-74%), and excellent (75-100%) based on their scores. Statistical analysis was carried out using SPSS 17. Continuous variables were expressed as frequency and percentage. Discrete variables were expressed as mean  $\pm$  standard deviation. Student test was used to compare mean value of sub-groups while chi-square test was used to determine the significance of observed differences for categorical variables. P value < 0.05 was considered significant.

**Results:** A total of 255 students participated in this study (M:F, 1:1.3). The mean score was 31.6 $\pm$ 7.3%. Forty two percent were studying Biology and seven (2.7%) had good knowledge of the disease.

Sixty two percent knew the cause of Lassa fever while 12.5% knew its etymology and 92.6% recognized rats as its vector. Fever (38.8%) and bleeding into the skin (20.4%) were the symptoms of Lassa fever identified by most respondents while 14.9% were aware that less than 20% of infected people may die from Lassa fever. Forty two percent knew that it is treatable. There was no significant difference in the knowledge of Lassa fever between Biology students and others ( $p = 0.083$ ).

**Conclusion:** Knowledge of Lassa fever is poor among our respondents. For a successful teacher-centered enlightenment campaign against Lassa fever, lectures on the disease should be included in the curriculum of Colleges of Education for all departments.

*Keywords: Knowledge; Lassa fever; trainee-teachers; tertiary institution; Nigeria.*

## 1. INTRODUCTION

Lassa fever (one of many viral haemorrhagic fevers) is a disease of immense public health significance. It was discovered in 1969 in Lassa village in Northern Nigeria following the death of two American missionary nurses. The aetiological agent is the Lassa fever virus that is found in West Africa (including countries such as Sierra Leone, Liberia and Guinea) and spread by its reservoir, the multimammate rat, *Mastomys natalensis* [1].

The estimated annual cases of Lassa fever in West Africa is between 100,000 and 300,000 with about 5,000 deaths per annum [2-3]. In comparison to the Ebola virus disease, it is a milder form of viral haemorrhagic fever with a mortality ratio of 1:70. However, in un-prepared settings, mortality may be as high as 65% [4].

Lassa fever is endemic in Nigeria and known to occur annually with outbreaks of epidemic proportions on occasions. The most current outbreak occurred in late 2015, before which there had been over 12 major outbreaks between 1969 and 2014 [5].

Our literature search showed that awareness and attitude to Lassa fever remain poor among health workers and the general population in Nigeria

despite on-going efforts which entailed the use of community health extension workers [6-8]. However, we did not come across efforts involving the use of school teachers to combat the Lassa fever scourge.

In order to stem the tide of recurrent Lassa fever outbreaks, there is need for concerted efforts to change community perception of Lassa fever so as to promote appropriate attitudinal changes that are expected to enhance eradication of the disease and its vector.

In our study, we postulate that employing the school platform to reach out to the community through teacher-centered, school-based peer education drives may be a viable option and an addition to current strategies. We draw this inference from the fact that this method has been successfully employed in Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS) control and promotion of right attitudes to sex education among school children [9]. The adaptation of this same strategy for the control and eradication of the Lassa fever disease is not just possible but is indeed a cheaper, more far-reaching and effective strategy. This strategy may likely to result in community behavioural transformation that is expected to spread from within family units to the broader society.

In order to achieve this, there is a need to ascertain the knowledge-base of the would-be teachers on Lassa fever disease and seek improvements where necessary. At least one study has shown that previous formal training of the school teachers aside self-efficacy and good school-community relations is one of the characteristics that contributed to effective teaching of HIV/AIDS in schools [10]. We therefore set out to determine the level of knowledge of Lassa fever among students of Adeyemi College of Education, Ondo State.

## 2. METHODOLOGY

### 2.1 Study Location

This study was conducted among students of Adeyemi College of Education, Ondo State, Southwest Nigeria. It is one of the twenty two institutions owned by the Federal government of Nigeria with a student population of about 16,000. It was established in 1964. It is affiliated to the Obafemi Awolowo University, Ile-Ife and awards the National College of Education and Bachelor's degrees for various disciplines. The students offering Biology are exposed to Introductory Parasitology (BIO 323) in their third year.

### 2.2 Study Design

This was a descriptive, cross-sectional survey of qualitative knowledge of Lassa fever using semi-structured, self-administered questionnaires. The questionnaire was pre-tested by our focus group in at least three meetings and validated before use. Respondents were classified according to exposure to Introductory Parasitology for Biology students and others (Integrated Science, Agricultural Science, Physics, Chemistry, Computer Science, Geography, English, History, Economics, Business Studies and Yoruba). Their knowledge-base of Lassa fever was assessed using a set of 25 multiple-choice questions with each question weighted as 1. Questions were drawn from a fact sheet published by the Centre for Disease Control of Lassa fever [11]. Each respondent's score was converted to percentage by multiplying by a factor of 4. The respondents were then grouped into three classes based on their scores; below average (<50%), good (50-74%) and excellent (75-100%). Statistical analysis was carried out by means of SPSS version 17. Continuous variables were expressed as frequency and percentage. Discrete variables were expressed as mean  $\pm$  standard deviation.

Student test was used to compare mean values of sub-groups while chi-square was used to determine the significance of observed differences for categorical variables. P value < 0.05 was considered significant.

### 2.3 Consent

Informed consent was obtained from the respondents. They were made to understand that participation is voluntary and there was no consequence for non-participation. All information obtained was kept confidential.

## 3. RESULTS

A total number of 255 students participated in this study. Their demographic characteristics are shown in Table 1. There were 109 (42.8%) males and 145 (57.2%) females (1:1.3) with mean ages of  $21.7 \pm 3.4$  and  $21.3 \pm 3.3$  years respectively. One hundred and eight (42.4%) were studying Biology while 57.6% were studying other courses.

**Table 1. Socio-demographic characteristics of respondents**

Department (n = 255)	Frequency (n)	Percentage (%)
Biology	107	42.0%
Agric. Science	23	9.0%
Integrated Science	8	3.1%
Chemistry	37	14.5%
Physics	11	4.3%
Geography	8	3.2%
Computer Science	2	0.8%
Non-Sciences	59	23.1%
<b>Age range (n=222)</b>		
<20 years	65	29.3%
20-29 years	154	69.4%
30-39 years	3	1.3%
<b>Religion (n = 169)</b>		
Islam	22	13.0%
Christianity	144	85.2%
Traditional	3	1.8%
<b>Marital status (n = 213)</b>		
Single	206	96.7%
Married	7	3.3%
<b>Ethnicity (n = 235)</b>		
Yoruba	218	92.8%
Hausa	8	3.4%
Igbo	9	3.8%
South-South	1	0.4%

Table 2 shows that 224 respondents (87.8%) did not know the country of origin of Lassa fever; 115 (45.1%) thought that Lassa fever is a disease

that was imported from South America. Sixty two percent knew that Lassa fever is caused by a virus while 74.1% felt the disease was named after an animal. Only 12.5% knew that it was named after a village in Nigeria. Two hundred and thirty six (92.6%) knew that Lassa fever is transmitted by rats. Two hundred and seven (81.2%) chose blood tests as the best diagnostic means for the disease. Thirty eight (14.9%) of respondents were aware that less than 20% of infected people are likely to die from Lassa fever. One hundred and seven (42%) knew that there is drug therapy for Lassa fever while 36.9% were not sure. Fever (38.8%) and bleeding into the skin (20.4%) were the symptoms of Lassa fever identified by most respondents. Keeping food in

tightly closed containers (47.4%) and keeping the environment clean (31.4%) were the two most common preventive measures against Lassa fever identified by respondents.

Table 3 shows that only seven respondents (2.7%) had good knowledge (60-74%) of the disease. There was no significant association between knowledge of Lassa fever among students and their department ( $p=0.258$ ).

The mean score was  $31.6 \pm 7.3\%$ . There was no significant difference in mean scores of students studying Biology and others ( $p=0.083$ ). The highest score obtained by any respondent in our study was 60% (Table 4).

**Table 2. Knowledge of respondents on Lassa fever**

Question	Options	Frequency (percent)
Lassa fever was imported from South America	Yes	115 (45.1%)
	No	31 (12.2%)
	I don't know	109 (42.7%)
Lassa fever is caused by	Bacteria	40 (15.7%)
	Virus	158 (62%)
	Spirochaete	26 (10.1%)
	Flu	19 (7.5%)
	I don't know	12 (4.7%)
	Lassa fever is named after	a Woman
	A man	7 (2.8%)
	A village	32 (12.5%)
	An animal	189 (74.1%)
	I don't know	12 (4.7%)
Lassa fever is transmitted by	Cats	3 (1.2%)
	Bats	9 (3.5%)
	Rats	236 (92.6%)
	Monkeys	7 (2.7%)
Lassa fever is best diagnosed by	Physically examining the patient	31 (12.2%)
	Laboratory test on blood samples and body fluids	207 (81.2%)
	x-ray	10 (3.9%)
	CT scan	7 (2.7%)
	What percentage of infected people may die from Lassa fever?	<20%
	25-40%	47 (18.5%)
	45-60%	76 (29.7%)
	65-90%	52 (20.4%)
	>90%	34 (13.4%)
	I don't know	8 (3.1)
There is currently no drug for treatment of Lassa fever	Yes	54 (21.1%)
	No	107 (42.0%)
	I don't know	94 (36.9%)

Question	Options	Frequency (percent)	
Anti-Lassa fever vaccine is available in the market	Yes	94 (37%)	
	No	54 (20.9%)	
	I don't know	107 (42.1%)	
The most common complication of Lassa fever after recovery from the illness is	Loss of memory	57 (22.3%)	
	Deafness	12 (4.7%)	
	Epilepsy	42 (16.5%)	
	Impotence	36 (14.1%)	
	no complication	88 (34.6%)	
	I don't know	20 (7.8%)	
	The symptoms of Lassa fever include	Fever	99 (38.8%)
Sore throat		27 (10.6%)	
Body itching		21 (8.2%)	
Diarrhea		30 (11.8%)	
Conjunctivitis		7 (2.8%)	
Reduction in urine output		10 (3.9%)	
Bleeding from the skin		52 (20.4%)	
I don't know		9 (3.5%)	
Lassa fever can be contracted via		Consuming the transmitting animal	75 (29.4%)
		Urine or faeces of the animal	152 (59.6%)
		Touching/playing with the animal	13 (5.1%)
	Inhaling infected air	6 (2.4%)	
	I don't know	9 (3.5%)	
	Person-to-person transmission of Lassa fever occurs through	Kissing	29 (11.4%)
Sitting beside an infected person		10 (3.9%)	
Sharing the same spoon with an infected person		17 (6.7%)	
Direct contact with the body fluid of an infected person		193 (75.7%)	
I don't know		6 (2.3%)	
Lassa fever can be prevented from spreading in the community by		Keeping food in tightly-closed containers	121 (47.4%)
		Maintaining a clean environment	80 (31.4%)
	Killing the transmitting animal	31 (12.2%)	
	Praying to God	13 (5.1%)	
	Wearing protective clothing like face mask and gloves	2 (0.8%)	
	I don't know	8 (3.1%)	

**Table 3. Association between knowledge of Lassa fever among students and their departments**

Scores	Biology students	Others	Total	P-value
	Frequency (%)	Frequency (%)	Frequency (%)	
Below average	106 (98.1%)	142 (96.6%)	248 (97.3%)	0.258
Good	2 (1.9%)	5 (3.4%)	7 (2.7%)	
Excellent	0	0	0	

**Table 4. Association between student groups and mean scores of knowledge on Lassa fever**

Groups	Freq <sup>a</sup>	Mean	SD <sup>b</sup>	SE <sup>c</sup>	Minimum	Maximum	P-value (CI = 95%)
Biology students	108	30.7%	7.17	0.66	20%	60%	0.083
Others	147	32.3%	7.71	0.62	20%	60%	
Total	255	31.62%	7.26	0.45			

frequency<sup>a</sup>; standard deviation<sup>b</sup>, standard error<sup>c</sup>

#### 4. DISCUSSION

Our study showed poor knowledge of the disease among students of the Federal government-owned College of Education in Ondo State; only seven (2.7%) of the students scored above 59%. Broken down into specifics, with the exemption of knowledge about vector for Lassa fever, causative agent, diagnostic method, and person-to-person transmission of the disease, their knowledge of the virus in other areas was below par. This finding is significant because Ondo State in which the institution is located has been listed among States affected by the Lassa fever outbreaks since it was first discovered in Nigeria, hence one would expect an appreciable in-depth knowledge of the disease among these college students [12]. More so, this survey was conducted in the middle of the most recent outbreak of the disease that affected Nigeria between the last quarter of 2015 and early 2016 during which period at least two cases had already been reported by the Ondo State Infectious Disease Surveillance Team [13].

The college students offering Biology receive formal exposure to training on Parasitology in the institution in their 3<sup>rd</sup> academic year but a close evaluation of the college curriculum showed that Lassa fever and other viral haemorrhagic diseases were not covered in the curriculum to be studied [14-15]. One may then safely assume that the poor knowledge of the disease found in our study underscores insufficient training on Lassa fever. A review of the National Commission for Colleges of Education prospectus is needed in order to meet current challenges of emerging and re-emerging diseases facing our contemporary healthcare system.

Despite the above submissions, we found that when compared to other respondents from previous studies, our respondents' performance in terms of knowledge of Lassa fever was better. For instance, our respondents' knowledge of the aetiology and vector is higher compared to that of primary healthcare providers in Edo State,

Nigeria (where the Lassa fever disease is endemic) and urban residents of Lafia, Nasarawa State [8,16]. Also, our respondents' knowledge on the vector for Lassa fever is better than the rural dwellers in Edo State studied by Asogun et al. [7]. The higher knowledge of Lassa fever among our respondents compared to the latter study may be due to the difference in their level of education.

Our study also revealed that there was no significant difference in the performances of Biology students and others. We may infer two possibilities from this; first is that the teaching of Introductory Parasitology may not be adequately addressing Lassa fever disease as shown previously or secondly that Lassa fever could be taught by any teacher whether Biology-related or not. It is apparent that their source of information is not different from that of the general population. Therefore, a formal and structured training of students of Colleges of Education across all departments will afford the government sufficient hands to reach out to the general populace through quality teachings delivered to the students in our primary and secondary schools.

Various authors have suggested that efforts should be made to increase the awareness of Lassa fever among the populace through health campaigns, employment of the mass media and religious groups on the mode of transmission of the disease, its signs and symptoms and encourage community participation in health education and environmental sanitation [6-8]. Unfortunately, current realities showed that there is a dearth of health workers who are to carry out these functions in Nigeria. More so, Nigerian healthcare professionals are unevenly distributed to the urban settlements such that the motivation for community awareness campaign is low. The situation is further compounded by poor funding, poor road network and lack of incentives for health workers [17].

One viable option is the training of the teachers in the primary and secondary schools to act as

public health educators on the Lassa fever disease since class-room teachers spend considerable amount of time with their students.

Judging by the success of the teacher-centered, school-based efforts at stemming the tide of HIV/AIDS pandemic, a similar or modified form of the teacher-driven education strategy on Lassa fever be explored [18]. This is because young people are more likely to imbibe new behaviours and thus become change agents for promotion of healthier patterns of living in the community. Peer education is often used to effect change at the individual level by attempting to modify a person's knowledge, attitudes, beliefs or behaviours [19].

The role of school teachers in the control of communicable diseases is gaining increasing recognition. For instance, after the recent Ebola scourge, Kekule suggested in his review that well-run education systems aside health services and functioning infrastructures should form the backbone of the integration of epidemic preparedness into international development policies to prevent future occurrences [20]. School teachers are now being provided with guidelines by health coordinators in some countries and the technical know-how on identification of important communicable diseases and relevant first-step interventions [21].

## 5. CONCLUSION

Knowledge of Lassa fever is poor among our respondents. For a successful teacher-centered enlightenment campaign against Lassa fever, lectures on the disease should be included in the curriculum of Colleges of Education for all departments.

## ETHICAL APPROVAL

It is not applicable.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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