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Assessment of knowledge on Lassa fever disease among caregivers presenting to a tertiary Institution in a Lassa fever endemic region, Southeast Nigeria

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Abstract: *Background:* Lassa fever disease is an infectious disease with high case fatality occurring in countries in West, Central, and East Africa. It is endemic in Nigeria and Ebonyi State, Southeast Nigeria. Knowledge of the cause, mode of transmission, and clinical presentations are invaluable in disease prevention and control.

Objective: The study was therefore aimed at assessing the level of knowledge of Lassa fever disease among caregivers that presented at children out-patient in a tertiary hospital in Ebonyi State.

Methods: It was a hospital-based cross-sectional study carried out within 6 months (May-October 2018). An Interviewer-administered questionnaire was used to obtain information on socio-demographics and level of knowledge on Lassa fever disease.

Results: Although 356 (92.7%) of the 384 respondents have heard of Lassa fever disease, only 205 (53.4%) had good knowledge of the disease. The mean age of

participants was 33.22 ± 7.53 ; male to female ratio 1:2.4. Respondents within 36 and 45 years were rated highest (65.0%) in good knowledge of the disease. More males (61.9%) than females (49.8%) knew about Lassa fever disease. Similarly, caregivers (67.7%) from the upper socio-economic class had better knowledge of the disease compared to 43.0% observed among their colleagues in the lower socio-economic class. There were significant relationships between knowledge of Lassa fever disease and age ($p= 0.026$), gender ($p= 0.030$), and socio-economic class ($p < 0.001$).

Conclusion: There is a huge gap in knowledge of Lassa fever disease among participants especially among female caregivers and those of lower socio-economic class. Public enlightenment on Lassa fever disease should be intensified in these groups of people

Key words: Assessment, Disease, Knowledge, Lassa fever

Introduction

Lassa fever diseases (LFD) also known as Lassa haemorrhagic fever (LHF) is an acute viral haemorrhagic fever, a zoonotic disease caused by the Lassa virus.¹ It was first discovered in Lassa Village, a town in Borno State, Nigeria in 1969, and is endemic in West African countries such as Sierra Leone, Benin, Guinea, Ghana, Mali, Liberia, and Nigeria but may exist in other West African countries. Yearly outbreaks have been reported in several parts of the country including Adamawa, Ebonyi, Edo, Gombe, Nassarawa, Plateau, Taraba, Yobe, and Ondo State.^{1,2}

The natural host for the virus is *Mastomys natalensis*, a peridomestic multi-mammate, widely distributed

throughout Central, West, and East Africa. The primary mode of transmission is from infected rats to humans through contact with food or household items contaminated with infected rats' droppings.³ The virus also has the capacity for a person to person spread, either within households through contact of body fluid of sick relatives or in health care settings.⁴ The disease presents with gradual onset of fever, malaise, headache, sore throat, muscle pain, chest pain, nausea, vomiting, diarrhea, cough, and abdominal pain, which may progress to facial edema, mucosal bleeding, disorientation, coma, and death in the late stages.⁵ The incubation period of Lassa fever ranges from 6 to 21 days.^{3,5} Estimated yearly incidence in West Africa is 100 000 to 300 000 cases and approximately 5000 deaths. Children

under age 10 years are considered most vulnerable.⁶ Seasonal patterns in the outbreak of Lassa fever occur in Nigeria, with most cases occurring in the dry season.⁷

Infection with the Lassa virus is an important cause of fever in children in West Africa and can mimic malaria or typhoid.^{6,8} A Nigerian study showed 6% of febrile admissions were due to Lassa fever and up to 23% of hospitalized children with the disease died.⁸ In epidemics, the case fatality ratio of patients with Lassa fever can be as much as 50% among hospitalized patients.⁸ There is currently no vaccine available for Lassa Fever, hence prevention is focused on interrupting the chain of transmission.⁹

Studies¹⁰⁻¹³ have shown poor community knowledge of Lassa fever in endemic zones in Nigeria. An assessment of the awareness and knowledge of Lassa fever disease especially among affected communities becomes very important to providing relevant information to stakeholders for policy making and community health awareness creation campaigns that will modify human behaviour towards the disease. This study assessed the knowledge of Lassa fever disease among caregivers that brought their children to the out-patient unit of a tertiary hospital in Ebonyi State. Findings from this study would provide baseline information on their knowledge, guide in decisions on how to improve on behavioural change communication with overall goal of reducing childhood morbidity and mortality contributed by LFD in Ebonyi State.

Materials and methods

Ebonyi State has a population of 2,176,947 people, the majority of which are Igbos.¹⁴ The study was carried out in a tertiary hospital that provides health care for indigenes from the 13 Local Government Areas (LGAs) of the State and its environs. The study duration lasted for 6-months period (May-October 2018)

It was a cross-sectional hospital-based study

The sample size was calculated using a prevalence rate of 50.0% where the prevalence rate is unknown. The sample size was determined by the formula for sample size appropriate for an infinite population (i.e. greater than 10,000).¹⁵

$$n = Z^2 pq / d^2$$

Where n=sample size when the population is greater than 10,000

Z=the standard normal deviate, usually set at 1.96 (which corresponds to 95% confidence interval)

p=the proportion in the target population estimated to have a particular characteristic.

$$q = 1 - p = 1 - 0.5 = 0.5$$

d= degree of accuracy desired, which for this study is set at 0.05 (proportion of the sampling error tolerated)

$$\text{Thus } n = \frac{(1.96)^2 (0.50) (0.5)}{(0.05)^2} = 384$$

Caregivers of children ages 17 years and below that presented at the children outpatient clinic within the study period and gave informed consent were recruited consecutively until the sample size was reached.

An interviewer-administered structured questionnaire which was adapted from KAP survey model of infectious diseases, was used to assess the level of knowledge of caregivers. Questionnaire assessed caregivers' awareness of the LFD, vector that caused it, mode of transmission and clinical features of LFD. The level of knowledge on LFD among caregivers was rated as good or poor. Positive responses were put in a scale. Caregivers that had positive responses for 50% of the questions and above were rated as having good knowledge of LFD whereas if the positive responses from caregiver were below 50% to the questions asked, the caregiver was said to have poor knowledge of the disease. The socio-economic classification of caregivers was determined using the classification by Oyedele,¹⁶ which classified subjects into five groups namely I to V using the average sum of maternal and paternal education and occupation. These groups were then categorized into upper social class if the average sum is I-III and lower social class if IV-V.

Ethical Considerations

Ethical approval was sought and obtained from the Human Research and Ethical Committee of the facility of study (REC APPROVAL NUMBER 24/06/2017-28/04/2019). The study was explained to mothers/caregivers and only those who gave informed written consent were included in the study.

Data analysis

The data collected were entered into Statistical Package for Social Sciences (IBM SPSS, version 22 Chicago, USA). Descriptive statistics (mean and standard deviation) were calculated for continuous variables while frequency and percentage were calculated for categorical variables. The Chi-square was adopted when both variables are categorical. The level of statistical significance was achieved if $p < 0.05$ at 95% confidence level.

Results

A total of 384 participants were recruited during the study period. The mean age of participants was 33.22 ± 7.53 ; male to female ratio 1:2.4. A total of 301 (78.4%) dwelt in the urban setting compared to 21.6% that dwelt in the rural area. Similarly, 223 (58.1%) were of lower socio-economic class compared to 41.9% of the upper class. Table 1

The overall knowledge of LFD was good in 205 (53.4%) of the respondents. Of the 384 participants, 356 (92.7%) have heard of Lassa fever disease and 333 (86.7%) knew that rat carry the virus that cause the disease. Only 242 (63.0%) of caregivers knew that hand washing could prevent LFD. A total of 211 (55%) assented to the fact that Lassa fever disease can manifest as malaria or typhoid. One hundred and seventy-three (45.1%) responded to high persisting fever for more than 3 days after anti malarial and antibiotics use was due to fake drugs and only 60 (15.6%) knew that it may be due to Lassa fever disease. Similarly, 111 (28.9%) knew that fever lasting more than one week, and resulting in death may be Lassa fever disease. While 258 (67.2%) caregivers were unaware of the possible cause of high fever with bleeding only 39 (10.2%) responded that it could be Lassa fever disease. Table 2A and B.

Relationship between caregiver level of knowledge of Lassa fever and socio-demographics

Sixty-four (64.0%) of the 100 caregivers that were between 36 and 45 years had good knowledge of Lassa fever disease while amongst caregivers above 45 years, 61.9% had poor knowledge of Lassa fever. Similarly, 70 (61.9%) of 113males had good knowledge of Lassa fever compared to 49.8% (135/271) among the female gender. A total of 109 (67.7%) of 161 caregivers from the upper socio-economic class had good knowledge of the disease compared to 96 (43.1%) of the 223 caregivers from lower socio-economic class. Good knowledge of Lassa fever disease was observed in 168 (55.8%) of the 301 caregivers that resided in urban area compared to 37 (44.6%) out of the 83 caregivers from the rural setting. There were statistically significant relationships between age ($p=0.026$), gender ($p=0.030$), socio-economic class ($p< 0.001$), and knowledge of Lassa fever disease among participants. Table 3

Socio-demographics	Frequency (n=384)	Percentage
<i>Age (in years)</i>		
<35	263	68.5
36-45	100	26.0
>45	21	5.5
<i>Gender</i>		
Male	113	29.4
Female	271	70.6
<i>Place of residence</i>		
Urban	301	78.4
Rural	83	21.6
<i>Socio-economic class</i>		
Upper	161	41.9
Lower	223	58.1

Assessment of knowledge on Lassa fever disease	Frequency	Percentage
<i>Heard of Lassa fever disease</i>		
Yes	356	92.7
No	28	7.3
<i>Pest that cause LFD</i>		
Rat	333	86.7
Don't know	51	13.3
<i>Hand washing can prevent LFD</i>		
True	242	63.0
False	4	1.1
Don't know	138	35.9
<i>Cause of high fever for more than 3 days after antimalarial or antibiotics medication</i>		
Fake drug	173	45.1
Poisoning	41	10.7
Lassa fever	60	15.6
Typhoid	35	9.1
Don't know	75	19.5

Assessment of knowledge on Lassa fever disease	Frequency	Percentage
<i>Know that Lassa fever disease can manifest as malaria/typhoid</i>		
True	211	55
False	17	4.4
Don't know	156	40.6
<i>Know that Lassa virus can be contracted through body fluid of infected person</i>		
Yes	263	68.5
No	17	4.4
Don't know	104	27.1
<i>Fever for > 1 week and then death may be Lassa fever disease</i>		
Yes	111	28.9
No	60	15.6
Don't know	213	55.5
<i>Knowledge of possible cause of high fever with bleeding</i>		
Poisoning	62	16.1
Lassa fever	39	10.2
Typhoid	5	1.3
Severe malaria	20	5.2
Don't know	258	67.2

Table 3: Relationship between caregivers' level of knowledge of Lassa fever and socio-demographics

Socio-demographics	Level of Knowledge of Lassa fever		X ²	p value
	Good (%)	Poor (%)		
<i>Age (in years)</i>				
<35	133 (50.6)	130 (49.4)	7.34	0.026*
36-45	64 (64.0)	36 (36.0)		
>45	8 (38.1)	13 (61.9)		
<i>Gender</i>				
Male	70 (61.9)	43 (38.1)	4.72	0.030*
Female	135 (49.8)	136 (50.2)		
<i>Socio-economic class</i>				
Upper	109 (67.7)	52 (32.3)	22.83	<0.001*
Lower	96 (43.1)	127 (56.9)		
<i>Place of residence</i>				
Urban	168 (55.8)	133 (44.2)	3.30	0.069
Rural	37 (44.6)	46 (55.4)		

*Significant relationship with level of knowledge of LFD

Discussion

In this study, most participants (92.7%) have heard of Lassa fever disease. This high level of LFD awareness may be because Ebonyi State has had frequent outbreaks of Lassa fever disease leading to the provision of regular public enlightenment programs through different forms of mass media by various arms of Government and non-governmental organizations in the State and beyond to control the disease. This finding is comparable to reports of previous community-based studies done in other parts of the country.¹⁷⁻¹⁹ Similar studies^{11,20,21} done in Nigeria also reported higher level of LFD awareness among respondents. On the contrary, a lower level of awareness of LFD has been reported by other researchers in Nigeria.^{12,22} The difference in this finding could be attributed to the time gap between the studies (2010-2014) as there was limited publicity of this disease entity then. Also, due to the erratic power supply, information on LFD may not be heard through radio or television especially for those in the rural areas.

Despite the high awareness level of LFD among the respondents, only about half of them had good overall knowledge of LFD. This shows the need to provide a simplified in-depth knowledge of the cause, mode of transmission, and prevention of Lassa fever during awareness creation campaigns and training. Most studies conducted in these endemic zones of LFD in Nigeria revealed poor knowledge of LFD among participants.^{1,10,20,23-28} However, few researchers have recorded good knowledge of LFD among the participants.^{17,18} These observations have revealed an obvious gap in the overall knowledge level of respondents in LFD endemic areas and may contribute to constant endemic nature and outbreaks of LF experienced in those locales as they are

likely to engage in risky behaviors that may predispose them to have the infection. Adult learning theory suggests that learners should be involved in the planning and evaluation of their instructions and that learning should be problem-centered rather than content oriented. In our context, community engagement has been recommended as a means of communicating the risk of infectious diseases.²⁹ Thus, the finding has emphasized on the need to review the content of information delivered to the public and ensure its deliverance in the form that it can really be processed and understood by them for effective practice.

In this study, age was significantly associated with knowledge of LFD as respondents below 45 years old had good knowledge of the disease compared to older individuals. This could be explained by the fact the younger respondents are more likely to have attained tertiary educational level and may understand the teachings on LFD better than the older participants. Also, younger individuals are more likely to be inquisitive, have time to source information from the internet, social media, and other sources to improve their knowledge level. A significant relationship between the educational level of the respondents and the knowledge of Lassa fever among the respondents was reported by a researcher in Ilorin, Nigeria.²⁰ The finding agreed with reports of other researchers.^{17,18,21,30} The possibility that these younger respondents were unlikely to be at the helm of decision-making as regards health-seeking behavior for a sick child underscores the need to ensure that older respondents also have adequate knowledge of LFD. Therefore greater emphasis should be placed on the older population to adequately enlighten them about the disease.

More males in this study had better knowledge of LFD compared to their female counterparts and this was statistically significant. This may be attributed to males having more time, being inquisitive, and more educated than females in the study location. Hence, they are more likely to source information on LFD through books and other available internet sources and listening to radio jingles and television programs on Lassa fever. As a result, they are more likely to understand the information provided during awareness creation campaigns and training of LFD. The gap in knowledge on LFD among female respondents becomes worrisome as they spend more time with the children providing most of their needed care and this may hamper the goal of reduction in childhood morbidity and mortality contributed by LFD. The finding in this study is comparable to report of a previous community-based study among traders conducted in Izzi, Ebonyi.¹⁰ On the contrary, community-based studies conducted in Ondo¹, Irrua, Edo³⁰, and Ilorin²¹ recorded more females than males were more knowledgeable on LFD and attributed their findings to frequent hospital visits by females exposing them to opportunities of health talks on LFD. A study in Akwa-Ibom did not find any association between gender and level of knowledge of LFD.¹⁷

Socioeconomic status was significantly associated with the level of knowledge of LFD among respondents in this study. Individuals with higher socioeconomic status can afford and access information on LFD thereby having greater knowledge of the disease than those of lower socioeconomic status. This finding is in line with studies done in other LFD endemic parts of the country.^{20,23} Lassa fever which has remained a serious threat to life on the vulnerable populace in the society has been regarded as an infectious disease of the poor.¹³

Based on these findings, it is therefore important that Lassa fever disease control communication efforts be focused more on older age groups, females and individuals from the low socioeconomic status as they have demonstrated inadequate knowledge of LFD and, are likely to engage in risky behaviors predisposing them to Lassa fever infection.

The study being hospital-based nature may not be a true representation of the knowledge level of LFD among residents in Abakaliki as health talks are delivered on LFD during clinic visits to clinic attendees who constituted the study participants.

Conclusion

There was a high level of awareness of Lassa fever disease among respondents. However, they had poor knowledge of the disease. Age, gender, and socioeconomic status were significantly associated with the level of knowledge of the participants.

It is recommended that regular health talks on LFD with detailed yet simplified content be provided and sustained during child clinic visits to educate caregivers on this disease entity. This education should be more interactive and participatory to ensure sustained knowledge and behavior change. Pamphlets and posters printed in native languages should be made available and distributed to individuals while sustaining already existing public enlightenment programs (radio jingles, Television advertorial) in the State

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