

## Knowledge and Prevention of Lassa fever among Adults in a Rural Community in Southern Nigeria

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**Abstract:** Lassa fever is a disease of public health importance with high mortality and morbidity especially among rural dwellers. This study was done to determine the knowledge of transmission, risk factors, prevention, symptoms and the preventive practices against Lassa fever among adults in Ukpom, a rural community in Akwa Ibom State, Nigeria. A community based descriptive cross-sectional study was done among 228 adults selected by multi-stage sampling in 2016 using a pre-tested interviewer-administered questionnaire and analysed with SPSS. Ninety point eight percent (90.8%) claimed to have heard of Lassa fever mainly through radio and TV (64.9%). The majority knew that consuming food contaminated with rat feces and urine (88.6%) including eating poorly cooked rats (82.5%) transmits Lassa fever. Most knew that a clean environment (95.2%), proper covering of food (93.4%), no holes in homes (93.4%) and not eating rats (89.5%) prevents Lassa fever. The top 2 risk factors for Lassa fever known were non-covering of food (91.7%) and poor refuse disposal (89.9%). Common symptoms known were headache (69.3%), fever unresponsive to antibiotics (68.4%) and vomiting (66.2%). Major practices to prevent it were covering of food (98.2%), not eating rats (97.4%) and keeping a clean environment (95.6%). Only 15.8% stopped burning bushes, 32.9% stopped drinking garri and 17.5% fumigated their houses as practices to prevent Lassa fever. Age was significantly associated with level of knowledge. ( $p=0.000$ ). Good level of knowledge of Lassa fever was found among community members though some misconceptions still existed. Intensified health education is recommended.

**Keywords:** Lassa fever, knowledge, preventive practices, Ukpom, Akwa Ibom State, Nigeria.

## INTRODUCTION

Lassa fever is an acute viral haemorrhagic illness caused by Lassa virus, a bi-segmented single-stranded RNA virus of the family Arenaviridae spp [1]. Lassa virus (LASV) is a zoonotic, rodent-borne, virus whose natural reservoir is a 'multimammate rat', *Mastomys natalensis* [2]. The *Mastomys* spp. produce large numbers of offspring, and are abundant in the savannah and forests of West, Central and East Africa. They are known to readily colonize human homes, thus increasing the risk of LASV spread from infected rats to humans. They are also commonly found in rural environment where over 70% of the population resides [3, 4]. The Lassa virus is shed in their excreta and humans are infected by contact with the excreta of the rats or by eating them (these rats are considered as a delicacy in some areas of the endemic region) or food stuff that has been contaminated with the urine of the rodent [5].

Person to person spread or secondary human spread is through contact with body fluids or secretions especially during care of sick relatives or among health

care personnel in health facilities [6]. With an incubation period of 1-3 weeks, the disease presents with clinical features indistinguishable from other febrile illnesses such as malaria and other viral hemorrhagic fevers. Symptoms are mild and often undiagnosed in about 80% of cases and death may occur within 2 weeks from onset of symptom from multi-organ failure [7]. About 15-20% of patients hospitalized for Lassa fever die from it while 1% of all Lassa fever cases results in death [8]. These symptoms, often difficult to diagnose clinically should be suspected in patients who present with fever ( $>38^{\circ}\text{C}$ ) not responding to antimalarial and antibiotic drugs, sore throat, retrosternal pain, conjunctivitis, bleeding from orifices, petechial hemorrhages, abdominal pains, vomiting and diarrhea [9]. Complications such as multiple organ damage and sensorineural hearing loss have been associated with Lassa fever [10]. The establishment of standard diagnostic facilities in endemic regions to facilitate early detection and prompt management of the disease in cases and contacts is vital. Lassa fever is endemic in the West African sub-region (Nigeria, Sierra Leone, Guinea, and Liberia)

where about 3-5 million individuals are infected yearly [11]. Outbreaks in Ghana and Ivory Coast are documented and several imported cases with hazardous outcomes have been reported in countries where it is not endemic [12]

Rural dwellers in West Africa are at risk of Lassa fever because of proximity to animal reservoir, open construction of African villages, the practice of drying grains by road sides or outside homes and unprotected grain storage within homes. All these factors are known to facilitate increased rodent-man contact or contamination of food sources by infected rodent secretions [13].

For a highly contagious disease with symptoms and signs that are similar to other endemic diseases, the creation of awareness amongst community members is very important in endemic areas. This study therefore, set out to assess the level of knowledge of Lassa fever among members of Ukpom community in Abak Local Government Area of Akwa Ibom State, Nigeria. Information gathered from this study will serve as a basis for enlightenment of the community on the causes, modes of transmission and more importantly, prevention of the disease.

This study therefore, sought to:

- Determine the awareness of Lassa fever among adults in Ukpom Community, Abak LGA of Akwa Ibom State.
- Ascertain the knowledge of transmission, risk factors, symptoms and prevention of Lassa fever among adults in Ukpom Community, Abak Local Government Area of Akwa Ibom State and the factors associated with knowledge of Lassa fever
- Determine the preventive practices against Lassa fever among adults in Ukpom Community, Abak Local Government Area of Akwa Ibom State.

## MATERIALS AND METHODS

### Study Location

Akwa Ibom State is one of the 36 states located in the south-south geopolitical zone of Nigeria. Abak is one of the Local Government Areas (LGAs) of the State. It has a population of 139,069 inhabitants (2006 National Census) and a projected population of 216,382 by 2016. Ukpom, one of the 5 clans in Abak LGA, is one of the rural communities in the LGA and is made up of 5 villages. The inhabitants of the area are majorly of the Annang tribe with farming and trading being their major occupation. It is an undulating lowland with abundant vegetation, a major road that cuts across it, with adequate drainage and a stream. There are numerous churches spread across all the villages. A primary healthcare centre and a general hospital are the major health service providers within the communities though alternative healthcare providers are also operational in the community.

## STUDY DESIGN

This was a community based descriptive cross sectional study conducted among adults in Ukpom, Abak local government Area, Akwa Ibom State, Nigeria from July to October, 2016. Ethical approval was obtained from the Ethical Review committee of the University of Uyo Teaching Hospital and informed consent was obtained from respondents before administration of questionnaires.

### Sample size determination

Two hundred and twenty eight (228) adults were selected for the study using the formula for obtaining sample size as follows:

$$n = z^2 pq / \delta^2$$

Where;

n = minimum sample size

Z = Given Z value (1.96)

P = Percentage of population with knowledge of Lassa fever (17.2%) [14]

$\delta$  = acceptable margin of error (5%)

A sample size of 217 was obtained. To make room for poorly filled questionnaires, a 5% non-response rate was added to obtain a sample size of 228.

### Sampling Technique

The study area, Ukpom clan has 5 villages. The total number of households and adults per village was obtained from the village heads and percentage of adults in each village was determined. The sample size for the study was determined in proportion to the population size of each village. In each village, simple random sampling was used to determine the direction to follow in recruiting respondents. The starting point for the participants' recruitment in each village was the Village Heads' house. An adult was consecutively selected into the study from each household after their houses were selected using systematic random sampling (interval method) until the desired sample size per village was obtained. Adults in the study area who were unable to provide informed consent, those with a history of a psychiatric disorder or the mentally handicapped were excluded.

### Instrument

The questionnaire was developed after a thorough literature review and further evaluation by experts in public health and pre-tested to ensure quality and content validity. The study participants were interviewed using an interviewer-assisted questionnaire after signing a written informed consent form. The various segments of the study instrument assessed socio-demographic variables, awareness, knowledge of transmission, risk factors, prevention, symptoms and the preventive practices of respondents against Lassa fever.

**Analysis**

The questionnaires were carefully examined for correctness and completeness, coded and analysed using the Statistical Package for Social Sciences (SPSS) version 21 for Windows. Qualitative data generated from the study was presented in form of tables and analysed as frequencies and percentages while appropriate measures of central tendencies were calculated for quantitative data. A total of 40 questions were asked to assess the knowledge of transmission, risk factors, prevention, and symptoms. One mark was awarded to every correct answer and zero for wrong answers. Respondents with less than 50% of the total score were termed to have poor level of knowledge while those with scores of 50% and above were grouped

as having good level of knowledge. Chi-square test was used to determine whether participants in each knowledge group of Lassa fever (poor, good) differed significantly with their socio-demographic characteristics. P-value of less than 0.05 was accepted to be statistically significant.

**RESULTS**

**Socio-demographic Characteristics of Respondents**

Out of the 228 respondents, males and females were equally distributed. The majority (57.9%) were married. A greater proportion (43.9%) had secondary education level of education, and almost all (99.1%) of respondents were Christians. The mean age of respondents was 33.36 years with a standard deviation of 12.78 and ranged from 18 to 86 years (see table-1)

**Table-1: Socio-demographic Characteristics of Respondents (n=228)**

Variables	Frequency	Percentage
<b>Gender</b>		
Male	114	50.0
Female	114	50.0
<b>Marital Status</b>		
Single	83	36.4
Married	132	57.9
Divorced	4	1.8
Widowed	9	3.9
<b>Education</b>		
No formal education	21	9.2
Primary education	76	33.3
Secondary education	100	43.9
Post-secondary education	31	13.6
<b>Religion</b>		
Christianity	226	99.1
Islam	2	0.9
<b>Mean Age</b>	33.36 ± 12.78	

**Awareness and Knowledge of Transmission, Risk Factors, Symptoms and Preventive Practices of Lassa Fever**

Ninety point eight percent (90.8%) of respondents claimed to have heard of Lassa fever. Radio and TV (64.9%) was the major source of information on Lassa fever while the church (0.2%) was the least source of information. Eighty three point 3 percent (83.3%) knew that Lassa fever is treatable. The majority of respondents knew that Lassa fever kills (89.0%) and that consuming food contaminated with rat faeces and urine transmits Lassa fever (88.6%), including eating poorly cooked rats (82.5%) . Most knew that patients survive if treated early (85.1%).

The top two risk factors known by respondents were that non covering of food (91.7%) and poor refuse disposal (89.9%) predisposes to Lassa fever. Others agreed that spreading food on the road (82.9%), eating

rodents (74.1%), and living in the rural setting (54.4%) are risky.

The 3 common symptoms known were headache (69.3%), fever (68.4%) and vomiting (66.2%). Others were miscarriage (42.5%), body pains (60.5%), sore throat (56.6%), diarrhea (63.6%), and bleeding (60.1%).

Eighty nine point five percent (89.5%) knew that not eating rats could prevent one from coming down with Lassa fever. Majority also admitted that keeping a clean environment (95.2%), sealing off holes in the house (93.4%), properly covering food (93.4%), and warming food before eating (91.2%) also prevents Lassa fever. More than half (55.3%) knew that stopping of bush burning would help in preventing Lassa fever (see table-2)

Table-2: Awareness and Knowledge of Transmission, Risk Factors, Symptoms and Prevention of Lassa Fever

Variables	Frequency	Percent
<b>Ever heard of Lassa fever</b>		
Yes	207	90.8
No	21	9.2
<b>*Sources</b>		
Radio/TV	148	64.9
Newspaper	7	3.1
Friend	69	30.3
School	1	0.4
Church	11	0.2
Health workers	11	1.1
<b>*Knowledge of Transmission</b>		
Food contaminated with rats can transmit it	202	88.6
Infected patients can transmit to another person	155	68.6
Eating poorly cooked rats transmit it	188	82.5
Infection with Lassa fever kills	203	89.0
Lassa fever is treatable	190	83.3
Patient survive if treated early	194	85.1
<b>*Knowledge of Risk Factors</b>		
Spreading food on the road is risky	189	82.9
Eating rodents predisposes to Lassa fever	169	74.1
Poor refuse disposal predisposes to Lassa fever	205	89.9
Rural dwellers are more at risk	124	54.4
All age groups are at risk	204	89.5
Not covering food predisposes to Lassa fever	209	91.7
<b>*Knowledge of Symptoms</b>		
Headache	158	69.3
Fever	156	68.4
Miscarriage	97	42.5
Body pains	138	60.5
Sore throat	129	56.6
Diarrhea	145	63.6
Vomiting	151	66.2
Bleeding	137	60.1
<b>*Knowledge of Prevention</b>		
Not eating rats prevents Lassa fever	204	89.5
Proper covering of food prevents Lassa fever	213	93.4
Warming of food before eating prevents Lassa fever	208	91.2
Clean environment prevents Lassa fever	217	95.2
Avoiding bush burning prevents Lassa fever	126	55.3
Fixing holes in the house prevents Lassa fever	213	93.4
<b>Overall Level of Knowledge</b>		
Poor	14	6.1
Good	214	93.9

\*Multiple responses

### Preventive Practices against Lassa Fever

The common preventive practices adopted by respondents against Lassa fever were covering their foods (98.2%), not eating rats (97.4%) and environmental sanitation (95.6%). However, 84.2% and 67.1% still burn bushes and drink garri respectively while fumigation of houses was done by 40 (17.5%) (See table-3).

### Association between Knowledge of Lassa Fever and Socio-demographic Variables

Age group was statistically significantly associated with level of knowledge of transmission, risk factors and prevention of Lassa fever. ( $p=0.000$ ) with respondents less than 40 years people having a better level of knowledge than the older respondents ones (see table-4).

**Table-3: Preventive Practices against Lassa Fever**

*Variables	Frequency	Percent
Do not eat rats	222	97.4
Do not burn bushes	36	15.8
Do not drink garri	75	32.9
Cover foods	224	98.2
Do not spread foodstuff outside	203	89.0
Environmental sanitation	218	95.6
Use rodenticides	116	50.9
Use rat gums	165	72.4
Physically kill rats	211	92.5
Use of cats to kill rats	124	54.4
Fumigation of house	40	17.5

\*Multiple responses

**Table-4: Association between Knowledge of Lassa Fever and Socio-demographic Variables**

Variable	Level of Knowledge		Total	Statistical tests and values
	Poor; n = 14 n (%)	Good; n = 214 n (%)		
<b>Age</b>				
Less than 40	3(1.8)	163(98.2)	166	$X^2= 19.89$
40 and above	11(17.7)	51(82.3)	62	Df= 1
<b>Gender</b>				$P = 0.00^*$
Male	5(4.4)	109(95.6)	114	$X^2= 1.218$
Female	9(7.9)	105(92.1)	114	Df= 1
<b>Educational Level</b>				$P = 0.409$
Informal	2(10.0)	18(90.0)	20	
Primary	7(9.7)	69(90.8)	76	$X^2= 3.050$
Secondary	4(4.0)	97(96.0)	101	Df= 3
Post-secondary	1(3.2)	30(96.8)	31	$P = 0.351$
<b>Marital status</b>				
Single	3(3.6)	80(96.4)	83	$X^2= 3.879$
Married	9(6.8)	123(93.2)	132	Df= 3
Divorced	1(25.0)	3(75.0)	4	$P = 0.134$
Widowed	1(11.1)	8(88.9)	9	
<b>Religion</b>				
Christianity	13(5.8)	213(94.2)	226	$X^2= 6.735$
Islam	1(50.0)	1(50.0)	2	Df= 1
				$P = 0.119$

\*significant p value

## DISCUSSION

This study sought to determine the level of knowledge about Lassa fever and preventive practices of community members against the disease. The study revealed good awareness (90.8%) of Lassa fever. This finding is in agreement with 93.1% reported in a similar study among households in Irrua, an endemic area for Lassa fever in Edo state but higher than reports of 87% in Nasarawa state and 17.2% in a rural community in Owo, Ondo State.[15,16,17] A higher level of awareness (95%) was reported in a study in Edo state probably because this was amongst health workers who have more information to actually manage the disease [14]. There was a good level of knowledge on Lassa fever by community members in this study. Tobin et al also reported good knowledge of signs and symptoms [14]. This good level of public awareness and knowledge can be explained by effective publicity

by the government and health institutions since the outbreaks in Nigeria. The mass media stands out as a veritable tool for awareness creation in this study as majority (64.9%) of respondents, just as the study in Ondo state (17) became aware of Lassa fever through the mass media. The media plays a very important role in disseminating information about health and health-related events.

On the knowledge of transmission of Lassa fever, the majority of respondents knew that food contaminated with rats, eating poorly cooked rats and infected persons with Lassa fever could transmit the infection to others. Most respondents also knew that though Lassa fever kills, it is a treatable condition and infected patients who seek early treatment do survive the infection. This is in agreement with a similar study [16].



Ninety one point seven percent (91.7%) of respondents could identify that leaving food materials uncovered could predispose to infection with Lassa fever virus through contamination by rat droppings or urine. Eighty nine point five percent (89.5%) also admitted that Lassa fever has no predilection for any age group hence anyone at any age could be infected. Eighty nine point nine percent (89.9%) of respondents knew that improper refuse disposal methods could predispose to contracting this disease. These results are in agreement with reports from another study [17].

There was also a good level of knowledge of the preventive measures against Lassa fever infection in the community. The majority of respondents knew that spreading food by the road side (89.5%), improper covering of foods (93.4%), dirty environment (95.2%) and good houses with no holes (93.4%) prevent the occurrence of Lassa fever infection in communities. A good proportion of respondents reported seeing rats in their homes. Good housing standard and clean environment are recognized as part of the methods of reducing the risk of coming down with Lassa fever [4].

However, only a little above half of respondents knew that bush burning promotes Lassa fever infection (55.3%). Bush burning, a culture that is commonly practiced in the study population was not seen by almost half of the population as a preventive measure for Lassa fever. This should be strongly dissuaded as bush burning displaces the rats from their natural habitat into homes. Collaboration between the health ministry, the media and extension workers of the ministry of agriculture may be useful in this regard.

There was a good level of knowledge of the symptoms of Lassa fever. The 3 common symptoms known were headache, fever unresponsive to anti-malarial drugs and antibiotics and vomiting. This is similar to the findings by other community based studies [14, 17]. This calls for more health education targeted at this community audience preferably using their local dialects to make it clearer to community members. Since most of the symptoms are similar to symptoms of other endemic diseases, emphasis should be stressed on early reporting of suspected clients to health facilities for prompt diagnosis and control of the infection in the community [17].

The study showed some practices undertaken by community members to prevent Lassa fever occurrence. Almost all the respondents (97.4%) stopped eating rats to prevent Lassa fever, a finding higher than 47.6% reported by Olayinka *et al.*, [17]. However, most (84.2%) still burn bushes and 67.1% still drink garri as a delicacy. Garri is one of the common staple foods in the area which can be eaten without cooking and is commonly contaminated with rat droppings when not properly covered. Identification of these risky practices led to the development of policies prohibiting bush

burning and drinking of garri by some states in Nigeria in attempts to prevent Lassa fever in the communities. Bush burning is believed to cause rodents and rats in those bushes to find their ways into residential areas. The common practice of spreading of garri along highways exposes it to easy contamination by rats [18, 19]. Such government policies are good initiatives in the fight against Lassa fever but may not be effective as effective implementation may be difficult. On the whole, about 93.9 per cent of respondents had good knowledge of the risk factors, symptoms, transmission and prevention of Lassa fever.

There was a significant association between the ages of respondents and knowledge of Lassa fever. The younger ones (less than 40 years) were more knowledgeable about Lassa fever than the older ones. This may be due to the younger generation having more time and even greater access to sources of information on Lassa fever like the electronic and print media and internet. Greater emphasis should be placed on the older population so as to adequately enlighten them about the disease. There was no significant association between level of education and awareness and knowledge of Lassa fever. A greater proportion attained secondary education, an educational level sufficient to comprehend health information especially from the mass media. Olayinka *et al.*, [17] however, reported that respondents with tertiary education were more aware of Lassa fever compared to those with secondary level and below. Gender, marital status and religion were not significantly associated with level of knowledge of Lassa fever.

It is therefore important that more campaigns and health and environmental education are carried out to create more awareness about this disease with a high virulence, morbidity and mortality.

## **CONCLUSION**

Good awareness and a good level of knowledge of Lassa fever was found among community members in Ukpom. However, some misconceptions were still reported among community members concerning the knowledge of transmission, prevention and even practices to prevent Lassa fever infection. The younger members of the community were more knowledgeable of the transmission and prevention of Lassa fever compared to the older members of the communities. Some members also reported seeing rats in their homes. Intensified health education of community members is needed to sustain this high level of awareness and knowledge among community members and correct any existing misconceptions among community members. This will go a long way to protect the communities against this deadly disease, Lassa fever.

### Conflict of Interest

The authors declare that there is no conflict of interest in the publication of the article

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