

## Formal Education and Lassa Fever Risks Behaviour among Households' Heads in Akoko Region of Ondo State Nigeria

Femi Rufus TINUOLA

Department of Sociology, Faculty of Social Sciences, Federal University, Gusau,  
Zamfara State

Email: [adufem2000@yahoo.com](mailto:adufem2000@yahoo.com)

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### Abstract

*Lassa fever is endemic in West Africa region with significant statistics of infection in Nigeria. Ondo is one of the 18 States reported to have a proportion of infection with Lassa when over 1000 cases were reported across Nigeria, from January 2018 till date with different levels of fatality. The patriarchal nature of the family arrangement and the significant influence of any decision by the heads of households on the overall health of all the members, are likely to result in behaviour that may put members on having contact with the disease vector. This study examines the level of education of households' heads and their engagement in behaviour that may expose the entire households to the risk of infection with Lassa fever. The social survey was conducted in Ondo State. A total of 245 heads of households were selected using systematic and purposive sampling techniques at two different stages respectively, who responded to a structured questionnaire containing 41 items on level of education and LF risks behavioural. Though, the level of knowledge about LF is high, over 78% engaged in behaviour that make them susceptible to the risk of contacts with multi-mammoth rat and contact related behaviour varies by level of education. The need for the traditional institutions, as agents of change to engage household heads on proper education about LF is recommended to curtail the trend among others.*

**Keywords:** *Infection, Lassa, Households, Morbidity, Education.*

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### Introduction

Historically, Lassa fever was discovered in 1969 and took its name after the town of Lassa in Borno State, Nigeria where the first cases originated (Fatiregun, Isere, Dosumu, Agunbiade & Onyibe, 2019). The illness is an acute febrile disease caused by the Lassa virus, a member of the family Arenaviridae, whose natural hosts are rodents of the genus *Mastomys*. (Tobin, Asogun, Akpede, Adomeh, Odi & Gunther, 2015; Okeya, 2019). Lassa fever disease is estimated to affect 2 million people and cause an estimated 5000–10,000 death annually with outbreaks reported from Sierra Leone, Guinea, Liberia, Benin, Ghana, Mali and Nigeria (Tambo, Adetunde & Olalubi 2018). It has also been reported in Europe and North America (Usuwa, Akpa, Umeokonkwo, Umoke, Oguanuo, Olorukooba, Bangboye & Balogun, 2020)). In Nigeria, yearly outbreaks have been reported in several parts of the country including Adamawa, Ebonyi, Edo, Nassarawa, Gombe, Plateau and

Taraba States, and more recently in some parts of Ondo State in south-west Nigeria (Fatiregun, et al. 2019). NCDC (2020) reports showed that in February, 89% of all confirmed cases are from Edo (38%), Ondo (38%) and Ebonyi (11%) States (NCDC, 2020). From the body of literature, understanding of the dynamics of disease transmission and effective communication for behavioural change is an effective way to preventing the disease. Literatures exist on the risk factors that promote transmission of the disease, but gap exist on level of education of household head and decision making in Ondo State as a mitigating factor to Lassa fever disease.

Tambo et al. (2018) affirmed that Lassa fever outbreak in Nigeria affected not less than 20 States, with 175 confirmed and suspected cases and 101 deaths since August 2015. Its resurgence was reported in Ondo State in 2016, in the northern senatorial district of Akoko and Owo regions. This research was conducted in Akoko region of Ondo State to examine the influence of level of education of households' heads on some risky behaviour in Lassa fever upsurge among the indigenous population. The major objective of this study is to examine the influence of formal education of household heads on the behaviours that expose members of household to the risk of Lassa fever infection. The specific objectives are:

1. To examine the households heads' knowledge about Lassa Fever
2. To discover the engagement of household heads in Lassa Fever Infection risk behaviours
3. To determine the influence of formal Education on Lassa fever infection risk behaviour

The objectives above are designed to provide, through available data, answers to the following research questions:

1. How knowledgeable about Lassa fever are households' heads?
2. Do heads of households engage in behaviour that put them at the risks of infection with Lassa fever?
3. Does the level of education influence the engagement in Lassa fever risks behaviours?

The hypothesis listed below is expected to be tested with the available data:

1.  $H_0^r$  = Formal education is not significantly related to knowledge about Lassa fever
2.  $H_1^r$  = Formal education is significantly related to knowledge about Lassa fever

## Theoretical Framework

This study is situated within the framework of the Health Belief Model (HBM) developed by Rosenstock (1966) to help understand and explain why people did or did not use preventive services offered by public health departments in the 1950's, and has evolved to address newer concerns in prevention and detection (e.g., mammography screening, influenza vaccines), as well as lifestyle behaviours such as sexual risk behaviours and injury prevention. The HBM has been most often applied for health concerns that are prevention-related and asymptomatic, such as early cancer detection and hypertension screening where beliefs are as important as or more important than overt symptoms.

The Figure 1: The Core Entities of the HBM.



Source: Glanz K, Rimer BK, Viswanath K, eds. 2008. *Health Behaviour and Health Education: Theory, Research, and Practice (4th ed)*. San Francisco: Jossey-Bass.

As indicated in the diagram above, formal education is one of the socio-economic factors modifying individual beliefs about Lassa fever. Those who have formal education are likely to be adequately informed about the disease and infection process, expectedly to moderate their individual beliefs on its etiology, severity and the threat it poses to the health wellness of humans. This is expected to have positive consequences on their individual risk behaviour relating to their health seeking on Lassa fever.

## Methods of Data Collection and Analysis

The study population is the households' heads in all the four Local Council Areas constituting Akoko region in Ondo State. These local governments are Akoko North West, Akoko North East, Akoko South West, Akoko South East. The Akoko region was selected for this study because in recent times, the areas have witnessed

new incidences of Lassa infection according to report from the Nigeria Centre for Disease Control (2020)

This study is a social survey of descriptive type employing quantitative data collection and analysis. Respondents were contacted and requested to provide answers to some serially arranged questions on the influence of formal education on the knowledge that expose them to infection with Lassa fever.

A total of 245 respondents were selected using dual sampling technique. All the four local council areas constituting Akoko region in Ondo State were selected on purpose i.e the recent cases of Lassa fever infection reported in the area by the Federal Ministry of Health (2020). Secondly, in each of the local council area, three communities (one urban and two rural) were selected by obtaining the lists of all communities in the region and adopting systematic sampling technique to pick nine communities. Table 1 shows the selected communities and the actual number of respondents sampled from each of the communities. Three levels of manpower were employed to ensure a successful data collection. Field Enumerators (16) for the selected communities, Field Coordinators (4) for each of the local council areas and the Research Coordinator (1).

Table 1: Number of Selected respondents per Local Council area

SN	Local Council areas	Sample Size
1	Akoko North West	60
2	Akoko North East	65
3	Akoko South West	60
4	Akoko South East	60
	Total	245

Source; Author's compilation, 2020

The study adopts the use of a Structured Questionnaire titled 'Lassa Fever Risks Behaviour (LFRB)'. The 42-item instrument is divided into three sections; Sample Characteristics, knowledge of Lassa Fever & Lassa Fever Risks Behaviour. It contains both open-ended (5%) and closed-ended questions (95%).

The study is a social survey. The traditional heads of all the selected communities were contacted and formal approval obtained to proceed into the communities for interaction with the heads of the selected households. In addition, selected heads of households were asked to indicate their readiness and acceptance to participate in the survey by endorsing a consent form.

Since the data is quantitative in nature, the questionnaires were collected from the field workers, collated, edited and coded for transcription into the various views of the SPSS Window for a comprehensive statistical analysis. The data were run in the uni-variate, bi-variate and multivariate levels, but were presented in descriptive tool (tables). The concerned variable (Education) was cross-tabulated with some other important variables to determine the nature of relationships existing between and among them. Hypotheses were tested with the use of chi-square technique and at the acceptable 0.05 level of significance. Tables were presented alongside their respective discussions for ease of reference.

## **Results and Discussions**

### **Sample Social Characteristics**

One-fifth of the respondents were between 18-31 years of age, 32-44 years, 25.7% and 45 – 51 years, 11.4%, while over half of the total respondents (54.3%) were 52 years and above. The mean age of all the respondents was found at 51.5 years. This indicates that in most of the households in communities where this study was conducted, their respective heads had an average age of 51.5 years. Previous research have indicated that the age at marriage and procreation in most parts of the south west Nigeria ranged between 25 – 30 years, consequently, at age 50 years, an individual is expected to have control over a household. About 69% of the households' heads that participated in this study were males, while the remaining 31.4% were females.

85.7% were Christians, while just 14.3% were Muslims. This finding does not suggest that there are more Christians than Muslims, but that among the participants in this survey, the Christians out-numbered the Muslims. An overwhelming majority 82.9% were of Akoko sub-ethnic group, Ekiti (2.9%), Akure (5.7%), Egin (2.9%) and Ebira (5.7%). About 43% attended and obtained pre-secondary certificate, 31.4% had secondary certificates, while the remaining 25.7% had post-secondary education certificates ranging from Ordinary National Diploma, Higher National Diploma, National Certificates in Education and Bachelor of Science among others. On the current status of marriage, 65.8% were currently staying with their spouses and children, 22.9% had separated from their spouses, while 11.4% had lost their spouses to the cold hands of death. About 8.6% were employees of the government and were distributed as teachers in local primary and secondary schools in the communities, 45.7% had private jobs, Artisans (5.7%), Farmers (26.8%) and 11.4% were self-employed. The data described above is presented in Table 2.

### **Fertility Behaviour & Dependency Rate**

Data presented in Table 3 shows some fertility related variables and dependence rate. Fertility behaviour is measured by the number of live births a couple has at a point in time. Among the selected households head that participated in this study, 28.6 percent of that had between 1 – 2 children, while those who had 3 – 4 children stood at 25,7percent, 5 – 6 children (40%) and those with 7 children and above were 5.7 percent of the total respondents. The mean number of children among the sample stood at 4. The percent distribution of dependent relatives varied based on the number of in-laws, siblings, uncles or cousins relying on them for sustenance and survival at a specific period of time. Responses on this issue are break down as follows; 1 – 2 dependent (57.1%), 3 – 4 dependent (22.9%), 5 – 6 dependent (14.3%), 7 & above (5.7%). Most households head had between 1 – 4 dependent relatives with an average of three. This suggests that at a point in time, an average of three persons lived with and depended on each family for socio-economic sustenance. Further investigations on the number of people living in each household shows that majority (68.6%) harbored a minimum of five persons in their households while the general average was found at 5.4 persons. Over forth-fifth (82.9%) of the households heads lived in three-room apartment and above.

### **Rooms Occupied/used for sleeping**

The nature of houses in the study areas is more of multiple rooms where each grown-up child has a room to him/herself while some rooms are reserved for the prospective visitors. Though the number of people living in the house is relatively high, as shown in Table 4, the number of rooms available in each household seems to be sufficient enough to accommodate the inhabitants. The mean number of rooms occupied by members of the family is about 4 suggesting that other available rooms are prepared and made ready for visitors. In addition, respondents indicated that the number of rooms specifically meant for sleeping was designated from those where properties were kept. Responses showed that the number meant for sleeping was a subject of marital status and the current status of marriage and family size among others. Those with larger family size reportedly occupied higher number of rooms and vice versa.

While most people who live permanently in a house will have a bedroom to themselves or share one with one or two other people, other rooms are often used as bedrooms. The number of people who should sleep in a room will depend upon the amount of air which is available to each person. In some countries like

Australia, the law requires that each adult person has at least 13 cubic metres of air and each child has at least 10 cubic metres of air in a sleeping area.

### **Objective 1: To examine knowledge about Lassa fever**

#### **Ever Heard of Lassa fever**

Though Lassa fever was discovered in Nigeria about 50 years ago in Lassa village in Borno State, its spread to other parts of Nigeria occurred due to poor disease management, uncontrolled nature of internal migration, and the contagious nature of the disease. It has been reported in almost all parts of the country, including Ondo State. Participants in this study were asked to indicate whether they have ever heard of Lassa fever or not. About three-fifth (57.1%) reported to have ever heard of Lassa fever against about 43 percent, who have never heard of the fever. This data is presented in Table 5.

#### **Sources of Information about Lassa Fever**

Those whoever heard of Lassa fever were asked to indicate their sources of information about the disease. The sources were classified as formal and informal. Data obtained showed Table 6 presents the distribution of respondents over informal sources as follows; families (8.7%), friends (8.7%) and religious homes (8.7%) and formal sources such as schools (13%), print media (30.4%), electronic media (65.2%) and health Centre (65.2%). Electronic media most especially, radio remains the main source of dissemination of health related information and mostly at the reach of the people in the rural areas. In the study areas, respondents revealed that the radio is the most available, affordable and reachable medium of information dissemination to the people.

#### **Perceived causes of Lassa Fever**

Scientific evidences have confirmed Lassa fever infection with mammoth rats as the disease vector. Respondents were asked to indicate their perceived causes of the disease among the humans. As shown in Table 7, about 4.3% believed the fever is a product of evil attack from the witches and 21.7% indicated that it could be a repercussion of wrong doings against the gods. Majority (69.6%) indicated that Lassa fever is an infection from rat, disease vector. They specifically stressed that with their level of knowledge about Lassa fever, were sure that it is contacted from either direct or indirect contact with mammoth rats.

## **Objective 2: To determine the behavior which put Households Head on the risk of infection with the Lassa fever**

### **Risk Behaviour**

Risk behaviour, an indulgence in any action or activity that can cause potential harm to the individual as a consequence of what he chooses to do. In broader sense, risk behaviour is how people behave before, during and after a given risk occurs. In the etiology and development of Lassa fever, in humans, certain behavioural patterns are considered to put an individual at the risks of infection with and possibly facilitate the spread of the disease to other humans. These behaviours create opportunities for contact with mammoth rat, the disease vendor.

Participants in this study were placed on some related risks behaviour to determine how frequent they engage in such thereby increasing the possibility of infection. On waste disposal mechanism, data on Table 8, the percent of respondents dropped their wastes in the following outlets; Dumpsites (34.2%), Burnt in open air (42.9%), Disposed in the open river (2.9%) and deposited in the waste collector bin (20%). The closeness of the dumpsites to the residential apartment is one of the secondary major determinants of the appearance of rats in homes, since most of these rats feed on the food remnants dumped on the refuse sites. Dumpsites are located in the in bushy land space in the environment that are not far from the residential apartments.

### **Rats contact related Behaviour**

Since rat of mammoth specie in the neighborhood often depend on most of the food remnants from humans, participants in this study were asked to indicate the possibility of these rats accessing food remnants from their households. Popular response (82.8%) point to the fact that there is no gainsaying the fact that rats often gain access to the food remnants in their homes with 81% indicating that they have seen rats either in the living room, kitchen and visitors apartments in their homes. Juxtaposing the data reported earlier that rats had access to food remnants either in the kitchen (81%) and or on the dining (19%) with the 42.9% who indicated that they eat food remnants kept overnight, it can be inferred that this behaviour is risky and has the propensity to increase indirect contacts with mammoth rats and further increase the possibility of spreading the infection as displayed in Table 9. The above scenario, as reported by the data, confirms a high risk behaviour of Lassa fever infection among the respondents through secondary contacts with unfinished food left over overnight either in the kitchen or on the dining sets, since members

of the household still fed on the food, the following day. Scientific evidences have linked Lassa fever infection to such behaviour.

### **Consumption of Bush Meat**

Primary contact with mammoth rats by humans is a behaviour that increases the chances of continuous infection. Respondents were asked to indicate if they actually eat bush meat, especially such in the rat family. Almost all the participants in this study (94.3%) reportedly ate bush meat in rat family while just 5.7% declined. With this significant proportion, the risk of infection from the primary host of the disease is high most especially in the communities where most people could not identify a mammoth rat. The situation is made worst when 87.8% ate rats always and 28% ate rats in less than one week prior to the field work and respondents reportedly had the most regular source of meat rat from game hunting (42.7%), vendors (9.7%) from where they obtain rat meat for consumption.

Lassa fever is contracted through the consumption of food exposed to rat droppings, urine or faeces. The disease is an acute febrile illness characterised by vomiting, facial swelling and muscle fatigue. Unlike humans, rats do not fall sick from the virus so they serve as a suitable host for its maintenance and multiplication. Killing rats and keeping them away from homes would be an effective solution to the Lassa fever epidemic. The foods that can be contaminated by the rats include garri, yam, rice and beans, among others. Uncovered foods, taking soaked garri that was not covered and feeding on the foods, that rats have defecated and urinated upon is not good for human consumption in addition to eating leftover foods without properly warming them.

### **Objective 3: To examine the influence of formal education on Lassa fever risks behaviour**

#### **Education/Lassa Fever Risk Behaviour**

The data in the table were generated from the cross tabulation of the data on level of education with specific variables on Lassa fever risks behaviour in an attempt to ascertain the influence of the level of education of the households' head specific

#### **Education/Distribution of Family members per Room**

In this study, questions have been asked from the respondents on their respective level of education they might have attained. The three broad categorizations, as shown in Table 10, were adopted to accommodate varying levels of formal school attainment. Responses on these three categories; Pre-secondary, Secondary and

Post-secondary were cross tabulated with other variables and are discussed below. The first set of discussion dealt with the role of formal education in the nature and type of accommodation occupied by members of the family. The responses discussed measured the importance of education on the distribution of the occupants per room vis-à-vis overcrowding and the possibility of rats, the disease vector of Lassa fever to find a convenient habitation in room exploring every opportunity.

### **Number of Rooms Occupied by members of the family**

About two-fifth of the total respondents of all respondents who occupied only one room had pre-secondary education, secondary (40%), and post-secondary education (20%), Two rooms: pre-secondary (25%), secondary (25%), and post-secondary (50%), Three rooms; pre-secondary (66.7%) and secondary (33.3%). Of all the families who occupied five rooms close to half (47.4%) had pre-secondary education while the remaining 52.6% had secondary & post-secondary education at equal half.

### **Number of Rooms used for Sleeping**

Of all the 77 i.e 31.4% of the respondents who had five sleeping rooms, 63.6% had pre-secondary education, while the remaining 27.3 had post-secondary education. It can therefore be deduced that education is a major determinant of the nature of accommodation/rooms, overcrowding of respondents.

### **Education/Sources of Information about Lassa Fever**

As indicated earlier in table 3, about 57.1% of the total sample who ever heard of Lassa fever were further asked to indicate their levels of education, in an attempt to determine the roles of formal education in the spread of information about Lassa fever. The data on table 10 indicates that 40% of them had post-secondary education, secondary 30% and pre-secondary (30%). This shows that education plays a major role in the dissemination of information about Lassa fever. Data reveals in Table 11, that people with high level of education are likely to be informed about Lassa than those with no formal education.

Chi-square results shows a significantly positive relationship between level of education and knowledge about Lassa fever. Though significant, education plays important roles in the knowledge about the possibility of infection with the fever. The data indicates that the higher the level of education, the higher the tendency to

be informed about the infection and vice versa. This shows that people of lower educational background may not be as knowledgeable compared to those of higher education status. Data in the table above shows that 40% of those who were knowledgeable about Lassa had post-secondary education. Formal education remains an instrument of spreading information. Further breakdown of data shows that education (66.7%) remains the second most reported source of information about Lassa fever, below print media (71.4%).

### **Sources of Information about Lassa Fever**

Of all the respondents (140) who have heard of Lassa fever, 10% got the information from the family and all possess post-secondary information. This shows that some elements of health talks and education may have taken place in the family of those who had post-secondary education. The statistics above is similar with those who main source of info about Lassa is friends. All this 14 respondents in this category had post-secondary education. In all 21 respondents representing 15% of those who ever heard about Lassa fever from schools of course had at least secondary form of education, while 33.3% had secondary education 66.7% had post-secondary education. An overwhelming majority (61.5%) of the 91 respondents, who reportedly heard of Lassa fever in their religion houses had pre-secondary education and only 7.7% had post-secondary level of education.

Also, of the 49 respondents whose main source of information about Lassa fever was print media, 71.4% had post-secondary education, while the remaining 28.6% had only secondary education. The print media in this category are newspapers, newsletters and other documentary evidence in black and white circulated for public consumption. This data reveals that the higher the level of education, the higher the tendency to read vital information on the print media because of the ability to read and write. While the number, in frequency, of the respondents who get the info about Lassa fever through electronic media increases, the highest percentage 60% was found on only those who had post-secondary education, 17.1% had secondary education while the remaining 22.9% had pre-secondary education. Half of those who heard the info about Lassa fever from health centre had post-secondary education, 30% had secondary education, while the remaining 20% had pre-secondary education.

### **Possible causes of Lassa fever**

The perceived cause(s) of an illness is one of the major factors influencing health seeking behaviour of an individual who is ill. The responses on possible causes of

Lassa fever was juxtaposed with the respondents' level of education, the data is insignificant as only 2.9% of the total respondents who reported that LF could result from evil attacks had a maximum of pre-secondary education. All the remaining respondents (97.1%) indicated that it was impossible for human to contact Lassa fever from an evil attack. Those in support of this assertion further explained that the symptoms of Lassa fever are relatively similar to those of traditional illness inflicted on humans by some traditional idols most especially when an abominable act has been committed by an individual. However, 14.3% of the total respondents argued that infection with LF could result as a repercussion of one's wrong doing. Of this proportion, only 20% had post-secondary education, while the remaining 80% was shared in equal proportion by those who had pre-secondary and post-secondary education respectively.

### **Education/Possible causes of Lassa fever**

#### **Education/Rats as Disease Vectors**

Till date, scientific evidence have found that mammoth rats remain the main source of infection with LF, however, in most parts of Nigeria where LF infection has been reported, rats remain the closest neighbor to people, due to the nature of houses as reported earlier in this study. Aside from the facts that some houses are built in bushy environment, the rural nature of most settlements in Ondo North Senatorial District where this study was conducted enhanced the closeness of the animal to human. The belief about the etiology of a particular disease is a factor in preventive cure behaviour to avert infection and ensure adequate health care for the infected.

Data represented in table 13 seem to indicate that education, as a social factor does not influence belief that Lassa fever is caused by rats, as the vector carrier. This is because no significant difference in the percent of responses when distributed across the levels of education among the respondents. As shown in the data, 43.7% had post-secondary education, 25% had secondary education, while the remaining 31.3% had pre-secondary education. There is a general belief among all strata of education that rat has been scientifically proved as the vector of Lassa fever.

### **Education/Rats Contact Related Behaviour**

With the significance acknowledgement of the fact that rat remains the disease vector of Lassa fever, even among the people with low educational background. It is expected, the knowledge will sharpen and influence their engagement in health risks behaviour, most especially as regards contact with the LF vector, mammoth rats. Rats contact related behaviour, as shown in Table 14, presents the responses

on the belief that rat is a vector and contact with rat infected food remnants. two relevant variables; education level of respondents and the possibility of consuming rats related food were cross tabulated to determine the possible links i.e whether respondents level of education will influence his/her tendency to eat rat infected food or not. Data in the table below reveals that half (51.9%) of those who reportedly eat rat infected food had pre-secondary education, while 30% had secondary education and the remaining 18% post-secondary education. Considering this data, level of education is inversely related to the possibility and tendency to eat rat infected food. This means that the lower the level of education, the higher the tendency to engage in Lassa fever risks behaviour and vice versa. Risk behaviour of Lassa fever infection. The data confirms that formal education plays a vital role in the infection with and spread of LF.

### **Education/Waste Disposal Mechanism**

Rats and mice thrive in environments with open drainage system and garbage-filled canals, and this is, unfortunately, the most prevalent form of drainage found in Nigeria. Therefore, until Nigeria can adopt a more hygienic form of sewage disposal, rats will continue to thrive within its contaminated drainage systems. A 2017 research reported a fourfold increase in rat infestation level where homes are less than 20 meters from open drainage systems. Open garbage dumping will always encourage rats and mice. One of the best ways to dispose of rubbish is to keep all rubbish in garbage bins with lids or in plastic dustbin bags. In many urban and rural areas, heaps of rubbish are dumped openly on roadsides and pavements without any concern for the impact this may have on public health.

Even when houses are not built in bushy environs, the mechanism for disposing waste can be an impetus for rats being closer to residential apartment and the possibility of eating food remnants at home. In situation where dump sites are located close to the house, the search for remnants of foods at dump sites that act as pull factors to rats. Could the level of education among the respondents in this study influence waste disposal behaviours? As shown in Table 15, among the 84 respondents who utilized dumpsites, 66.7% had pre-secondary education, 8.3% had secondary education and 25% had post-secondary education. Majority of the respondents in this category indicated that there are specific dumpsites within their vicinities where they are confined to drop their refuse. Open air: pre-secondary (40%), secondary (46.7%) and post-secondary (13.3%). All the respondents who dump their refuse in river channels had a maximum of pre-secondary education. Forty nine respondents dump their refuse in waste collector and respondents' distribution varies directly with the level of education. Those with post-secondary

education represent the majority (71.4%), secondary education (20.4%), and pre-secondary education (8.2%). Generally, data direction shows that while those with higher level of education preferred waste collector as a means of dumping refuse, those with pre-secondary education preference for the dumpsite and river is high. Those with secondary education had high preference for burning in open air.

### **Education/Bushy Land Space**

Since rats, the disease vector of Lassa fever, mostly live in the bush, leaving bushy land space close to human dwelling place is a behaviour that is risky and because it may facilitate human direct and indirect contacts with rats. Researchers have found that poor quality housing is often responsible for a high rate of rat infestation. For example, rats frequently gain access to homes through holes in roofs, doors or walls. Hence, badly maintained homes are the most attractive hiding places for rats and mice. Additionally, rodents find it easy to hide in overcrowded homes, and this is why slum areas are characteristically the most common breeding places for rats and mice.

Respondents, based on their different levels of education were asked to indicate if there is an available bushy land space close to their environment that could enhance rats breeding. Over half 53.8% of those who had bushy; land space in their environment had pre-secondary education, 38.5% had secondary education while the remaining 7.7% had post-secondary education as shown in Table 16.

### **Education/ Frequency of leaving Food Remnant at Home**

When different levels of education were cross tabulated with the frequency of leaving remnant food at home, data showed that 35 respondents representing 14.3% of the total sample size dropped food remnants daily, pre-secondary(20%), secondary(40%), and post-secondary(40%) respectively. Data in Table 17 further reveals that among those who dropped remnants at home one in a week, 28.8% had secondary education while the remaining 71.2% had post-secondary education. About 26% of total sample seldom drop food remnants at home with pre-secondary (33.3%), secondary (44.4%) and post-secondary (22.3%).

### **Education/Possibility of Rats eating from food Remnants**

Since the possibility of leaving food remnants at home cut across all the education strata, they were further requested to respond to a question on the possibility of rats eating from the kept remnants. All those who reportedly keep food remnants from indicated the possibility of rats eating from the food remnants, even across all the

education strata as shown in Table 18; pre-secondary (33.3%), secondary (53.3%) and post-secondary (13.4%). To further determine contacts with rats through consumption of food remnant, a follow-up question on whether they eat food kept till the following day was asked. Responses confirm the eaters of food remnants across all three education strata; pre-secondary (36.8%), secondary (31.6%) and post-secondary (31.6%). This report further stresses that the risk of indirect contact with food eaten by rats cut across all education strata. Those who ever ate rats cut across all education strata, pre-secondary (37.5%), secondary (12.5%) and post-secondary (50%). In fact, data show that the higher the level of education, the higher the tendency to eat bush meat in rat category. Therefore, it is right to say that educated people eat more of bush meat in rat's category than the uneducated.

Eating rat is directly proportional with the levels of education. While people with low education, as reported by this data, eat remnant food which probably might have been touched by rats, highest proportion of those who eat rats are found among the people with highest level of education. Good to conclude that the higher the level of education, the higher the possibility to eat rats and vice-versa. While the lower the level of education, the higher the tendency to eat remnants of food which must have probably might have been touched by rats. Direct contact with disease vector, rat is more reported among the uneducated, through consumption of rat meat while indirect contact through the consumption of remnants of food which probably would have been touched by rat is common among the people of lower education status. It can be generally deduced here that education status play both infective and non-infective role in infection with Lassa fever.

### **Conclusion and Recommendations**

Education plays a major role in the knowledge about Lassa fever and the information dissemination media have some relationships with the level of formal education because the language of dissemination, mostly, English, is taught in formal education systems, at the expense of the local dialects. This is made possible because some of the terminologies in Lassa fever could not be translated into local dialects to enhance better understanding with the illiterate households' heads. In the information transmission process, heads of households intercept between formal education media and members of the families. This was prominent in rural societies where most people are predominantly engaged in farming and other petty jobs with no formal education. In addition, the patriarchal nature of the social structure made household heads a channel of information dissemination. Consequently, their actions and inactions have significant influence on the

exhibition of behaviours that may expose members of the households to the risks of infection with Lassa fever in Ondo State Nigeria.

This study recommends that some programmatic measures must be put in place towards preventing the new incidence and effective management of the infected to prevent further spread among the risky population. These measures include enlightenment campaign through mass media, workshops, seminars and various ministries' communication channels for the household heads. There is the need for collaboration with traditional rulers and other opinion leaders at the grassroots to educate household heads to shun such a notion and realize that rat is the disease's primary vector. The inclusion of Lassa fever education in the curriculum of science related courses in both primary and secondary levels of education will assist to further strengthen knowledge about the disease.

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## Appendix: Tables

Table 2: Sample Characteristics

VARIABLES	F	%
Age (in years)		
18 – 24	07	2.9
25 – 31	42	17.1
32 – 37	21	8.6
38 – 44	14	5.7
45 – 51	28	11.4
52 above	133	54.3
Sex		
Male	77	31.4
Female	168	68.6
Religion		
Christianity	210	85.7
Islam	35	14.3
Ethnicity		
Yoruba	217	88.6
Ibo	28	11.4
Sub-Ethnic		
Akoko	203	82.9
Ekiti	7	2.9
Akure	14	5.7
Ondo	7	2.9
Ebira	14	5.7
Highest Level of Education		
Pre-secondary	105	42.9
Secondary	77	31.4
Post-secondary	63	25.7
Marital Status		
Never married	14	5.7
Ever married	231	94.3
Marriage Status		
Currently with spouse	161	65.8
Separated	56	22.9
Widower	28	11.4

Occupation		
Government Employee	21	8.6
Private Employee	112	45.7
Artisan	14	5.7
Farming	70	28.6
Unemployed	28	11.4

Source: Author's Survey, 2018

Table 3: Fertility Behaviour & Dependency Rate

Variables	Responses				
	1 – 2 F %	3 – 4 F %	5 – 6 F %	7 & above F %	Total F %
Number of Children	70 28.6	63 25.7	98 40.0	14 05.7	245 100.0
Number of dependent relatives	140 57.1	56 22.9	35 14.3	14 05.7	245 100.0
Number of people living in the house	35 14.3	42 17.1	63 25.7	105 42.9	245 100.0

Mean No of Children = 3.7

Mean No of Dependent Relatives = 2.87

Mean No of People living in the house = 5.44

Source: Author's Survey, 2018

Table 4: Rooms occupied/used for sleeping

Variables	1 F (%)	2 F (%)	3 F (%)	4 F (%)	5 F (%)
No of rooms occupied by the family	35 (14.3)	28 (11.4)	21 (8.6)	28 (11.4)	133 (54.3)
No of rooms used for sleeping	42 (17.1)	35 (14.3)	49 (20.6)	42 (17.1)	77 (31.4)

Mean number of rooms occupied

Mean number of rooms used for sleeping

Source: Author's Survey, 2018

**Table 5: Ever Heard of Lassa fever**

Have You heard of Lassa Fever	F	%
Yes	140	57.1
No	105	42.9

Source: Author's Survey, 2018

**Table 6: Sources of Information about Lassa Fever**

Sources of Lassa Fever	Yes		No	
	F	(%)	F	(%)
Families	14	(8.7)	147	(91.3)
Friends	14	(8.7)	147	(91.3)
Schools	21	(13.0)	140	(87.0)
Religious houses (Church or Mosque)	14	(8.7)	147	(91.3)
Print media (newspapers, magazines etc)	49	(30.4)	112	(69.6)
Electronic media (radio & television )	105	(65.2)	56	(34.8)
Health Centre (govt & private hospital)	70	(43.5)	91	(56.5)

Source: Author's Survey, 2018

**Table 7: Perceived causes of Lassa fever**

Perceived causes of Lassa Fever	Yes	No
Evil attack	07 (4.3)	154 (95.7)
Repercussion of one's wrongdoing/gods' wrath	35 (21.7)	126 (78.3)
Rats acting as the disease's vector	112 (69.6)	49 (30.4)

Source: Author's Survey, 2018

**Table 8: Lassa fever Risk Behaviour**

Variables	F	%
Mode of waste disposal		
Dumpsite	84	34.2
Burn in open air	105	42.9
Dispose in open river	07	02.9
Deposited in waste collector	49	20.0
Bush land space close to dwelling house		

Yes	91	37.1
No	154	62.9

Source: Author's Survey, 2018

**Table 9: Rat Contact Related Behaviour**

Variables	Responses			
	Yes		No	
	F	%	F	%
Possibility of rats eating from remnant of foods	203	82.8	42	17.2
Ever noticed the rats ate part of remnant of foods	203	82.8	42	7.2
Ever seen rats in your house	203	82.8	42	17.2
Ever ate remnants of food	105	42.9	140	7.1
Engaged in game hunting	203	82.8	42	17.2
Ever killed rats in the house	210	85.7	35	14.3
Ever ate bush meat	231	94.3	14	05.7

Source: Author's Survey, 2018

**Table 10: Education/Distribution of Family members Per Room**

Levels of Education	Number of Rooms occupied by members of the Family						Total F %					
	1		2		3			4		5		
	F	%	F	%	F	%	F	%	F	%		
Pre-secondary	14	40.0	07	25.0	14	66.7	07	25.0	63	47.4	105	42.8
Secondary	14	40.0	07	25.0	07	33.3	14	50.0	35	26.3	77	31.4
Post-Secondary	07	20.0	14	50.0	00	00.0	07	25.0	35	26.3	63	25.8

  

Levels of Education	Number of Rooms by members for sleeping						Total F %					
	1		2		3			4		5		
	F	%	F	%	F	%	F	%	F	%		
Pre-secondary	21	50.0	14	40.0	00	00.0	21	50.0	49	63.6	105	42.8
Secondary	14	33.3	14	40.0	35	71.4	07	16.7	07	09.1	77	31.4
Post-Secondary	07	16.7	07	20.0	14	28.6	14	33.3	21	27.3	63	25.8

Source: Author's Survey, 2018

**Table 11: Education/Sources of Information about Lassa fever**

Variables	Levels of Education							
	Pre-secondary		Secondary		Post-secondary		Total	
	F	%	F	%	F	%	F	%
Ever heard of Lassa fever	42	30.0	42	30.0	56	40.0	140	100.0
<b>Sources of Information</b>								
Families	00	00.0	00	00.0	14	100.0	14	100.0
Schools	00	00.0	07	33.3	14	66.7	21	100.0
Religions Houses	56	61.5	28	30.8	07	07.7	91	100.0
Print media	00	00.0	14	28.6	35	71.4	49	100.0

Electronic media	24	22.9	18	17.1	63	60.0	105	100.0
Health centre	14	14.0	21	30.0	35	50.0	70	100.0

Chi-square Results;  $X^2_C = -38.7$ ,  $X^2_t = -43.2$ ,  $df(v) = 2$ , Level of significance = 0.05

Source: Author's Survey, 2018

**Table 12: Education/Possible causes of Lassa fever**

Variables	Levels of Education							
	Pre-secondary		Secondary		Post-secondary		Total	
Causes	F	%	F	%	F	%	F	%
Evil attack	00	00.0	00	00.0	14	100.0	14	100.0
Repercussion of one's wrong doing	00	00.0	07	33.3	14	66.7	21	100.0

Source: Author's Survey, 2018

**Table 13: Education/Rats as Lassa fever Vendor**

Level of Education	Yes	
	F	%
Pre-Secondary	35	31.3
Secondary	28	25.0
Post – Secondary	49	43.7
Total	112	100.0

Source: Author's Survey, 2018

**Table 14: Education/Rats contact related behaviour**

Level of Education	Yes	
	F	%
Pre-Secondary	69	51.9
Secondary	40	30.1
Post – Secondary	24	18.0
Total	133	100.0

Source: Author's Survey, 2018

**Table 15: Education/Waste Disposal Mechanism**

Variables	Levels of Education							
	Pre-secondary		Secondary		Post-secondary		Total	
Waste Disposal Mechanism	F	%	F	%	F	%	F	%
Dumpsite	56	66.7	07	08.3	21	25.0	84	100.0
Burn in open air	42	40.0	49	46.7	14	13.3	105	100.0
Water/River	07	100.0	00	00.0	00	00.0	07	100.0
Waste collection bin	04	08.2	10	20.4	35	71.4	49	100.0

Source: Author's Survey, 2018

**Table 16: Education/Bushy land space**

Level of Education	Yes	
	F	%
Pre-Secondary	49	53.8
Secondary	35	38.5
Post – Secondary	07	07.7
Total	133	100.0

Source: Author’s Survey, 2018

**Table 17: Education/ Frequency of leaving food remnants at Home**

Levels of Education	Period						Total					
	Daily		Once a week		Days in month		Seldom		Never			
	F	%	F	%	F	%	F	%	F	%		
Pre-secondary	07	20.0	00	00.0	00	00.0	21	33.3	77	57.9	105	42.8
Secondary	14	40.0	02	28.8	01	14.3	28	44.4	35	26.3	77	31.4
Post-Secondary	14	40.0	05	71.2	06	85.7	14	22.3	21	15.8	63	25.8

Source: Author’s Survey, 2018

**Table 18: Education/Possibility of rats eating from food remnants**

Level of Education	Yes	
	F	%
Pre-Secondary	35	33.3
Secondary	56	53.3
Post – Secondary	14	13.4
Total	112	100.0

Source: Author’s Survey, 2018