



ORIGINAL ARTICLE

## Lassa fever awareness and knowledge among community residents in Ondo State, Nigeria

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### Keywords

Awareness;  
Knowledge;  
Lassa fever;  
Risk  
communication;  
Ondo State

### ABSTRACT

**Background:** The Lassa fever outbreak in Ondo State in 2018 recorded high morbidity and mortality. This study was conducted to assess awareness and knowledge of Lassa fever preventive measures among community residents in the affected areas in order to guide risk communication interventions.

**Methods:** A community-based descriptive cross-sectional study was conducted in six affected Local Government Area (LGAs), involving heads of households selected using a multistage sampling technique. A structured pre-tested questionnaire was administered to 2992 consenting study participants and data was analysed using IBM Statistical Package for Social Sciences version 20.0.

**Results:** Over three quarters 2, 537 (84.8%) of respondents were aware of Lassa fever of which 2, 363 (93.1%) knew that multimammate rat transmits the disease to humans. Also, 1804 (71.1%) knew that washing hands regularly could prevent the disease. However, only 845 (33.3%) of the respondents who reported awareness of the disease knew that cooking all foods properly before eating could prevent the disease. The predictors of good knowledge of Lassa fever were being a female ( $p= 0.017$ ), having secondary or tertiary education ( $p=0.001$ ), and currently married or divorced ( $p=0.01$ ).

**Conclusion:** A high level of awareness, but inadequate knowledge of some preventive measures of Lassa fever were observed among community members. Risk communication messages should focus more on preventive measures of the disease targeting young males with low education in these LGAs, the epicentres of the outbreak.

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### INTRODUCTION

Lassa fever an acute viral haemorrhagic illness is endemic in some countries in the West African sub-region including Nigeria.<sup>1-</sup>

<sup>7</sup> The annual number of infections has been

estimated at 100,000 to 300,000 with about 5000 deaths.<sup>1</sup> Although the overall case fatality rate is 1-2%, during outbreaks it could be as high as 50%.<sup>2</sup> The virus was first isolated in 1969 from a missionary nurse

working in Lassa town of Borno State in North-eastern Nigeria.<sup>2, 7</sup> Since then, 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.<sup>7</sup>

The clinical features are similar to other febrile illnesses such as malaria and typhoid fever. The primary host of the disease is the multimammate rat (many-breasted rats called *Mastomys natalensis*) found in and around homes in most sub-Saharan African countries, scavenging on food remains or poorly stored food.<sup>2</sup> Infected rodents excrete the virus in urine, saliva, respiratory secretion and blood.<sup>2, 3, 7</sup> Humans presumably become infected with the virus through contact with infected rodents' excreta, urine, tissues or blood.<sup>3, 4</sup> Primary transmission to man can also be through faecal-oral route while secondary transmission could be through direct physical contact with infected persons or their body fluids, or through sexual intercourse.<sup>2, 7</sup>

Public health response has been coordinated through the incident management system. Cases and deaths are reported through the routine surveillance system using a standard case definition. Blood specimens are collected for confirmation at WHO-accredited laboratories and cases managed at designated treatment centres such as Irrua Specialist Hospital in Edo State and Federal

Medical Centre Owo in Ondo State among others in the country. Other notable public health response include communication and advocacy, infection and prevention control, as well as safe burial practices.<sup>5, 7</sup>

Although previous outbreaks in Ondo State were restricted to two LGAs, the current outbreak in 2018 affected six LGAs in the north and central senatorial districts.<sup>7</sup> In the course of the outbreak in 2018, risk communication messages were developed and disseminated mainly through several media platforms such as radio, television, community dialogue meetings, etc. Despite these interventions, continued primary transmission of the disease persisted in the state. Hence, this study was conducted to assess awareness and knowledge of Lassa fever preventive measures among community residents in the affected areas to guide risk communication interventions in order to curtail the spread of the disease. Assessment of risk communication activities during outbreaks will provide data for programme managers to use to identify gaps and take corrective actions in risk communications to prevent disease transmission.

## **METHODOLOGY**

A descriptive cross-sectional community-based study design was carried out in May 2018. The study was conducted in the six LGAs in Ondo State (Owo, Ose, Idanre, Akure South, Akure North, Akoko South West LGAs) affected by the Lassa fever outbreak in January to June 2018. Ondo

State is one of the 36 states in the Federal Republic of Nigeria situated between longitudes 40 151 E and 60 001E of the Greenwich meridian and latitudes 50 451N and 70 451 N, which are to the North of the equator, in the Southwestern geopolitical zone of the country. The states bordering Ondo State are Ekiti State to the North, Kogi State to the northeast, Edo State to the East, Delta State to the southeast, Ogun State to the southwest and Osun State to the northwest.<sup>8-10</sup> The state is divided into three senatorial districts (Ondo-North, Ondo-Central and Ondo-South) with 18 LGAs and has a 2018 projected total population of about 4,906,078 based on the 2006 population census.<sup>10</sup>

The predominant ethnic composition of the state is the Yoruba subgroups of the Akoko, Akure, Okitipupa, Ilaje, Ondo and Owo people. The Ijaws; Apoi and Arogbo populations inhabit the coastal areas of the State. The climate of the state is highly favourable for agrarian activities and crops such as cocoa, kola nut, palm tree and arable crops like maize and tubers (e.g. yam) and cassava are grown annually.<sup>9-11</sup> The annual rainfall is between 1000mm and 1500mm with a high daily temperature of about 30°C. The vast majority of the population consists of peasant farmers cultivating food and cash crops at a small-scale level. Hunting and livestock keeping are also principal occupations of the population of Ondo State who rear goats, sheep and also do some fish farming. Other economic activities in the state include trading and civil service.<sup>12</sup>

The study populations were heads of households in selected communities within the LGAs. We estimated that 311 household heads in an affected LGA will be required to obtain a 24% proportion of respondents with good general knowledge of Lassa fever based on a previous study<sup>3</sup> with a desired absolute accuracy of 5% at type 1 error of a two-sided test,  $\alpha$  of 0.05 and assuming a 10% non-response rate. A multistage sampling technique was employed in this study. In stage 1, we selected five wards from the list of wards in each LGA using the simple random technique by balloting. In stage 2, five to six settlements out of an average of 30 settlements per ward were also sampled by simple balloting. A total of 30 settlements (5 wards \* 6 settlements) were randomly selected from the list of settlements generated from each LGA. In stage 3, all houses with household members present at the time of visit in a settlement were approached, and a household was selected by simple random sampling using the table of a random number if the number of households in the house is more than one; otherwise the only household is selected. Finally, in stage 4, heads of households or assigned adults older than 18 years (where the head of household was not present in selected households) were interviewed.

A structured questionnaire was administered to participants by trained research assistants using Open Data Kit (ODK) application. The questionnaire was developed by researchers from the literature reviewed and captured information on

socio-demographic variables, including sex, age, religion, occupation, ethnicity, marital status, educational level and LGA of residence. Others were variables assessing awareness and knowledge of cause and prevention of Lassa fever. The draft questionnaire was reviewed and face validated by colleagues in the State Ministry of Health. It was also pretested before the final version was administered.

The data obtained were analysed using IBM SPSS version 20.0 statistical software. The knowledge score was obtained by scoring each of 39-item variables with “1” assigned for a correct response and “0” assigned for an incorrect response. A total knowledge score of 39 with a range of 0-19 scores (0-49%) considered as poor knowledge while scores 20-39 (50-100%) were considered good knowledge. Bivariate and multivariate logistic analyses were conducted with respondents’ socio-demographic characteristics as independent variables and knowledge of Lassa fever categorized as good and poor knowledge as the dependent variable. Variables in the bivariate analysis with a p-value of < 0.2 were included in the multivariate model and a p-value < 0.05 was accepted as statistically significant.

The study was conducted as part of an outbreak control investigation hence permission to conduct the study was obtained from the State Ministry of Health (SMoH) and the LGA Primary Health Care Department. Informed consent was also obtained from the respondents. They were made to understand that participation is

voluntary and there was no consequence for non-participation. Also, the study will enable investigators to make recommendations to prevent further spread of Lassa fever in the community, thus beneficiary to the study participants and their communities at large. All information obtained was kept confidential.

## RESULTS

Table 1 shows the socio-demographic characteristics of the respondents. A total of 2,992 heads of households from the six selected LGAs responded. The mean age of respondents studied was 43.04±13.97 years, 1,531 (51.2%) were females, 2,461 (82.3%) were of Christian faith and 2,446 (81.8%) were Yorubas. Majority of the respondents 2,578 (88.2%) were married and had at least a secondary education 1,894 (63.3%). Most of the respondents 2,537 (84.8%) reported having heard about Lassa fever and 2,149 (84.7%) of those who reported awareness knew that fever is a symptom (Table 2).

Most of those who were aware of the disease knew that the disease could be transmitted from rat to human 2,363 (93.1%) and it could be treated in the hospital 2,074 (81.8%). However, only very few knew that diarrhoea 722 (28.5%), nausea and vomiting 927 (36.5%) were symptoms of the disease. Moreover, hunting and eating of bush meat 792 (31.2%), contact with body fluids of patients 833 (32.8%), attending or participating in funeral of a diseased Lassa

**Table 1: Socio-demographic characteristics of the respondents**

| Variables                | Frequency<br>(n=2992) | Percent |
|--------------------------|-----------------------|---------|
| <b>Sex</b>               |                       |         |
| Female                   | 1531                  | 51.2    |
| Male                     | 1461                  | 48.8    |
| <b>Age group (years)</b> |                       |         |
| <25                      | 268                   | 9.0     |
| 25-34                    | 710                   | 23.7    |
| ≥35                      | 2014                  | 67.3    |
| <b>Religion</b>          |                       |         |
| Christianity             | 2461                  | 82.3    |
| Islam                    | 485                   | 16.2    |
| Traditional              | 34                    | 1.1     |
| Others                   | 12                    | 0.4     |
| <b>Ethnicity</b>         |                       |         |
| Yoruba                   | 2446                  | 81.8    |
| Igbo                     | 225                   | 7.5     |
| Hausa                    | 32                    | 1.1     |
| Others                   | 289                   | 9.7     |
| <b>Marital status</b>    |                       |         |
| Married                  | 2578                  | 86.2    |
| Not Married              | 414                   | 13.8    |
| <b>Educational level</b> |                       |         |
| Primary                  | 1098                  | 36.7    |
| Secondary                | 1197                  | 40.0    |
| Tertiary                 | 697                   | 23.3    |

fever patient 229 (9.0%) and travel to places where there is an epidemic 305 (12.0%) or visiting hospitals where Lassa fever patients were isolated 283 (11.2%) were considered by few of the respondents who were aware as modes of transmission of the disease. Also, only a few recognised open dumping 594 (23.4%) and not washing hands regularly 449 (17.7%) as possible causes. Similarly, on knowledge of measures of prevention, few respondents knew that disposing waste in covered dustbin 452 (17.8%), not touching a sick or dead person with bare hands 427 (16.8%), washing fruits

before eating 671 (26.4%) and cooking all foods properly before eating 845 (33.3%) are measures to prevent occurrence of the disease. The major source of information reported was by radio 2, 083 (82.1%). Additional sources reported included health workers 843 (33.2%), television 822 (32.4%) and neighbours/friends 784 (30.9%), Figure 1.

Overall, only 1,004 (33.6%) of the respondents were considered to have good knowledge of the disease. On a multivariate binary logistic regression model, the predictors of good knowledge were being a female (OR = 1.2, 95% CI 1.0-1.5), having a secondary (OR = 1.7, 95% CI 1.3-2.0) or tertiary education (OR = 2.0, 95% CI 1.4-2.5), currently married (OR = 2.0, 95% CI 1.2-3.4) or divorced (OR = 4.3, 95% CI 1.4-13.0) and residing in Akoko Southwest (OR = 3.2, 95% CI 2.4-4.2) or Akure North (OR = 1.6, 95% CI 1.2-2.1) or Idanre (OR = 2.9, 95% CI 2.2-3.9), (Table 3).

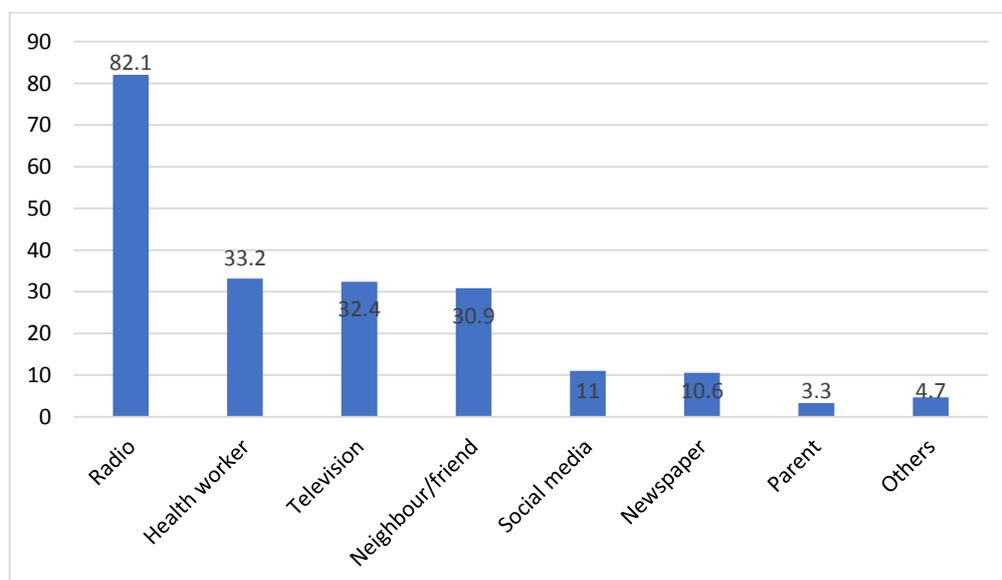
## DISCUSSION

The current study with over 2000 participants in six LGAs of Ondo State is larger in size and coverage compared to 122 participants in a similar study to assess awareness of Lassa fever in one of the endemic communities in the State.<sup>4</sup> The current study may, therefore, be more reliable and representative. The findings on the sociodemographic distributions of participants by sex, marital status, religion and education were consistent with findings of the report of the integrated household

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

| Knowledge domains  | *Frequency (n=2537) | Percent |
|--|---------------------|---------|
| <b>Symptoms</b>  |                     |         |
| Fever  | 2149                | 84.7    |
| Nausea and vomiting  | 927                 | 36.5    |
| Diarrhoea  | 722                 | 28.5    |
| <b>Transmission</b>  |                     |         |
| Rat to Human   | 2363                | 93.1    |
| Human to Human   | 1155                | 45.5    |
| <b>Possible causes of Lassa fever</b>                        |                     |         |
| Unhygienic food practices                                    | 1639                | 64.6    |
| Open refuse dumping  | 594                 | 23.4    |
| Not washing hands regularly                                  | 449                 | 17.7    |
| A touch of sick or dead persons with bare hands              | 410                 | 16.2    |
| <b>Preventive measures</b>                                   |                     |         |
| Washing hands with soap and water regularly                  | 1804                | 71.1    |
| Store food item in a lid-covered container                   | 1182                | 46.6    |
| Do not spread food items by the roadside or in an open place | 1122                | 44.2    |
| Do not touch a life or dead rat with bare hands              | 875                 | 34.5    |
| Cooked all foods properly before eating                      | 845                 | 33.3    |
| Wash fruits before eating with clean water                   | 671                 | 26.4    |

\*Multiple responses allowed

**Figure 1: Reported sources of information on Lassa fever by respondents**

survey in Ondo State and the 2006 population census for the State.<sup>14</sup> The proportion of respondents who reported awareness of Lassa fever disease in the current study is higher than that reported in a study carried out in 2014 among community members in one of the endemic settlements used for this study.<sup>4</sup>

This may be because the current study was carried out at the time when some forms of sensitization have been done or were still ongoing, thereby increasing memory recall of the respondents while the 2014 study was a baseline survey carried out before any community sensitization activity on Lassa fever in the LGA.

**Table 3: Predictors of knowledge of Lassa fever**

|                          | Poor knowledge<br>n (%) | Good knowledge<br>n (%) | Adjusted odds ratio/<br>95% CI | p-value |
|--------------------------|-------------------------|-------------------------|--------------------------------|---------|
| <b>Sex</b>               |                         |                         |                                |         |
| Female                   | 1004 (65.6)             | 527 (34.4)              | 1.2 (1.0-1.5)                  | 0.017   |
| Male                     | 984 (67.4)              | 477 (32.6)              | 1                              |         |
| <b>Age (years)</b>       |                         |                         |                                |         |
| <25                      | 204 (76.1)              | 64 (23.9)               | 1                              |         |
| 25-34                    | 480 (67.6)              | 230 (32.4)              | 1.3 (0.9-1.9)                  | 0.231   |
| ≥35                      | 1304 (64.7)             | 710 (35.3)              | 1.5 (1.0-2.2)                  | 0.068   |
| <b>Religion</b>          |                         |                         |                                |         |
| Christianity             | 1631(66.3)              | 830 (33.7)              | 1.0 (0.4-2.2)                  | 0.908   |
| Islam                    | 324 (66.8))             | 161 (33.2)              | 1.0 (0.4-2.3)                  | 0.993   |
| Others                   | 24 (70.6)               | 10 (29.4)               | 0.9 (0.2-4.8)                  | 0.874   |
| Traditional              | 9 (75.0)                | 3 (25.0)                | 1                              |         |
| <b>Ethnicity</b>         |                         |                         |                                |         |
| Hausa                    | 24 (75.0)               | 8 (25.0)                | 1.1 (0.4-2.5)                  | 0.901   |
| Igbo                     | 171 (76.0)              | 54 (24.0)               | 0.7 (0.5-0.9)                  | 0.013   |
| Others                   | 1578 (64.5)             | 868 (35.5)              | 0.7 (0.5-0.8)                  | 0.003   |
| Yoruba                   | 215 (74.4)              | 74 (25.6)               | 1                              |         |
| <b>Marital Status</b>    |                         |                         |                                |         |
| Married                  | 1665 (64.6)             | 913 (35.4)              | 0.5 (0.4-0.6)                  | 0.001   |
| Not Married              | 323 (78.0)              | 91 (22.0)               | 1                              |         |
| <b>Educational level</b> |                         |                         |                                |         |
| Primary                  | 769 (70.0)              | 329 (30.0)              | 1                              |         |
| Secondary                | 806 (67.3)              | 392 (32.7)              | 1.7 (1.3-2.0)                  | 0.001   |
| Tertiary                 | 413 (59.3)              | 283 (40.7)              | 2.0 (1.4-2.5)                  | 0.001   |
| <b>LGAs</b>              |                         |                         |                                |         |
| Akoko                    | 235(46.7)               | 268(53.3)               | 3.2(2.4-4.2)                   | 0.001   |
| South-west               | 332(66.3)               | 169(33.7)               | 1.6(1.2-2.1)                   | 0.002   |
| Akure North              | 352(73.5)               | 127(26.5)               | 0.9(0.6-1.1)                   | 0.273   |
| Akure South              | 260(53.9)               | 222(46.1)               | 2.9(2.2-3.9)                   | 0.001   |
| Idanre                   | 423(87.2)               | 62(12.8)                | 0.4(0.3-0.5)                   | 0.001   |
| Ose-                     | 386(71.2)               | 156(28.8)               | 1                              |         |
| Owo                      |                         |                         |                                |         |

Moreover, the level of awareness obtained in this study is higher than what was obtained among community members in similar studies.<sup>3, 4-19</sup>

Although most respondents were aware of Lassa fever disease, gaps exist in the details of the knowledge they have with only 33.6% having good knowledge. Inadequate or gaps in knowledge may predispose community members to engage in risky behaviours that may predispose them to have the infection. For instance, only very few knew that hunting and eating of bush meat could be a predisposition to infection. Gaps also exist on the knowledge of measures of prevention,

as many of the respondents did not know for examples that disposing of waste in a covered dustbin, not touching a sick or dead person with bare hands and cooking all foods properly before eating are measures to prevent the occurrence of the disease. Similar gaps were observed in studies carried out among community members and health workers.<sup>4, 15</sup> This may not be surprising given the way most sensitization programmes are conducted, which merely give instructions rather than engaging the participants. 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.<sup>17</sup> In our context, community engagement has been recommended as a means of communicating the risk of infectious diseases.<sup>18</sup>

The major source of information reported was by radio with only a few respondents reporting having heard of the disease from health workers and peers. This finding is consistent with the results of the previous study.<sup>4</sup> This is a demonstration of the role of media, health workers and peers in disseminating outbreak information. Reports here and elsewhere had indicated that mass media and peers are valid means of providing current information to the general population,<sup>18</sup> hence the need to use these media to provide detail information to the general public in an ongoing regular basis. In this study, the predictors of good knowledge were being a female, having a secondary or tertiary education, age  $\geq 35$  years, currently married or divorced, and residing in Akoko Southwest or Akure North or Idanre. A previous study found high education, high income and working in the civil service as factors influencing knowledge of Lassa fever.<sup>19</sup> From our findings, it is necessary, therefore for Lassa fever risk communication efforts to focus on those with less education, male gender, young people, single and residing in Owo and Ose LGA as they are likely to engage in behaviours that make them prone to Lassa fever infection.<sup>4, 19</sup>

Finally, we acknowledge the limitation that the study design, a cross-sectional survey

imposes on our findings. Recall and social desirability bias cannot be ruled entirely out despite efforts to minimise them. The survey was carried out when the outbreak was already subsiding, but sensitisation activities were still ongoing. Our findings, though revealed a high level of awareness and knowledge of the cause, more needs to be done in engaging the community and to providing more information on the risk factors and preventive measures for the disease through mass media and health education by the health workers.

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