Knowledge, Attitude and Practice in the Management of Lassa fever among Healthcare Workers in Ondo State, Nigeria

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Abstract

Background: Lassa fever is an acute viral hemorrhagic illness caused by the Lassa virus. This disease over the years has caused infections and deaths of healthcare workers who are involved in treating and managing infected patients. This study assessed the knowledge, attitude, and practice of healthcare workers in the management of Lassa fever in three health facilities in Ondo State.

Methods: A descriptive cross-sectional study among healthcare workers sat three health facilities in Ondo States involving the use of semi-structured questionnaires. Data were analyzed and presented using descriptive statistics at 95% confidence interval and (p<0.05) level of significance.

Result: A total of 85 healthcare workers participated in the study with females 52(61.2%), having a tertiary level of education 71 (81.6%), and at least five years post-graduation experience (65%) constituting the majority. The mean age among participants was 32.7(±8.9)years. Overall, 75(88.2%) respondents had good knowledge of Lassa fever, with 81 (95.3%) of them having correct knowledge of Lassa fever's cause and vector. Adequate hand washing 77(90.6%) was viewed to be the most acceptable precautionary measure to prevent the spread of Lassa fever in healthcare facilities. A fair rating was adjudged towards the care and management of Lassa fever patients as forty-seven (55.3%) exhibited a positive attitude.

Conclusion: Healthcare workers showed overall good knowledge of Lassa fever and were aware of preventive measures towards limiting community and nosocomial spread. However, there is a need for institutions to consolidate on the measures to improve a positive attitude to the care and management of Lassa fever patients.

Keywords: Lassa fever, Healthcare workers, Knowledge, Attitude, Practice

1. Introduction

Lassa fever is a viral hemorrhagic fever caused by Lassa virus (LASV), a member of the virus family "Arenaviridae" and transmitted by the multimammate rat Mastomys natalensis (M. natalensis). The first confirmed cases of the disease were reported in Nigeria (1969). The disease was named after the town where it first occurred in Lassa, Borno State(CDC, 2014; VHFC, 2020). The host of the LASV, the multimammate rat, once infected could excrete the virus from its urine for a prolonged period and at times for the rest of their lives(CDC, 2014; Lo Iacono et al., 2015; VHFC, 2020). In addition, these rats can produce a large number of offspring frequently. They are predominant forest dwellers but can also colonize human homes especially areas where food is stored. Lassa fever is a zoonotic disease transmitted from animal-to-human and this arises from contaminations with the excreta, urine, and other secretions of the rats(Lo Iacono et al., 2015). This has contributed to approximately 19% of all reported cases (Lo Iacono et al., 2015). Other frequently reported routes are human-to-human transmission (secondary transmission) occurring through direct contact with infected blood or bodily secretions.

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This occurs mainly between individuals caring for sick patients although anyone who comes into close contact with a person carrying the virus is at risk of infection (Taiwo Ijarotimi et al., 2018). Nosocomial transmission of Lassa fever in healthcare facilities represents a significant burden on the healthcare system (VHFC, 2020).

Infection prevention and control (IPC) practices, training, and re-training of healthcare workers have been documented as important factors in controlling potential outbreaks of Lassa fever and other infectious agents within healthcare facilities (Ajayi et al., 2013). The onset of illness of Lassa fever typically comprises non-specific signs and symptoms difficult to distinguish from many other febrile diseases. Some patients progress to severe vascular instability and multiorgan system failure, with case fatality ratios in hospitalized cases reaching about 20% (7). These unspecific signs and symptoms make it difficult to recognize and diagnose in a typical hospital setting which puts healthcare workers at great risk.

The 2017/2018 Lassa fever outbreak in Nigeria was unprecedented; heralded by an initial report of a cluster of cases and deaths among healthcare workers in a tertiary health facility by week 2 of 2018 (Dan-Nwafor et al., 2019). At the end of 2018, 23 states within the country were affected by the Lassa fever outbreak. A total number of 3498 suspected cases were identified, of which 633 cases were confirmed with a case fatality ratio of 27% (171 deaths) (NCDC, 2019). Healthcare workers accounted for 7% and 5.8% of confirmed cases and deaths attributed to Lassa fever outbreak respectively, depicting substantial risk to healthcare workers. (Dan-Nwafor et al., 2019; NCDC, 2019). Ondo State is one of the states in Nigeria where Lassa fever is endemic and 25% of the confirmed cases were recorded in the state (NCDC, 2019). Although there had been pockets of studies in the country on knowledge, attitude, and practice of healthcare workers on Lassa fever, there is a need for more information to plan strategies to reduce these avoidable cases and deaths. This study assessed the knowledge, attitude, and practice of healthcare workers in the management of Lassa fever during the 2018 outbreak in Ondo state.

2. Methods

A cross-sectional study adopting the use of a pre-tested semi-structured questionnaire to collect information from consenting healthcare workers in three health facilities (2 secondary and 1 tertiary) at the peak of the 2018 Lassa fever outbreak in Ondo State. The cadre of healthcare workers include doctors, nurses (registered and auxiliary), laboratory scientists, and pharmacists.

Data collected includes demographics, knowledge of Lassa fever, case management, prevention, and attitude of healthcare workers to infection control practices. The questionnaires were self-administered. Overall knowledge of Lassa fever was assessed with an aggregate of 7 points (ever heard of Lassa fever, correct knowledge of cause and vector, modes of transmission, incubation period, symptoms, if vaccine existed, and knowledge of drug”). These were graded as either good knowledge (5-7 points) or poor knowledge (≤4 points). Also, the overall attitude of healthcare workers towards Lassa fever was assessed with an aggregate of 5 points (accept posting to Lassa fever ward, Lassa fever should be managed by only specifically trained personnel, think that government and facility management are doing enough to protect staff from getting infected with Lassa fever, willingness to be trained to manage and attend to Lassa fever patients), these were assessed as “Positive” attitude (4-5 points) or “Negative” attitude (≤ 3 points). Data were summarized with the use of descriptive statistics; categorized variables were presented with the use of counts and proportions while means and standard deviation were computed for continuous variables. Chi-square test was used to test for the association between categorical variables (Fisher’s exact test was used for variables with an estimated value of less than 5). Logistic regression was used to determine the predictors/drivers of knowledge, attitudes, and prevention practices. All analyses were at 95% confidence interval and P<0.05 level of significance.

Ethical approval was obtained from the Nigerian Institute of Medical Research Institutional Review Board (NIMR IRB). Permission was obtained both from the Ondo State Ministry of Health and the management of the participating health facilities. The questionnaires were administered anonymously in the health facilities and confidentiality was assured.

3. Results

A total number of 85 respondents were included in the analysis with two respondents excluded due to their designation (administrative staff). The majority of respondents were in public health facilities (82.4%), females (61.2%), and had tertiary education (81.2%). Laboratory technologists (34.1%) and Nurses (22.4%) accounted for the majority of respondents. (Table 1).
A significant proportion of healthcare workers (95.3% each) were aware of Lassa virus and rats being the cause and vector of Lassa fever. In addition, unprotected contact with infected body fluids (89.4%) was the commonest nosocomial route of transmission recorded. In contrast, more than a quarter of respondents (25.9%) reported transmission of the virus through mosquitoes. Overall, 75 (88.2%) of respondents had good knowledge of Lassa fever (Table 2).

Table 1: Socio-demographic Characteristics of Respondents

| Characteristics         | Frequency (%) |
|-------------------------|---------------|
| **Age** Mean (±SD)      | 32.7 (±8.9)   |
| **Sex**                 |               |
| Male                    | 33 (38.8)     |
| Female                  | 52 (61.2)     |
| **Marital Status**      |               |
| Married                 | 44 (53.6)     |
| Single/Widowed          | 38 (46.4)     |
| **Level of Education**  |               |
| Secondary               | 8 (9.4)       |
| Tertiary                | 77 (90.6)     |
| **Designation**         |               |
| Lab Technologist        | 29 (34.1)     |
| Nurse                   | 19 (22.4)     |
| Medical Doctor          | 12 (14.1)     |
| Nurse Assistant         | 12 (14.1)     |
| Pharmacist              | 11 (12.9)     |
| Dental Therapist        | 1 (1.2)       |
| **Types of Facility**   |               |
| Public                  | 70 (82.4)     |
| Private                 | 15 (17.6)     |

Table 2: Knowledge of respondents on Lassa fever

| Variable                              | Frequency (%) |
|---------------------------------------|---------------|
| **Cause of Lassa Fever**              |               |
| Virus                                 | 81 (95.3)     |
| Bacteria                              | 3 (3.5)       |
| Protozoa                              | 1 (1.2)       |
| **Vector of Lassa Fever**             |               |
| Rats                                  | 81 (95.3)     |
| Mosquito                              | 3 (3.5)       |
| Arthropod ticks                       | 1 (1.2)       |
| **Modes of transmission of Lassa Fever** |   |
| Contact with infected Persons         | 68 (80.0)     |
| Consumption of contaminated food      | 61 (71.8)     |
| Spreading food uncovered on ground/surfaces | 60 (70.6)   |
| Handling corpses                      | 59 (69.4)     |
| Hunting rodents                       | 52 (61.2)     |
| Contaminated utensils                 | 52 (61.2)     |
| Unprotected sex with carrier          | 47 (55.3)     |
| Mosquito bite                         | 22 (25.9)     |
| **Commonest modes of transmission within healthcare settings** | |
| Unprotected contact with infected body fluids | 76 (89.4) |
A majority of respondents correctly identified the incubation period (76.5%), non-availability of vaccines (72.9%), and use of Ribavirin (78.8%) in the management of Lassa fever. The most common symptoms associated with Lassa fever were fever unresponsive to antimalarials and antibiotics (75.3%) and bleeding from the orifice (69.4%). Polymerase chain reaction (62.4%) and ELISA (30.6%) were the most common methods of diagnosis mentioned by respondents. (Table 3)

Table 3: Knowledge of Case Management

| Variables                                             | Frequency (%) |
|-------------------------------------------------------|---------------|
| **Incubation period of Lassa Fever**                  |               |
| 2 – 21 days                                           | 65(76.5)      |
| 3 – 10 days                                           | 16(18.8)      |
| 5 – 7 days                                            | 2(2.4)        |
| **All persons infected with Lassa virus show symptoms** |               |
| No                                                    | 44(51.8)      |
| Yes                                                   | 35(41.2)      |
| **Most common symptoms associated with Lassa fever**  |               |
| Fever, unresponsive to antimalarials or/ & antibiotics| 64(75.3)      |
| Bleeding from orifice                                 | 59(69.4)      |
| Conjunctival haemorrhage                              | 47(55.3)      |
| Abnormal swelling of the neck and/or face             | 36(42.4)      |
| Deafness                                              | 35(41.2)      |
| Jaundice                                              | 25(29.4)      |
| Persistent low blood pressure                         | 25(29.4)      |
| Spontaneous abortion                                  | 23(27.1)      |
| **Methods of laboratory diagnosis in use**            |               |
| RT-PCR                                                | 53(62.4)      |
| ELISA                                                 | 26(30.6)      |
| Antigen detection tests                               | 13(15.3)      |
| Virus isolation by cell culture                        | 14(16.5)      |
| Rapid test kit                                        | 8(9.4)        |
| **Vaccine available to prevent Lassa fever Infection**|               |
| No                                                    | 62(72.9)      |
| Yes                                                   | 17(20.0)      |
| **Drugs available for treating Lassa fever**          |               |
| No                                                    | 8(9.4)        |
| Yes                                                   | 77(90.6)      |
| **Name of drug for treatment of Lassa fever**         |               |
| Ribavirin                                             | 67(78.8)      |
| Cefuroxime                                            | 1(1.2)        |
| Don’t know/no response                                | 17(20)        |
RT-PCR—Real time Polymerase Chain Reaction, ELISA—Enzyme-linked Immunosorbent Assay

More than 90% of the healthcare workers said that safe food storage and adequate handwashing were the most effective ways of preventing Lassa fever in the community and healthcare facilities respectively.

The precautionary measures to be taken during burials of deceased Lassa fever patient include preparing the body with care to avoid the risk of transmission (85.9%), burying as soon as possible (78.8%), the tomb must be at least 2-metre-deep (58.8%) and disinfecting vehicle after transporting body (54.1%).

Furthermore, less than 50% of respondents had Standard operating procedures (SOP) for the management of Lassa fever available at their duty post (Table 4).

Table 4: Prevention practices of Healthcare workers

| Variable                                                                 | Frequency (%) |
|--------------------------------------------------------------------------|---------------|
| Methods of prevention of Lassa fever within the community                 |               |
| Safe food storage                                                        | 77(90.6)      |
| Maintenance of a clean environment                                       | 74(87.1)      |
| Avoidance of rodent consumption                                          | 71(83.5)      |
| Avoid contact with blood & body fluids when caring for sick persons      | 70(82.4)      |
| Good housing standards                                                   | 61(71.8)      |
| Avoidance of bush burning                                                | 45(52.9)      |
| Precautionary measures to prevent spread of Lassa fever in healthcare facilities |               |
| Adequate handwashing                                                     | 77(90.6)      |
| Personal protective equipment                                            | 72(84.7)      |
| Health education                                                         | 67(78.8)      |
| Safe burial practices                                                    | 67(78.8)      |
| Isolation                                                                | 59(69.4)      |
| Safe injection practices                                                 | 56(65.9)      |
| Barrier nursing                                                          | 53(62.4)      |
| Use of dedicated equipment for each patient                              | 51(60.0)      |
| Precautions to be taken during burial of a deceased Lassa fever patient  |               |
| Prepare body with care to avoid risk of transmission                     | 73(85.9)      |
| Bury as soon as possible                                                 | 67(78.8)      |
| Tomb must be at least two metres deep                                    | 50(58.8)      |
| Disinfect vehicle after transporting body                                 | 46(54.1)      |
| Respect all cultural practices & religious beliefs of the family         | 23(27.1)      |
| Availability of a copy of the national guideline or any other SOP for Management of Lassa fever at their duty post |               |
| No                                                                       | 41(51.8)      |
| Yes                                                                      | 38(48.2)      |

Table 5: Attitude of healthcare workers to Lassa fever management

| Variable                                | Frequency (%) |
|-----------------------------------------|---------------|
| Acceptance of posting to Lassa fever ward |               |
| Yes                                     | 63(74.1)      |
| No                                      | 22(25.9)      |
Lassa fever should be managed by only specifically trained personnel

| Yes | 70(82.4) |
| No  | 15(17.7) |

Willingness to be trained to manage Lassa fever patients

| Yes | 34(40.0) |
| No  | 51(60.0) |

Will attend to a Lassa fever patient

| Yes | 60(70.6) |
| No  | 25(29.1) |

Do you think the government and facility management are doing enough to protect staff from getting infected with Lassa fever?

| Yes | 34(42.5) |
| No  | 46(57.5) |

5. Discussion

Lassa fever is a zoonotic acute haemorrhagic fever endemic in West Africa. Healthcare workers are at risk of contracting Lassa fever when protective measures and proper sterilization methods are not employed. This study evaluates the knowledge, practice, and attitude of healthcare workers in Ondo state to ensure continued reduction to nosocomial transmission and better case management.

A total of 85 healthcare workers participated in the study. The majority were females (61.2%), had a tertiary level of education (81.2%), and practiced in public health facilities (82.4%). The proportion of respondents with good knowledge and a positive attitude with respect to Lassa Fever was 75 (88.2%) and 47 (55.3%) respectively. Safe food handling and adequate handwashing were identified as the most effective ways of preventing Lassa Fever.

The general knowledge of Lassa fever among healthcare workers in Ondo was high. The knowledge of Lassa fever (causative agent, mode of transmission, case definition, and management) was high in this study. This finding contrasts Ibidolapo et al study in the same state where less than 50% of the healthcare workers had good knowledge of Lassa fever (Taiwo Ijarotimi et al., 2018). Similar reports of poor knowledge were reported by Asuke et al (40%), Ireye et al (4.4%) amongst healthcare workers in other states with Lassa fever outbreak in Nigeria (Asuke et al., 2020; Ireye et al., 2019). The overall good knowledge of Lassa fever was also higher compared to reports from other endemic countries (Tobin et al., 2013). The reason for the variability in the knowledge of Lassa fever could due to the different timelines, hospital settings, and healthcare workers’ cadre.

The fair rating of positive attitude in our study was lower compared to Asuke et al (84%) and Ireye et al (63.3%) (Asuke et al., 2020; Ireye et al., 2019). Our fair attitude rating in the current is a reflection of the poor government support towards the training of healthcare workers about Haemorrhagic viral diseases including Lassa fever. The high ratings in previous studies were attributed to the private healthcare facilities settings and prevention control measures in the facilities evaluated.

Adequate handwashing and use of personal protective equipment were predominant measures at preventing nosocomial transmission of Lassa fever. The practice of Infection prevention and control remains the backbone for limiting the spread of diseases within the healthcare facilities. This is in agreement with reports by Asuke et al, Ibidolapo et al. but in contrast to previous studies done in other parts of the country with Lassa fever outbreak (Asuke et al., 2020; Taiwo Ijarotimi et al., 2018). The limitations responsible for these differences vary from the ease of availability of PPE, level of healthcare facility, and cadre of healthcare workers.

Healthcare workers in Nigeria had a share of the burden of Lassa fever disease during the 2018 outbreak accounting for 7% and 5.8% of confirmed cases and case fatalities respectively (Dan-Nwafor et al., 2019; NCDC, 2019). The healthcare workers in Ondo State had good knowledge of the causes, vector, and modes of transmission of Lassa fever. In addition, more than three-quarters of them knew the incubation period to be 2-21 days and mentioned the use of ribavirin, as the drug used for patient management. This is very encouraging because correct information would be passed around on Lassa fever considering the fact that the most common source of information is from peers (62%).
This is in contrast with another study (Taiwo Ijarotimi et al., 2018) where the knowledge was just about 42%, this may be as a result of the health facilities (primary and secondary facilities) surveyed compared to our respondents who were involved in managing the Lassa fever patients during the 2018 outbreak. About 90% of respondent’s demonstrated good knowledge of infection and prevention measures against Lassa fever with most of the facilities adequately equipped to prevent disease outbreaks within their facilities.

This study is similar to a 2013 study where the use of gloves as personal protection equipment was reported in about 89.8% of the healthcare workers studied (Adebayo et al., 2015). However, less than a third of respondents (27%) believe cultural and religious practices during burial rites should still be maintained. This is in contrast with the study (Tobin et al., 2013) where 86.0% of respondents did not know of any special precautions to be taken during burial of a deceased Lassa fever patient. This calls for more education on transmission routes and precautionary measures on Lassa fever. This significant improvement could have alluded to the high level of knowledge and prevention practices within our study population.

Poor attitude to Lassa fever was recorded among 45% of respondents which is in contrast to about 30% recorded among healthcare workers in a similar study (Adeomi et al., 2017). This finding buttresses the need for continuous training, re-training, and encouragement to change the orientation towards building a positive attitude in all categories of workers within our healthcare facilities.

6. Conclusion

Healthcare workers showed overall good knowledge of Lassa fever and were aware of preventive measures towards limiting community and nosocomial spread. However, there is a need for institutions to consolidate on the measures to improve a positive attitude to the care and management of Lassa fever patients.

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