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Knowledge, Attitude and Practice towards Prevention and Control of Lassa Fever among Health Workers and Residents in Asaba, Delta State of Nigeria

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Abstract:

BACKGROUND: Nigeria has experienced repeated outbreaks of Lassa fever over the years, with cases reported in Asaba, Delta State as well. A number of measures to prevent and control the spread of Lassa fever in Delta State have been carried out. This study was conducted to determine the knowledge, attitude and practices of health workers and residents in Asaba towards the prevention and control of Lassa fever, particularly after prevention and control measures had been instituted.

METHODS: A cross-sectional descriptive survey was conducted among health workers and residents in Asaba. Self-administered questionnaires were used as the instrument of the study. All collected data were cleaned, sorted and entered into the spreadsheet of Statistical Package for the Social Sciences (SPSS) version 22 for analysis.

RESULTS: A total of 400 completed questionnaires were retrieved, with 63.5% of respondents being females and 36.5% males. About 85.5% of respondents were aware that rats were the vectors of Lassa fever, but only 10.3% knew that ribavirin was the drug of choice for treatment of the condition. Bagging of waste at home was carried out by 64.3% of the study population, while 55.7% did that at work. As much as 21.5% of the subjects claimed they had been bitten by a rat, while 76% said they soak and drink garri. As much as 41.9% of health workers indicated they would not know what to do if they came in contact with a suspected or confirmed case of Lassa fever, and only 19.3% said they used personal protective equipment at work.

CONCLUSIONS: The findings suggest that practices of health workers and residents in Asaba put many of them at high risk of contracting Lassa fever.

RECOMMENDATION: Stricter enforcement of control measures on a long-term basis is required to achieve positive behaviour change with regard to prevention and control of Lassa fever.

Keywords:

Haemorrhagic fever, Lassa fever, *Mastomys natalensis*

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Introduction

Lassa fever is an acute viral haemorrhagic fever due to infection with Lassa fever virus. The predominant reservoir is *Mastomys natalensis,* the multi-mammate rat. Other less common reservoirs include *Mastomys erythroleucus*.[1]

Having uncovered stored food also poses a risk. Endemic areas in West Africa are Nigeria, Liberia, Sierra Leone and Guinea.

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The infection can be transmitted by rodent-to-human spread via inhalation of aerosolised virus; ingestion of food or materials contaminated by infected rodent excreta and urine or catching and preparing Mastomys as a food source without recommended food hygiene precautions. Transmission can also be done by human to human through direct contact with blood, tissues, secretions or excretion of infected humans; needle stick or cut injuries.[2]

Increasing public awareness through awareness campaigns, coupled with improved environmental sanitation and provision of safe food handling and storage practices, and hygienic funeral practices in various communities could contribute greatly to reducing the incidence of the disease.[3]

Training programmes for health workers to implement barrier nursing of infected patients and to observe other infection control measures will help to prevent nosocomial spread of Lassa fever.[4]

The incubation period of infection with Lassa fever virus is 6–21 days. The clinical manifestations include fever, dizziness, headache, sore throat, cough, abdominal pain, vomiting, diarrhoea, dizziness and swollen face. Severe cases manifest with bleeding. Drug treatment of Lassa fever is with ribavirin.[2]

In an article describing the epidemiological and clinical features of Lassa fever outbreak in Nigeria from 1 January to 6 May 2018, Ilori *et al*. revealed that 1893 suspected Lassa fever cases were reported with 80.6% from Edo, Ondo and Ebonyi States. They included 10 probable cases and 423 laboratory-confirmed cases.[5] The proportion of the number of laboratory-confirmed cases among all persons with suspected cases tested was 22.5% nationally, with Lagos State being the lowest at 3.4% and Delta State being the highest at 70.0%. Edo, Ondo and Ebonyi States had 16.5%, 31.6% and 69.6% positivity rates, respectively. The positivity rate among symptomatic contacts was 34.6%. A total of 37 healthcare workers were infected with 8 deaths, giving a case fatality rate of 21.6%. The case fatality rate for patients who received ribavirin was 20.7% while that of patients who did not receive ribarivin was 71.4%. It is suspected that epidemiological and environmental reasons such as low prevalence of the virus in rodents or good hygiene practices may contribute to reducing the prevalence of the disease in some areas.[5]

Recommended measures for mitigating the impact of outbreaks of Lassa fever include improvement in risk communication, surveillance, laboratory diagnosis, clinical management, infection prevention and control practices, logistics and coordination.[5]

A number of measures to prevent and control the spread of Lassa fever in Delta State have been carried out over the years. Various ministries, departments and agencies mounted enlightenment campaigns; personal protective equipment was procured and distributed to health workers and deratization of selected markets was carried out. Following all these events, it is worthwhile to determine the knowledge attitude and practices of health workers and residents in Asaba, the capital of Delta State, towards the prevention and control of Lassa fever. This would identify gaps and provide a basis for implementing measures to fill those gaps to prevent spread of the disease in future.

Methods

A cross-sectional descriptive survey was conducted among health workers and residents in Asaba. Health workers from the government-owned tertiary, secondary and one primary as well as one private health facility in Oshimili South Local Government Area whose headquarters is Asaba were included in the study. Residents were drawn from civil servants, teachers, students, members of faith-based organisations and market men and women. Self-administered questionnaires were used as the instrument of the study. Questionnaires were pre-tested among healthcare workers and residents outside Asaba to ascertain if the content of the questionnaire addresses the objectives of the study, as well as ascertain the reliability, sensitivity and validity of the questionnaire.

A leaflet on prevention and control of Lassa fever, as well as one on bagging waste, was given to respondents on completion of the questionnaire. Treatment guidelines and protocol on management of Lassa fever and standard precautions in health care were also given to the health workers who participated in the study. These materials distributed were used to reinforce earlier efforts for control of Lassa fever in Delta State such as sensitisation on environmental sanitation and orientation of health workers on management of Lassa fever.

Decision rule for knowledge level about Lassa fever

Eleven items were used to assess knowledge of Lassa fever. Each correct response attracted a score of 1 and wrong response was rated zero (0). The maximum score attainable per respondent was 11, the median of actual scores was 5. An aggregate score <5 was regarded as poor knowledge, while a score ≥5 was graded as good knowledge.

Sampling technique

A purposive sampling technique was used.

Sample size determination

The Cochran formula[6] for calculating minimum sample size for prevalence studies was used, where z = 1.96, i.e., standard normal deviation at 95% confidence limit, *P* = 17.2% being the percentage of those who had previously heard about Lassa Fever among residents in a rural community in South-West Nigeria,[7] producing a minimum sample size of 219. To compensate for non-100% anticipated response rate, the formula below will be used: sample size (N) = calculated sample size (219) ÷ anticipated 90% response rate (0.9).

Therefore, the sample size to be used equals 243; more than 243 health workers and residents were recruited for the study.

Data collection and analysis

Data collection was done from March to October 2017. All collected data were cleaned, sorted and entered into the spreadsheet of Statistical Package for the Social Sciences (SPSS) version 22 (IBM Corp, Armonk, NY) for analysis.

Ethical considerations

Ethical approval to conduct the study was obtained from the Research Ethics Committee of Federal Medical Centre, Asaba. Participation in the study was entirely voluntary and participants could refuse to take part or withdraw from the study at any time without any consequences. Written informed consent was obtained from those who volunteered to participate in the study.

Results

A total of 400 completed questionnaires were retrieved, with 63.5% of respondents being females and 36.5% males. Tables 1 and 2 display some socio-demographic characteristics and occupations of the respondents, respectively. Table 3 displays practices of respondents that increase the risk of Lassa fever transmission, while Table 4 depicts practices of respondents that prevent Lassa fever transmission. Tables 5 and 6 describe the knowledge level about Lassa fever among respondents of different occupations and gender, respectively. A total of 85.5% of respondents were aware that rats were the vectors of Lassa fever, but only 10.3% knew that ribavirin was the drug of choice for treatment of the condition, with 6.4% being health workers. As much as 41.9% of health workers indicated they would not know what to do if they came in contact with a suspected or confirmed case of Lassa fever, and only 19.3% of them said that they used PPEs at work.

The most common source of information on Lassa fever was audio–visual (54.8%). Bagging of waste at home was carried out by 64.3% of the study population, while 55.7% did that at work. Those who claimed they had been bitten by a rat constituted 21.5% of the respondents, while 76% said they soak and drink garri, a food item that can be easily contaminated by rats.

Table 1: Some socio-demographic characteristics of health workers and residents in Asaba

Characteristic	*n* (%)
Gender	
Male	146 (36.5)
Female	254 (63.5)
Marital status	
Single	150 (37.5)
Married	226 (56.5)
Living with partner	10 (2.5)
Separated	6 (1.5)
Widowed	8 (2.0)
Educational status	
No formal education	15 (3.7)
<4 years primary education	5 (1.2)
>4 years primary education	27 (6.8)
JSS completed	2 (0.5)
SSS completed	77 (19.3)
Tertiary education	274 (68.5)
Total	400 (100)

JSS: Junior secondary school, SSS: Senior secondary schools

Table 2: Occupation of health workers and residents in Asaba

Occupation	*n* (%)
Health workers (doctors, dentists, pharmacists, nurses, optometrists and laboratory technologists)	62 (15.5)
Unemployed	17 (4.2)
Trader	77 (19.3)
Civil servant	111 (27.8)
Student	44 (11.0)
Accountant	4 (1.0)
Teacher	65 (16.3)
Artisans (technicians, drivers, security/gatemen, hairdresser)	10 (2.5)
Corp members	7 (1.7)
Others (retiree, lawyer, clergy)	3 (0.8)
Total	400 (100)

There was no significant difference between respondents of different occupations as well as different gender with regard to knowledge level about Lassa fever.

Discussion

More than one-third of the study population indicated that they do not bag their waste at home and at work, which would have discouraged the breeding of rats some of which could be infected by Lassa fever virus and contribute to rodent control. Almudena *et al*., in their study on rodent control to fight Lassa fever, stipulate that rodent control interventions include rodent trapping, use of local rodenticides, environmental

Table 3: Practices that increase risk of Lassa fever transmission

Variables	Yes, *n* (%)	No, *n* (%)	I don't know, *n* (%)	Total, *n* (%)
Have you seen rats in your home?	323 (80.7)	74 (18.5)	3 (0.8)	400 (100)
Have you been bitten by a rat?	86 (21.5)	287 (71.8)	27 (6.7)	400 (100)
Do you soak and drink garri?	304 (76)	96 (24.0)	0	400 (100)
Do you dry food items on the ground?	49 (12.3)	351 (87.7)	0	400 (100)
Have you touched or dressed a corpse?	11 (2.7)	389 (97.3)	0	400 (100)

Table 4: Practices of respondents that prevent Lassa fever transmission

Variables	*n* (%)
Use of PPE at work	53 (13.3)
Bagging waste at home	257 (64.3)
Bagging waste at work	223 (55.7)

PPE: Personal protective equipment

Table 5: Knowledge level about Lassa fever among respondents of different occupations

Occupation	Poor knowledge (*n*=163), *n* (%)	Good knowledge (*n*=193), *n* (%)	Total, *n* (%)
Traders	32 (19.6)	27 (14.0)	59 (16.6)
Civil servants	44 (27.0)	61 (31.6)	105 (29.4)
Students	18 (11.0)	22 (11.4)	40 (11.2)
Teachers	25 (15.4)	35 (18.1)	60 (16.9)
Health workers	27 (16.6)	33 (17.1)	60 (16.9)
Others*	17 (10.4)	15 (7.8)	32 (9.0)

χ^2=3.464, *P*=0.629 (not significant). *Others: Artisans, retirees, clergymen, lawyers, corps members and unemployed

Table 6: Knowledge level about Lassa fever among respondents of different gender

Gender	Poor knowledge (*n*=163), *n* (%)	Good knowledge (*n*=193), *n* (%)	Total, *n* (%)
Male	55 (33.7)	77 (39.8)	132 (37.1)
Female	108 (66.3)	16 (60.2)	224 (62.9)

χ^2=1.434, *P*=0.231 (not significant)

hygiene, home repairs and rodent-proof storage and should emphasize on community participation.[8] The authors describe an association between the estimated timing of high exposure of humans to animals (shortly after the start of dry season) and the breeding season of rodents in Nigeria. It was also observed that the number of reported cases of Lassa fever usually rises in the first 2 to 3 months of the year and this exceeds the baseline over the rest of the year several times. Furthermore, the study revealed that the relative risk of acquiring Lassa fever infection during the high-risk period was five times greater than during the rest of the year. The study noted that rodents migrate closer to human settlement to breed and hibernate during the dry season which, in turn, leads to an increase in the contact rate with rodents.

In the light of the above, preventive measures should aim to reduce the frequency of contact between rodents and humans as well as raise awareness among local residents.[9]

As majority of the respondents feel that proper waste disposal and control of rats is not achievable in the State, aggressive public enlightenment has to be embarked upon to change that attitude which will ultimately affect practice.

The low level of knowledge of treatment for Lassa fever is likely to delay reporting of cases as well as cause panic among health workers and residents in the event of an outbreak.

It is worrisome that as much as 41.9% of health workers admitted they would not know what to do if they came in contact with a suspected or confirmed case of Lassa fever. This finding makes it imperative for continuous orientation of all health workers on protocols for prevention and management of highly infectious diseases such as Lassa fever.

Measures instituted by NCDC to control Lassa fever were surveillance training for public health officers, sensitisation workshop to increase suspicion of the disease conducted for healthcare Workers, sensitisation of the general public done through media such as radio, television, poster and social network services, strengthening of laboratory capacity and sample transportation systems for facilitation of disease detection and reporting, convening of workshops for clinical management of Lassa fever, reviewing and updating National guidelines to treat Lassa fever patients to include infection prevention and control measures, guidance on clinical treatment and care of post-infection complications.[10]

Until a Lassa fever vaccine is developed and approved by national regulatory bodies, rodent control and human behaviour change will continue to be the main strategy to prevent Lassa fever in highly endemic areas.[8]

In order to facilitate pathogenesis in studies, vaccine development and therapeutic testing for Lassa fever, there needs to be the development of small animal models that mimic human diseases.

Ideally, these models should match the disease manifestations, disease progression, pathological changes and the various pathogenicities of different strains in humans.[11] While efforts at conducting research on animal models with the hope of developing a Lassa

fever vaccine and other therapeutic agents are being promoted, the emphasis currently should be on rodent control and behaviour change in order to reduce the incidence and case fatality rate from the disease.

The low level of use of personal protective equipment among health workers needs to be investigated further to determine underlying causes that must be addressed promptly in order to prevent nosocomial infection with Lassa fever among health workers.

Although the use of purposive sampling in this study has some limitations, the results obtained showed a fair representation across multiple occupations. Further studies in this area should adopt more s sampling techniques to enhance generalisability of the findings.

The findings in this study suggest that practices of health workers and residents in Asaba put many of them at high risk of contracting Lassa fever. It is recommended that stricter enforcement of control measures on a long-term basis is required to achieve positive behaviour change with regard to prevention and control of Lassa fever. Organisation of regular infection control rounds by public health specialists within health facilities should be embarked upon. The staff of the Department of Public Health should join those in the Department of Medical Services and Training in the State Ministries of Health to inspect private hospitals to ensure they comply with infection control measures.

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Conflicts of interest
There are no conflicts of interest.

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