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LASSA FEVER AND PERCEIVED HEALTH IMPLICATIONS AMONG RESIDENTS OF OKE-ERO LGA: INCORPORATING INFOGRAPHIC REPRESENTATIONS

*[1]OLADOSU, R. O. & [1]ONIYANGI, S. O.

[1]Department of Health Promotion and Environmental Health Education, University of Ilorin, Kwara state, Nigeria.
Corresponding Author's E-mail: rachaeloladosu1@gmail.com *Phone No.: +2348066700685*

ABSTRACT

This research on Lassa fever was conducted in rural communities located within Oke-Ero Local Government Area of Kwara State. We use multi-stage sampling technique consisting of simple random, proportionate and convenience sampling techniques to select a sample size of (402) respondents for this study. The results of the study among the respondents showed that abortion and haemorrhage are significantly perceived as implications of LF as cal. $\chi2$ (256.69) was greater than the critical value (16.92) and cal. $\chi2$ (238.597) was greater than the critical value (16.92) at degree of freedom 9 and $\alpha=0.05$ for the latter and former respectively. Other results revealed that the residents of Oke-Ero LGA significantly have knowledge of causes, prevention and symptoms of LF as cal. $\chi2$ (1011.28) was greater than the critical value (7.82), cal. $\chi2$ (668.299) was greater than the critical value (7.82); and cal. $\chi2$ (437.79) was greater than the critical value (7.82) for the three cases at DF 3 and $\alpha=0.05$ respectively. From the findings the null hypotheses were rejected in all cases. These results showcase positive correlation with the level of education of the respondents. In conclusion, the residents of Oke-Ero LGA have knowledge of causes, prevention and symptoms of LF and they perceived abortion and haemorrhage as implication of LF. Therefore, the researchers recommend that government at all levels, further strengthen campaigns on the causes, symptoms, and prevention of LF and encourage community participation in health education and environmental sanitation.

Keywords: *Infographics, Knowledge, Lassa fever, Perception, Symptoms*

INTRODUCTION

Lassa fever (LF) was first detected and described in the 1950s. Later, the virus noted to be causing the disease was; identified in 1969 in Lassa town, Borno State, Nigeria (Alenoghena *et al*., 2019). This discovery was when two missionary nurses died from the disease in the Yed Ser Ram river valley at the south end of Lake Chad (Alenoghena *et al.,* 2019). In Nigeria, as part of the national action plan for health security and relentless efforts in achieving Sustainable Development Goals (SDGs 3) focusing on good health and well-being for all citizens. The awareness of rural people to LF outbreak and the verification of their level of understanding of the preventive and safety measures needed to take against contacting the fever is a welcome development. Therefore, this research attempted to examine how well-informed people are and the goals, incorporated five variables to confirm their state of awareness (Mazzaola and Kelly-Cirino, 2019).

LF was defined; by World Health Organisation (WHO) as an acute viral haemorrhagic and febrile illness caused by the Lassa virus, a member of the arenavirus family of viruses prevalent in West African and is responsible for thousands of deaths annually (WHO, 2016). According to WHO (2020), between 1st January to 9th February 2021, 472 confirmed cases, 70 deaths, case fatality ratio of (14.8%) was reported in 26 out of 36 states and the Federal Capital Territory Nigeria.

The primary mode of transmission of LF is basically from rodent to man. The secondary transmission is possible Alenoghena *et al*. (2019) in both community and healthcare settings, where the virus is usually spread, by contaminated medical equipment, such as re-used needles or by secretions from the body of a person infected with the virus. Lassa virus; spread between humans through direct contact with the blood, urine, faeces, or body fluid of infected persons. According to WHO (2016; 2017; 2020) abortion is one of the symptoms of LF. Again Bello *et al*. (2016); Richmond and Baglole (2004) reported LF and hemorrhage as symptoms of LF.

The purpose of this research is to provide relevant information to the government and decision-makers by analysing the response of the target audience using the gateway LGA for checking the level of awareness of the residents to LF virus. Kwara State reported the first case in 2017 when a boy was confirmed positive in Ifelodun LGA, which is within the same senatorial district as Oke-Ero LGA. The Kwara State government went into action on receiving the news. A quick response was made possible by sending blood samples of eight suspected persons for testing, of which one of the tested samples, incidentally identified as the father of the patient, produced positive results (The Eagle Online, 2017). Vital information will guide in case of infection and contact tracing.

According to Ozdamli and Ozdal, (2017); Alqudah *et al.* (2019), the infographic concept is a way of disseminating information in visual form. It uses image patterns, charts, diagrams, etc., in helping readers visualize and compare how pieces of information relate together. It originated from the word "information" and "graphic" blended and became consistently used in English language books around the 1960s and as a teaching aid. Figure 1 shows an infographic representation of the trend of LF confirmed cases in September 2021 in Nigeria. Population distribution by political wards and the demographic information of the respondents are presented in Figures 2 and 3 respectively. Figure 2, shows the population of the respondents who participated in answering questions raised. Figure 3 shows the frequency and percentage to five categories of personal data collected from 402 respondents: Gender: Female, (210, 52.2%), Male, (192, 47.8%); Age: 18-23, (116, 28.9%); 24-29, (89, 22.1%); 30-35, (66, 16.4%); 36-41, (58, 14.4%); 42-47, (28, 7.0%); 40 years &above (45, 11.2%); Location: Church, (140, 34.8%), Mosque, (104,

25.9%), Market, (45, 11.2%), School, (113, 28.1); Marital Status: Single, (157, 39.1%); Married, (229, 57.0%), Widow/widower, (9,2.2%), Divorce, (6, 1.5%), Separated, (1, 0.2%); Education: Non-formal, (37, 9.2%), Primary, (43, 10.7%), Secondary, (111, 27.6), Tertiary, (211, 52.5).
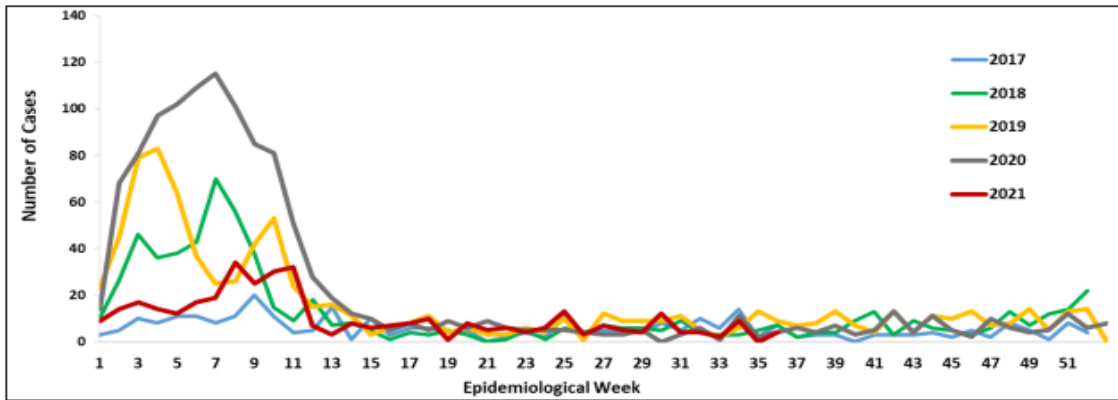

Figure 1: Infographic representation of trend of confirmed cases by epidemiological week of LF in Nigeria. Source (Nigeria Centre for Disease Control, 2021)
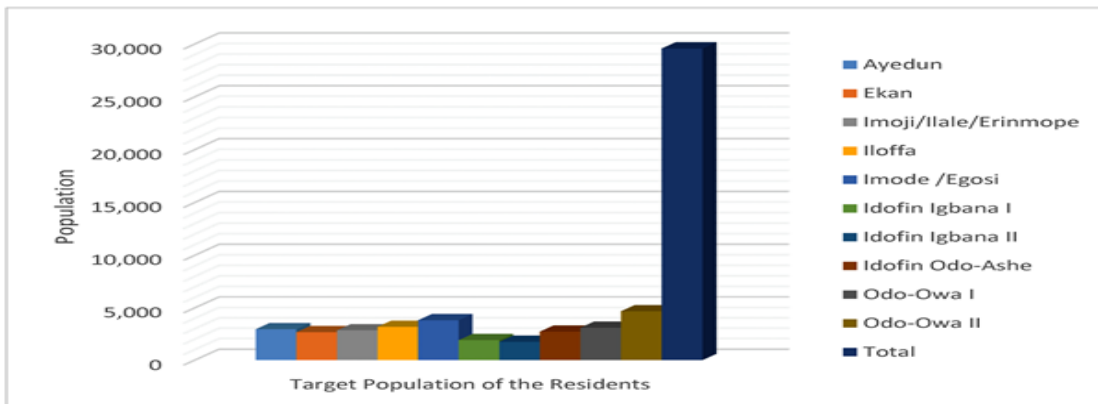

Figure 2: Infographic representation of the target population of the respondent by political ward
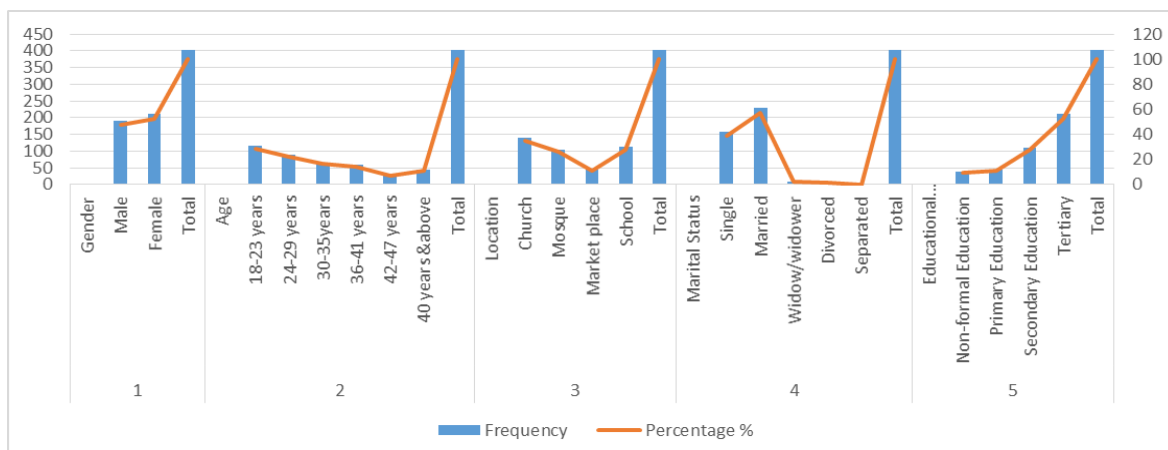

Figure 3: Infographic representation of respondents' demographic data

MATERIALS AND METHOD

STUDY AREA

Oke-Ero LG is the study area, geographically located in Universal Transverse Mercator (UTM) zone 31 with coordinates (723110.82mE, 920149.20mN) and (758184.78mE, 886124.21mN). It has a boundary with three states Osun, Ekiti, and an outlet to Kogi. Iloffa is the headquarters and has three districts: (Ekan meje, Idofin, and Iloffa/Odo-Owa). The LGA has ten political wards. These political wards are: Aiyedun, Odo-Owa I, Odo-Owa II, Iloffa, Idofin-Igbana I, Idofin-Igbana II, Imode/Egosi, Ekan, Idofin Odo-Ashe, and Imoji/Ilale/Erinmope. The inhabitants are predominantly Yoruba speaking; their main occupation is farming and trading for men and women, respectively. Figure 4 shows the map of Kwara State showing the LGA of study.
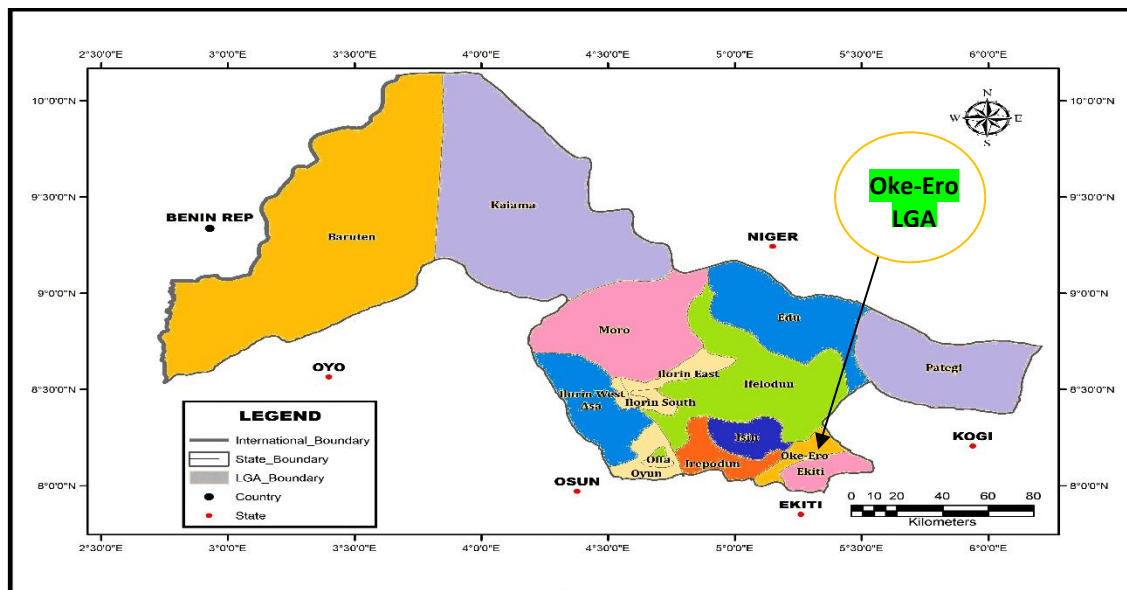
Figure 4: Map of Kwara state showing the location of the study area

MOTIVATION FOR THE STUDY

The need to consider Oke-Ero LGA as a case study area for this research carried out in late 2016 was due to its strategic geographic location and peculiarities stated as follows: (i) it shares boundaries with Osun State and Ekiti State where Lassa fever had been previously reported; (ii) it is the second LGA next to Kogi State where Lassa fever cases had been confirmed; (iii) It shares the same senatorial district with Ifelodun LGA where a case has been confirmed in the Babanla community Kwara State.

During the dry season, the majority of the farmers use the bush burning method as a means of clearing their lands, during which many of the rats from the bushes find their ways to neighbourhood houses to hide for safety (Oniyangi *et al*., 2016). Communities under this LGA are rural dwellers where WHO (2017) opined that such persons are at greater risk of the virus.

RESEARCH DESIGN

We used a descriptive research design in this study in line with Oniyangi *et al*. (2016). According to National Population Commission (2006), 57,619 live in Oke-Ero LGA are about 57,619, but the target population is those above 18 years old with 29,566. A total of 402 respondents were randomly selected from five different political wards within the study area using a multi-stage sampling approach consisting of simple random, proportionate, and convenience sampling.

RESEARCH INSRUMENT

A well-developed researcher structured questionnaire in consonant with a two-point Likert rating scale with options of Yes, No, and four-point Likert rating scale, format with options of Strongly Agree, Agree, Disagree, and Strongly Disagree were used for the study. The instrument contained sixteen (16) items based on four variables viz: abortion, haemorrhage, causes, and symptoms of LF. We used the split-half method to determine the reliability of the instrument using Cronbach's Alpha; a correlation coefficient (r) of 0.70 was obtained. An Infographic system was used for population and demographic data representation and in answering the research questions raised for the study. Strongly Agree (SA) and Agree (A) were merged into a positive response, while Disagree (D) and Strongly Disagree (SD) was merged into the negative responses.

RESEARCH QUESTIONS

i. Will abortion be perceived as an implication of LF among the residents of Oke-Ero LGA?

ii. Will haemorrhage be perceived as an implication of LF among the residents of Oke-Ero LGA?

iii. Will residents of Oke-Ero LGA, have knowledge of causes of LF?

iv. Will residents of Oke-Ero LGA, have knowledge of prevention of LF?

v. Will residents of Oke-Ero LGA, have knowledge of symptoms of LF?

RESEARCH HYPOTHESES

1. Abortion will not significantly be perceived as an implication of LF among the residents of Oke-Ero LGA.

2. Haemorrhage will not significantly be perceived as an implication of LF among the residents of Oke-Ero LGA.

3. Residents of Oke-Ero LGA, will not significantly have knowledge of causes of LF.

4. Will residents of Oke-Ero LGA, will not significantly have knowledge of the prevention of LF?

5. Residents of Oke-Ero LGA, will not significantly have knowledge of symptoms of LF.

DATA ANALYSIS

Inferential statistics of Chi-square was used to analyze the stated null hypotheses at 0.05 level of significance, using (SPSS) version 20.0.

RESULTS AND DISCUSSION

Figures 5 to 9 are the infographic representations of the respondents' reactions to the research questions raised for the study. Figure 5 shows that majority of the respondents 320 (80%) have positive responses to the items and perceived

abortion as implication of LF while 80 (20%) of the respondents responded negatively and do not perceive abortion as implication of LF. Figure 6 shows that majority of the respondents 337 (84%) have positive responses to the items and perceived haemorrhage as implication of LF while 63 (16%) respondents responded negatively and do not perceive haemorrhage as implication of LF. Figure 7 shows those respondents that responded to "yes" and have the knowledge of causes of LF were 362 (90.0%) while the respondents that responded to "no" and do not have the knowledge of causes of LF were 38 (9.5%). Figure 8 shows those respondents that responded to "yes" and have the knowledge of prevention of LF were 345 (86%) while the respondents that responded to "no" and do not have the knowledge of prevention of LF were 55 (14%). Figure 9 shows those respondents that responded to "yes" and have the knowledge of symptoms of LF were 305 (76%) while the respondents that responded to "no" and do not have the knowledge of symptoms of LF were 95 (24%).

	Lassa virus will cause high foetal mortality	Increased level of virus in pregnant women as a result of Lassa fever will lead to abortion	Placental infection as a result of Lassa fever will lead to abortion	If Lassa fever is left untreated, it will lead to foetal mortality
■ SA	35.50%	29.40%	31.60%	41%
■ A	50%	44.50%	43.80%	44%
■ D	10%	19.90%	17.40%	12%
■ SD	4.50%	6.20%	7.20%	3%

Figure 5: Infographic representation of respondents on perceived abortion as implication of LF

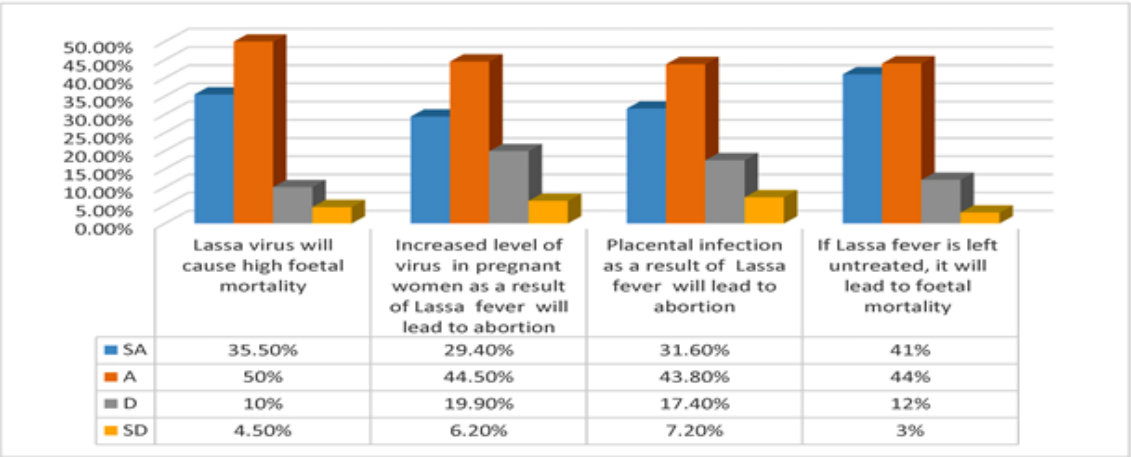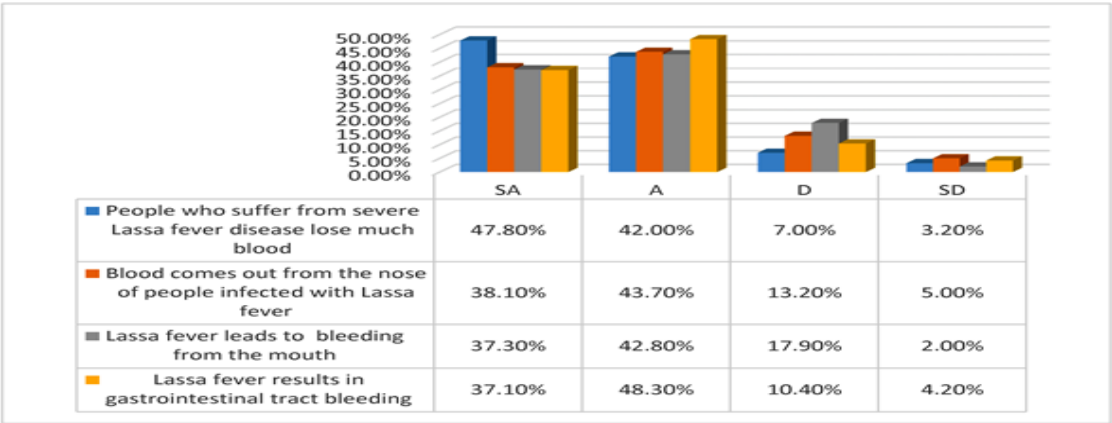|	SA	A	D	SD
■ People who suffer from severe Lassa fever disease lose much blood	47.80%	42.00%	7.00%	3.20%
■ Blood comes out from the nose of people infected with Lassa fever	38.10%	43.70%	13.20%	5.00%
■ Lassa fever leads to bleeding from the mouth	37.30%	42.80%	17.90%	2.00%
■ Lassa fever results in gastrointestinal tract bleeding	37.10%	48.30%	10.40%	4.20%

Figure 6: Infographic representation of respondents on perceived haemorrhage as implication of LF
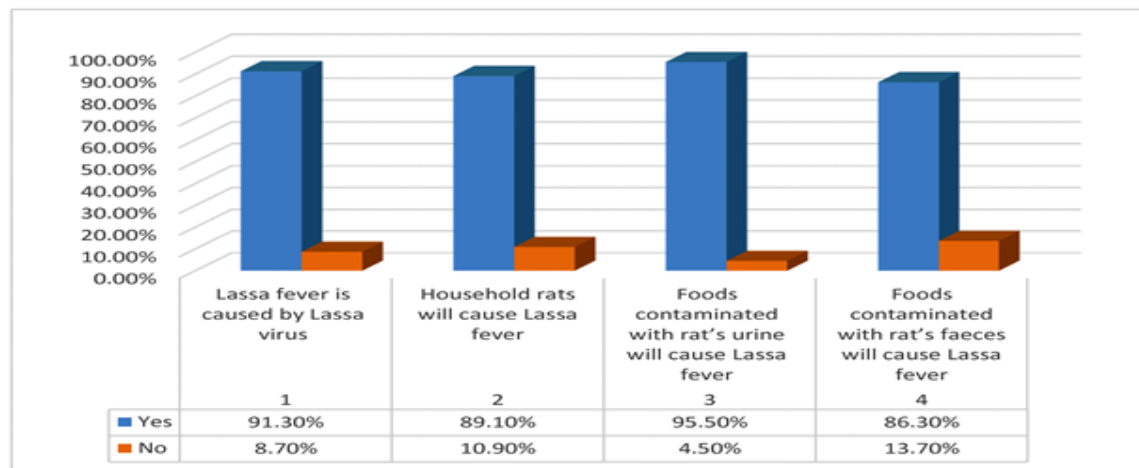
Figure 7: Infographic representation of respondents' knowledge of causes of LF

	1 Lassa fever is caused by Lassa virus	2 Household rats will cause Lassa fever	3 Foods contaminated with rat's urine will cause Lassa fever	4 Foods contaminated with rat's faeces will cause Lassa fever
Yes	91.30%	89.10%	95.50%	86.30%
No	8.70%	10.90%	4.50%	13.70%
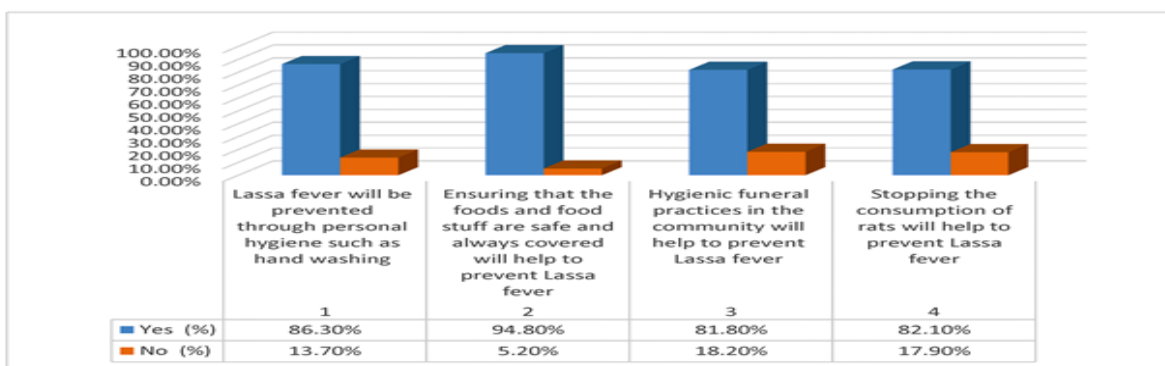
Figure 8: Infographic representation of respondents' knowledge of prevention of LF

	1 Lassa fever will be prevented through personal hygiene such as hand washing	2 Ensuring that the foods and food stuff are safe and always covered will help to prevent Lassa fever	3 Hygienic funeral practices in the community will help to prevent Lassa fever	4 Stopping the consumption of rats will help to prevent Lassa fever
Yes (%)	86.30%	94.80%	81.80%	82.10%
No (%)	13.70%	5.20%	18.20%	17.90%
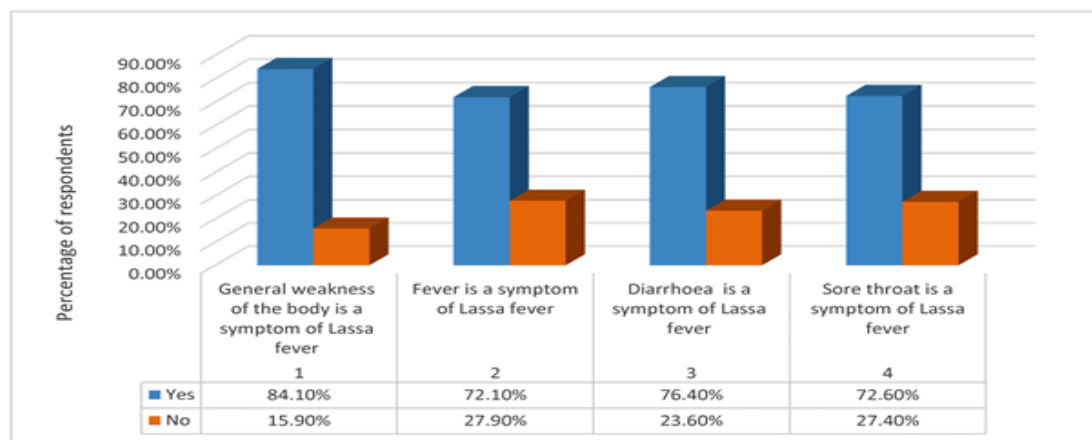
Figure 9: Infographic representation of respondents' knowledge of symptoms of LF

	1 General weakness of the body is a symptom of Lassa fever	2 Fever is a symptom of Lassa fever	3 Diarrhoea is a symptom of Lassa fever	4 Sore throat is a symptom of Lassa fever
Yes	84.10%	72.10%	76.40%	72.60%
No	15.90%	27.90%	23.60%	27.40%

In Tables 1 to 5, the results obtained for the five hypotheses tested are presented. Table 1 revealed that the calculated chi-square value of 256.69 which is greater than chi-square table value of 16.92 (cal. χ^2 val χ^2 tab. val) at the degree of freedom 9 and at 0.05 level of significance, since the calculated χ^2 value is greater than the table χ^2 value, the null hypothesis is therefore rejected. Table 2 shows that the calculated chi-square value of 238.597 which is greater than chi-square table value of 16.92 (cal. χ^2 val χ^2 tab. val) at the degree of freedom 9 and at 0.05 level of significance, since the calculated χ^2 value is greater than the table χ^2 value, the null hypothesis is therefore rejected.

Table 3 revealed that the calculated chi-square value of 1011.28 which is greater than chi-square table value of 7.82 (cal. χ^2 val χ^2 val) at the degree of freedom 3 and at 0.05 level of significance since the calculated χ^2 value is greater than the table χ^2 value, The null hypothesis is therefore rejected. Table 4 shows the calculated chi-square value of 668.299 which is greater than chi-square table value of 7.82 (cal. χ^2 val χ^2 val) at the degree of freedom 3 and at 0.05 level of significance since the calculated χ^2 value is greater than the table χ^2 value, the null hypothesis is therefore rejected. Table 5 revealed that the calculated chi-square value of 437.79 which is greater than chi-square table value of 7.82 (cal. χ^2 val χ^2 val) at the degree of freedom 3 and at 0.05 level of significance. Since the calculated χ^2 value is greater than the table χ^2 value. The null hypothesis is therefore rejected.

Table 1: Chi-square analysis showing abortion as a perceived implication of LF among the residents

S/N	ITEMS	SA (%)	A (%)	D (%)	SD (%)	Total	Df	Cal. χ^2 Val..	Tab. χ^2Val	Decision
1.	Lassa virus will cause high foetal mortality	143 (35.5%)	201 (50%)	40 (10%)	18 (4.5%)	402 (100%)				
2.	Increased level of virus in pregnant women as a result of Lassa fever will lead to abortion	118 (29.4%)	179 (44.5%)	80 (19.9%)	25 (6.2%)	402 (100%)	9	256.69	16.92	H_0 is rejected
3.	Placental infection as a result of LF will lead to abortion	127 (31.6%)	176 (43.8%)	70 (17.4%)	29 (7.2%)	402 (100%)				
4.	If LF is left untreated, it will lead to foetal mortality	165 (41%)	177 (44%)	48 (12%)	12 (3%)	402 (100%) 1608				
	Total	**138**	**183**	**60**	**21**					

Table 2: Chi-square analysis showing haemorrhage as a perceived implication of LF among the residents

S/N	ITEMS	SA (%)	A (%)	D (%)	SD (%)	Total	Df	Cal. χ^2 Val.	Tab. χ^2Val.	Decision
1.	People who suffer from severe LF disease lose much blood	192 (47.8%)	169 (42.0%)	28 (7.0%)	13 (3.2%)	402 (100%)				
2.	Blood comes out from the nose of people infected with LF	153 (38.1%)	176 (43.7%)	53 (13.2%)	20 (5.0%)	402 (100%)				
3.	LF leads to bleeding from the mouth	150 (37.3%)	172 (42.8%)	72 (17.9%)	8 (2.0%)	402 (100%)	9	238.597	16.92	H_0 is rejected
4.	LF results in gastrointestinal tract bleeding	149 (37.1%)	194 (48.3%)	42 (10.4%)	17 (4.2%)	402 (100%)				
	TOTAL	**161**	**178**	**49**	**14**	**1608**				

Table 3: Chi-square analysis showing knowledge of causes of LF among the residents

S/N	ITEMS	Yes (%)	No (%)	Total	Df	Cal. χ^2 Val.	Tab. χ^2Val.	Decision
1	LF is caused by Lassa virus	367 (91.3%)	35 (8.7%)	402 (100%)				
2	Household rats will cause LF	358 (89.1%)	44 (10.9%)	402 (100%)				
3	Foods contaminated with rat's urine will cause LF	384 (95.5%)	18 (4.5%)	402 (100%)	3	1011.28	7.82	H_0 is rejected
4	Foods contaminated with rat's faeces will cause LF	347 (86.3%)	55 (13.7%)	402 (100%)				
	TOTAL	**364**	**38**	**1608**				

α = 0.05

Table 4: Chi-square analysis showing knowledge of prevention of LF among the residents.

S/N	ITEMS	Yes (%)	No (%)	Total	Df	Cal. χ^2 Val.	Tab. χ^2Val.	Decision
1.	LF will be prevented through personal hygiene such as hand washing	347 (86.3%)	55 (13.7%)	402 (100%)				
2.	Ensuring that the foods and food stuff are safe and always covered will help to prevent LF	381 (94.8%)	21 (5.2%)	402 (100%)				
3.	Hygienic funeral practices in the community will help to prevent LF	329 (81.8%)	73 (18.2%)	402 (100%)	3	668.299	7.82	H_0 is rejected
4.	Stopping the consumption of rats will help to prevent LF	330 (82.1%)	72 (17.9%)	402 (100%)				
	TOTAL	**347**	**55**	**1608**				

α = 0.05

Table 5: Chi-square analysis showing knowledge of symptoms of LF among the residents

S/N	ITEMS	Yes (%)	No (%)	Total	Df	Cal. χ^2 Val.	Tab. χ^2Val.	Decision
1.	General weakness of the body is a symptom of LF	338 (84.1%)	64 (15.9%)	402 (100%)				
					3	437.79	7.82	H_0 is rejected
2.	Fever is a symptom of LF	290 (72.1%)	112 (27.9%)	402 (100%)				
3.	Diarrhoea is a symptom of LF	307 (76.4%)	95 (23.6%)	402 (100%)				
4.	Sore throat is a symptom of LF	292 (72.6%)	110 (27.4%)	402 (100%)				
	Total	**307**	**95**	**1608**				

α = 0.05

DISCUSSION

Hypothesis one was rejected, implying that abortion is significantly perceived, as an implication of LF among the residents. The finding is similar to Bello *et al*. (2016), who reported that an increased level of viremia in pregnant

women from LF leads to placental infection, which can cause abortion, and demise of fetal even in third-trimester pregnant as found by Branco *et al*. (2011); Agboeze *et al*. (2011).

Hypothesis two was rejected, implying that haemorrhage is significantly perceived; as an implication of LF among the residents. The finding is similar to WHO (2016); Oniyangi *et al*. (2019), who discovered that LF disease might progress to more serious hemorrhaging of the person's eyes, gums, and nose.

Hypothesis three was rejected because the residents significantly have knowledge of causes of LF. This finding is similar to Tobin *et al*. (2013); Alenoghena *et al*. (2021) who reported that respondents knew the cause of LF to be Lassa viruses, and more than half of the respondents knew the vector of LF to be the *Mastomys natalensis* rat and other rodent species.

Hypothesis four was rejected, meaning that the residents significantly have knowledge of the prevention of LF. This finding is in agreement with Ossai *et al*. (2020), where the majority of the respondents demonstrated good preventive practices against LF and CDC (2004) that listed some measures to keep in place in preventing LF in residential areas.

Finally, hypothesis five was rejected, implying that the residents significantly have knowledge of symptoms of LF. This finding is similar to WHO (2017); WHO (2020) who affirmed that the onset of the LF is symptomatic which starts with fever, general weakness, and malaise. After a few days, headache, sore throat, muscle pain, chest pain, nausea, vomiting, diarrhoea, cough, and abdominal pain may follow.

The future direction is to take this study further to include health workers who are; at the receiving end in diagnosing, treating, and monitoring patients with suspected cases of LF infection.

CONCLUSION

The following are the conclusions from the work

1.   The residents of Oke-Ero LGA have knowledge of symptoms of LF
2.   The residents of Oke-Ero LGA have knowledge of transmission of LF
3.   The residents of Oke-Ero LGA have knowledge of the prevention of LF
4.   They perceived abortion as an implication of LF
5.   They perceived haemorrhage as an implication of LF

RECOMMENDATIONS

The following are recommended based on the findings of the work:

1.   More effort should be directed; toward disseminating appropriate information to the rural dwellers on symptoms of LF.

2.   Occasional town hall meetings and media participation should be encouraged; by the Kwara state government for Lassa fever-free environment for the citizens.

3.   The antiviral drug should be given early to pregnant women with Lassa fever to prevent abortion.

4.   Further study to capture health workers within the LGA is suggested.

COMPETING INTERESTS

The authors have no conflict of interest to declare in this work

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