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## Ebola Virus Disease Awareness among School Teachers in a North-Central State, Nigeria



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### ABSTRACT

**Background:** The magnitude of recent outbreak of Ebola Virus Disease (EVD) in Nigeria caught all the stakeholders and healthcare community unprepared. The prevailing outbreak of communicable diseases and lack of EVD awareness strategies targeting school teachers and pupils calls for a wider awareness and a national advocacy on the EVD pathogenesis. **Objective:** To determine the awareness level among school teachers' on EVD, causes, symptoms, curability and preventive measures. **Methods:** A cross-sectional descriptive study design was employed in this study. Clustered sampling method was used for the selection of the schools and one hundred and sixty (160) participants were recruited from 19 public and private schools using availability and convenient sampling technique. **Results:** The majority (68.0%) of the school teachers were male and equal number (68.0%) of them were between the ages of 18 – 37 years. General awareness about EVD was high (97.0%) among participants and four in every ten (41.0%) of them heard about EVD through mass media. More than half (55%) of participants admitted that they were not trained on how to prevent EVD and nearly half (49%) of them reported that their schools do not have school health services. Majority 91% of participants indicated that EVD is preventable through regular hand washing with disinfectant and running water (85%) and avoiding funeral or burials (81%). Educational attainment ( $p=0.000$ ) years of experience ( $p=0.000$ ) and type of employment ( $p=0.018$ ) were associated with participants awareness. **Conclusion:** Participants had relatively high knowledge on EVD processes and they are prepared to handle future outbreak of communicable diseases in their domain. Educational attainment, years of experience and type of employment setting played roles in the general awareness among the teachers. Efforts should be intensified to provide more first aid kits, personal hygiene utilities in schools and comprehensive awareness on EVD through mass media.

## 1. BACKGROUND

The Ebola virus disease (EVD) is a concerned public health issue in the Sub-Saharan Africa region and globally [1]. EVD, previously known as Ebola hemorrhagic fever, is a rare and deadly disease caused by infection with one of the *Filovirus* family (Ebola virus) [2, 3, 4, 5]. Of the four identified strains of Ebola virus, three; the Zaire, Ivory Coast, and Sudan strains have been shown to cause disease in both humans and nonhuman primates, with the Zaire strain exhibiting the highest lethality rate [6,7]. Since its discovery in 1976 near the Ebola River in what is now the Democratic Republic of the Congo, the outbreaks have appeared sporadically in some West Africa countries [2].

The recent outbreak in West Africa is the largest outbreak of Ebola virus disease with the Zaire species of the virus [8, 9, 10, 11]. Although most previous Ebola outbreaks occurred in Central Africa, this outbreak started in the West African nation of Guinea in late 2013 and was confirmed by the World Health Organization in March 2014 [9, 12]. The outbreak subsequently spread to Liberia, Sierra Leone and Nigeria. As at August 15, 2014, the cumulative number of suspected and laboratory-confirmed cases attributed to Ebola virus was 2127, including 1,145 deaths (case-fatality rate 54%) [13], while in Nigeria, 8 of the 20 reported EVD cases died, giving an estimated case fatality rate of 40% (95% CI: 22–61). Of the 20 cases, 11 were healthcare workers; nine of whom acquired the virus from the index case before the disease was identified in the country [14].

Based on the available evidence and the nature of other similar viruses, researchers believed that Ebola virus disease is animal-borne (zoonotic) and that bats/monkey/chimpanzees are the most likely reservoirs [2] and the main mode of transmission is via person-to-person transmission by having direct contact with blood or body fluids.

Following the outbreak of the Ebola Virus Disease in Nigeria, the Federal Government postponed the resumption date of all primary and secondary schools across the country to 13th October 2014, instead of the earlier September date. This measure was taken to prevent the spread of the disease among school children [15]. Without further delay, the Federal Government embarked on preparedness, prevention and control strategy that involves public sensitization/awareness raising campaign about EVD, avoid physical contacts and the promotion of preventive practices such as regular disinfectant handwashing and the use of Information Communication Technology (ICT) materials which were supported by UNICEF

[16]. In addition, the Government further took steps to ensure that other states are prepared and held a preparedness/prevention workshop across the country. The level of preparedness include incident management system; capacity development for all those involved; data and information management; epidemiology/surveillance; laboratory; case management infection, prevention and control, social mobilization and creating more awareness to the public psychosocial supports, decontamination/evacuations and burials, logistics such as supplies and transportation [16]. Conversely, despite all these efforts put in place by the government for all primary and secondary schools in the country to resume on Monday 13th October 2014 [17] teachers in some states were not ready to resume as the Nigeria Union of Teachers had insisted that the action of the federal government was hasty. Adding that the government should ensure that hand gloves, sanitizers, infra-red thermometers, running water and soap, among others, are made available in all schools across the country [18].

The government of Nigeria needs to place a more focus on educating the public on concept, misconceptions, characters, causes, complications, care and how to prevent the transmission of EVD as well as encouraging the public to seek medical care promptly in the event they experience any signs and symptoms associated with the disease [16]. A study from Sierra Leone [19] reported that 97% of the participants had heard of Ebola and believed in its existence. In the same vein, Studies among the general population surveys in Lagos state [3] and Centre for Public Policy Alternatives [1] shows that majority of the healthcare workers and the general population have average to good level of knowledge of the Ebola virus disease, the mode of transmission and preventive measures. However, such evidence does not exist for teacher's awareness on EVD. Teachers are fundamental to workforce development and technological advancement of any nation. They are directly or indirectly involved in the dissemination of health information and healthy practices to pupils and parents. This study is undertaken to fill this gap.

### **1.1. Aim of the study**

To determined Ebola Virus Disease awareness (EVD) among school teachers in a North-central State, Nigeria.

## 2. METHODS

### 2.1. Setting

This study was carried out in 15 selected primary and secondary schools in Bida town. Bida is a local government headquarter of Bida Local Government Area of Niger State. It lies at 9° 06' N and 6° 01' E on the Nupe sandstone formation. Bida town is bounded by Pichi in the west, Baddegi in the east, Gbazhi in the North and Doko in the South. The town is located to the North-east of the Federal Capital Territory Abuja with population of 188,181 in 2006 and projected population of 192,161 people in 2009. The major ethnic group is the Nupe [20, 21]. Bida is the headquarters of the Nupe kingdom. There are other places in Bida such as Bamisu estate, Ramatu Dangana, ECWA poly road, small market, main market and other places. There are also different schools like the Federal Government Girls College, Federal polytechnic staff primary/secondary schools among others. Bida is not only occupied by northerners, it is a place with vast tribes like Igbo, Yoruba, Hausa, Igala, Urhobo, Calabar and other tribes inclusive. According to Musa's [20] study, majority of schools in Bida are owned by government. The study [20] further revealed that Bida has about 50 public and 37 private primary schools, 15 public and 6 private secondary schools respectively.

### 2.2. Study design

The study adopts a cross-sectional study design to obtain data from teachers on Ebola Virus Disease awareness from nursery, primary and secondary school teachers in Bida Local Government Area of Niger State, using a questionnaire.

### 2.3. Study population

The population for the study consisted of different cadres of teachers in both public and private nursery, primary, junior and senior secondary schools in Bida town, Bida Local Government Area of Niger State. There was a total of 87 nursery/primary schools and 21 secondary schools. These schools were in five wards from which the sample schools were selected. There was also a total of 65 public schools and 43 private schools.

### 2.4. Sample size and sampling technique

The study deployed a clustered sampling method for the selection of the schools and one hundred and sixty (160) participants were recruited from 19 public and private schools using

availability and convenient sampling technique. Teachers that were present at the schools on the days of the study and were willing to participate formed the sample size. All the selected teachers in the selected schools were eligible for participation except those that were on break, leave, or decline consent was excluded from the study. Fifteen out of one hundred and eight schools were randomly selected from fourteen wards and they include:

- 1 Army Day Senior Secondary School, Bida (public)
- 2 Army Day Junior Secondary School, Bida (public)
- 3 Government College (Senior Secondary School), Bida (public)
- 4 Government College (Junior Secondary School), Bida (public)
- 5 Government Model School (Senior Secondary School), Bida (public)
- 6 Government Model School (Junior Secondary School), Bida (public)
- 7 Ndayeko Senior Secondary School, Bida (public)
- 8 Ndayeko Junior Secondary School, Bida (public)
- 9 Ndayeko Primary School, Bida (public)
- 10 Jibrin Memorial Senior Secondary School), Bida (private)
- 11 Jibrin Memorial Junior Secondary School), Bida (private)
- 12 Victory Primary School, Bida (private)
- 13 Victory Nursery School, Bida (private)
- 14 Kingdom Heritage Primary School, Bida (private)
- 15 Kingdom Heritage Nursery School, Bida (private)

## **2.5. Data collection tools**

The instrument used for this study was a questionnaire developed by the authors based on the CDC criteria and from review of relevant literature [19].

## 2.6. Data analysis and management

The statistical software SPSS Version 20.0 was used to analyze the data. Categorical data were expressed as frequency and percentages while continuous variables, were expressed as mean and standard deviation. Association between categorical variables was expressed using Chi-square ( $\chi^2$ ) and test of statistical significance (p-value) was set at  $p=0.05$ .

## 2.7. Ethics

Permission to carry out this study was obtained from the Office of the Educational Secretary, Bida Local Government Education Authority, Niger State on the 3<sup>rd</sup> August 2015. Informed consent was obtained from individual participants to facilitate the collection of information from the sample.

## 3. RESULTS

### 3.1. Participants' socio-demographic characteristics

As shown in Table 1 below one-third (54, 33.8%) of participants teach at senior secondary classes, almost half of them (77, 48.1%) hold National Certificate of Education and two-third (106, 66.3%) work with public schools and majority (116, 72.5%) of participants had between 1 – 15 years of teaching experience.

**Table 1: Participants socio-demographic characteristics (n=160)**

Variable	Frequency	Percentage
<i>Gender</i>		
Male	108	67.5
Female	52	32.5
<i>Age in years</i>		
18 - 27	44	27.5
28 - 37	64	40.0
38 - 47	24	15.0
48 and above	20	12.5
No response	8	5.0

*Marital Status*

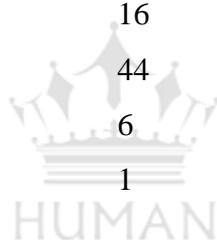
Single	70	43.8
Married	88	55.0
Widowed	2	1.2

*Participants teaching level*

Nursery	12	7.5
Primary	42	26.3
Junior Secondary class	52	32.5
Senior Secondary class	54	33.8

*Highest academic qualification*

A-Level Certificate	4	2.5
ND*	12	7.5
NCE*	77	48.1
HND*	16	10.0
B Sc	44	27.5
PGD	6	3.8
M. Sc	1	0.6

*Years of experience*

0 - 5	68	42.5
10-15	48	30.0
16-20	10	6.3
21 - 25	14	8.8
26 - 30	14	8.8
31 - 35	6	3.8

*Type of participants employment*

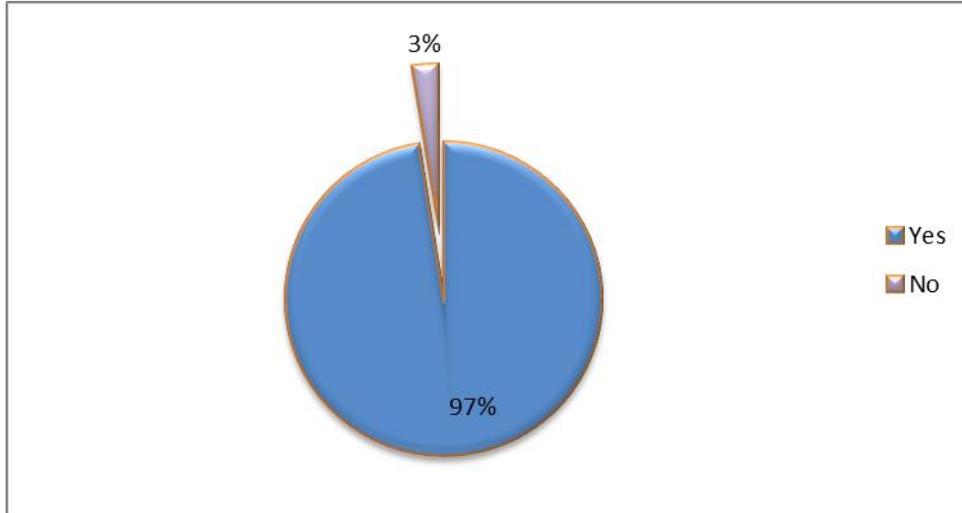
Government	106	66.3
Private	54	33.8

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ND\* = National Diploma, NCE\*= National Certificate of Education, HND\*= Higher National Diploma.

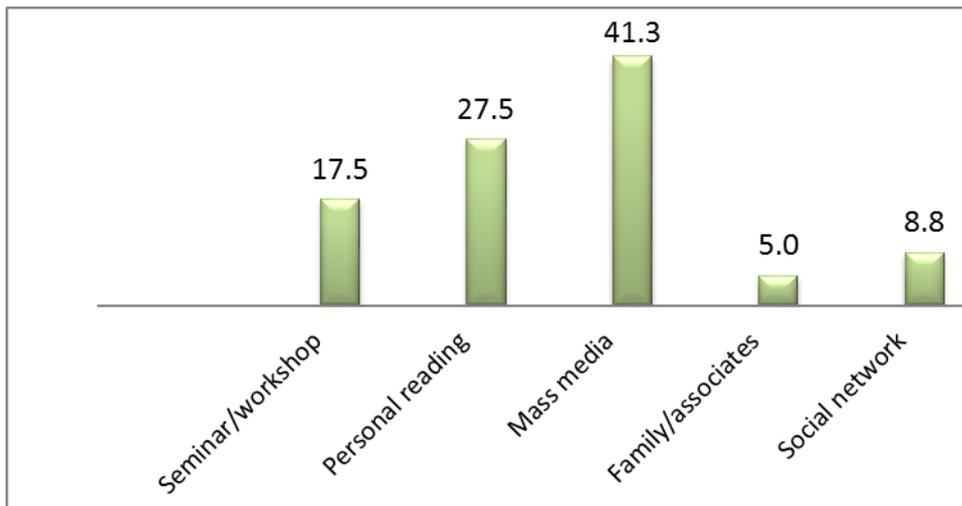
### 3.2. Awareness of EVD

The finding indicates that there is a high awareness level of EVD among teachers in the study area as indicated by fig. 1.



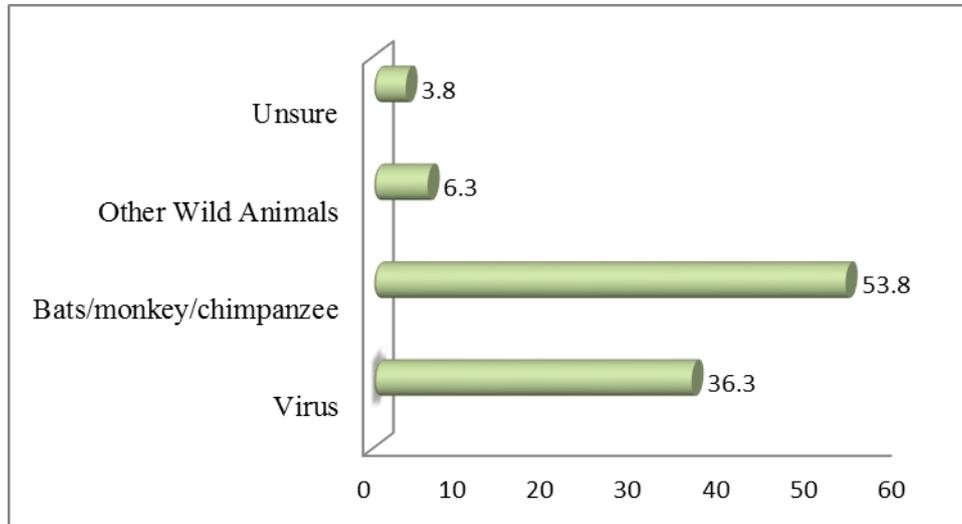
**Figure 1: Participant’s awareness level about EVD**

As shown in fig. 1, majority (156, 97%) of participants affirmed that they had ever heard of Ebola Virus Disease. This implies a generally high level of awareness among teachers in the study area. To the teachers, this level of awareness is connected to some of the sources of EVD information dissemination as indicated in fig. 2.



**Figure 2: Participants’ source(s) of awareness about EVD**

Fig 2 indicates that four in every ten (66, 41.3%) participants got information about EVD through mass media, while a good number 44, 27.5% and (28 17.5%) got theirs through personal reading and seminar/workshops respectively.



**Figure 3: Participants’ awareness on cause(s) of EVD**

On the cause(s) of EVD, Fig 3 reveals that, little above half (86, 53.8%) of participants opined that EVD is caused by bats/monkey/chimpanzees and discerned followed by (58, 36.3%) participants who correctly pointed out that, virus is the main cause of EVD.

**Table 2: Training on EDV, availability of medical personnel and first aid kits in the schools (n=160)**

Variable	Frequency	Percentage
Have you ever had any training on EVD		
Yes	70	43.8
No	88	55.0
Unsure	2	1.2
Do you have a nurse or doctor in your school?		
Yes	76	47.5
No	78	48.8
Unsure	6	3.7

Does your school have stocked First Aid Kits

Yes	136	85.0
No	16	10.0
Unsure	8	5.0

Do you have access to the First Aid Kits in your school

Yes	100	62.5
No	48	30.0
Unsure	12	7.5

Training needs for teachers. Data were collected from the participants on whether or not they had some form of training on curbing EVD, medical personnel and first aid kits are available for the teachers in their respective schools. Table 2 above reveals that more than half (88, 55.0%) of participants admitted that they have never had any training on EVD and about half (78, 48.8%) of them do not have school nurse or a doctor.

**Table 3: Awareness on mode of transmission of EVD (n=160)**

Variable	Frequency	Percentage
EVD can be transmitted through sexual intercourse		
Yes	102	63.8
No	44	27.5
Unsure	14	8.7
EVD can be transmitted through breast milk		
Yes	108	67.5
No	38	23.8
Unsure	14	8.7
EVD can be transmitted through mosquito bites		
Yes	56	35.0
No	72	45.0
Unsure	32	20.0
EVD can be transmitted by Bats/Monkeys & Chimpanzees		
Yes	144	90.0

No	8	5.0
Unsure	8	5.0
EVD can be transmitted by touching contaminated objects that have germs from an infected person		
Yes	146	91.3
No	10	6.2
Unsure	4	2.5
The more symptomatic a person is, the greater the risk of catching the virus from his body fluid		
Yes	138	86.2
No	6	3.8
Unsure	16	10.0
EVD can be contracted from an infected person who does not show any symptoms		
Yes	114	71.3
No	18	11.2
Unsure	28	17.5

As shown in Table 3 above, the vast majority of participants (146, 91.3%) admitted that touching an EVD contaminated object can transmit the disease and a similar portion of them (144, 90.0%) opined that bats, monkeys and chimpanzees are responsible vectors for the transmission of EVD.

**Table 4: Awareness on preventive and curative measures of EVD (n=160)**

Variable	Frequency	Percentage
<i>EVD can be cured</i>		
Yes	120	75.0
No	20	12.5
Unsure	20	12.5
<i>EVD can be prevented</i>		
Yes	146	91.3

No	10	6.2
Unsure	4	2.5

*EVD can be prevented through regular hand washing with running water*

Yes	136	85.0
No	12	7.5
Unsure	12	7.5

*EVD can be prevented by avoiding funeral or burial that require handling the body of person who died from Ebola*

Yes	130	81.2
No	8	5.0
Unsure	22	13.8

*Are you aware of any policy on the prevention of EVD*

Yes	118	73.8
No	30	18.8
Unsure	10	6.2
No response	2	1.2



*Do you Know any contact number to call and report a suspected case of EVD*

Yes	70	43.8
No	84	52.5
Unsure	6	3.7

*Do you have adequate charisma to curb any outbreak of EVD in future*

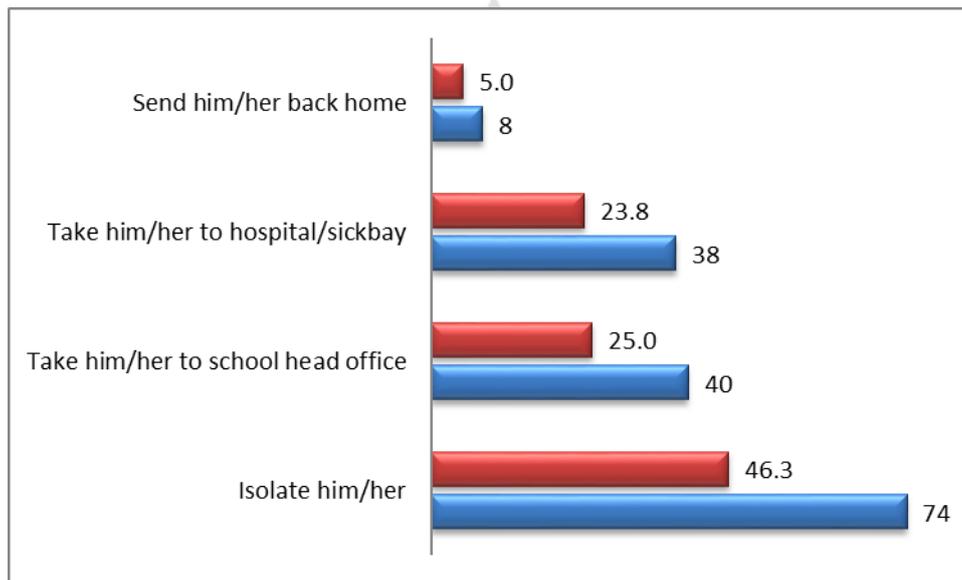
Yes	76	47.5
No	48	30.0
Unsure	36	22.5

*Do you think government has put enough measures in place to*

*prevent future outbreak of EVD*

Yes	112	70.0
No	26	16.2
Unsure	22	13.8

As shown in Table 4 majority (120, 75.0%) of participants poised that EVD is curable and a higher portion of participants (146, 91.3%) admitted that EVD is preventable. With regards to participants awareness on policy about EVD prevention, most participants (118, 73.8%) indicated that they are aware of a policy on the prevention and spread of EVD. A little above half (84, 52.5%) of participants admitted that they were not aware of any phone contact to report suspected case of EVD. A good number (76, 47.5%) of the participants indicated that they had good charisma to managed any future outbreak of EVD in the schools and (122, 70%) of the teachers disclosed that government had put in place adequate measures to curtail any future outbreak of EVD in the country.



**Figure 4: Measures to take when suspecting a student with EVD**

As regards to action to be taken when a student is suspected of having EVD in the school environment, a good number (74, 46.3%) of the teachers signified that they would isolate the infected student from others while few (8, 5.0%) indicated sending the student back home (see Fig 4).

### 3.3 Participant's knowledge on the effective means of providing information about EVD

On the effective means of providing information about EVD, more than half (88, 55.0%) of the participating teachers identified mass media as the effective means of providing EVD information to the masses.

**Table 5. Factors associated with Ebola Virus Disease awareness among school teachers**

	Chi square ( $\chi^2$ )	df*	p-value
<b><i>Highest academic qualification with participants' awareness on EVD</i></b>			
Have you heard about EVD?	84.426	12	.000
Have you received any training on EVD preventive measures?	40.252	12	.000
Do you have stock of first aid kits in your school?	18.836	12	.093
Causes of EVD	63.234	18	.000
EVD can be cured	18.576	12	.000
EVD is preventable	11.774	12	.464
Which of these personal hygiene supplies is available in your school?	134.198	54	.000
Do you have all it takes to curb future outbreak of EVD?	14.754	12	.255
Do you think government has done enough to curb EVD?	17.313	12	.138
<b><i>Years of experience with participants awareness on EVD</i></b>			
Have you heard about EVD?	16.389	10	.089
Have you received any training on EVD preventive measures?	14.259	10	.162
Do you have stock of first aid kits in your school?	12.314	10	.265
Causes of EVD	49.051	15	.000
EVD can be cured	33.761	10	.000
EVD is preventable	18.909	10	.041
Which of these personal hygiene supplies is available in your school?	128.996	45	.000

Do you have all it takes to curb future outbreak of EVD?	19.978	10	.029
Do you think government has done enough to curb EVD?	21.671	10	.017
<b><i>Type or nature of employment with participants' awareness on EVD</i></b>			
Have you heard about EVD?	9.939	2	.007
Have you received any training on EVD preventive measures?	8.235	2	.016
Do you have stock of first aid kits in your school?	4.321	2	.115
Causes of EVD	4.849	3	.183
EVD can be cured	8.088	2	.018
EVD is preventable	3.111	2	.211
Which of these personal hygiene supplies is available in your school?	35.09	9	.000
Do you have the all it takes to curb future outbreak of EVD?	16.988	2	.000
Do you think government has done enough to curb EVD?	21.753	2	.000

Significant factors affecting Ebola Virus Disease awareness among school teachers are presented in Table 5. There is statistically significant between teachers awareness of EVD and educational attainment ( $p=0.000$ ), working experience ( $p=0.041$ ) and type of employment ( $p=0.018$ ).

#### 4. DISCUSSION

This study was conducted to determine awareness of Ebola Virus Disease among school teachers in a north-central city of Nigeria. Finding of this study indicated that most of the participating school's teachers were holders of National Certificate of Education, with 1-15 years of teaching experience. This is in line with the Teachers Registration Council of Nigeria [22], National Policy on Education [23], and Federal Ministry of Education [24] where it is featured that, the minimum qualification standard for entry into the teaching profession in Nigeria should be the Nigeria Certificate in Education (NCE). This must have been responsible for the high level of awareness on the EVD process (97%) found in this

study. Similarly, the concerted efforts on wakefulness awareness campaign during the outbreak of the disease could also have accounted for the observed level of awareness of the disease. This finding is similar to a study [25] by the Liberian Ministry of Health, which reported high level of awareness on EVD among the participants.

In addition to highest academic qualification, findings further indicated that other major factors that contributed to the participant's high level of awareness on EVD in this study were years of working experience and type of employment. For instance, 48% of the participants possess National Certificate of Education, 66% of whom taught in governments schools. Statistically, highest academic qualification ( $p=.000$ ) and type of employment ( $p=.007$ ) were associated with participants awareness on EVD.

Comparatively, the results of this study and previous study [25] established that the majority of participants identified the cause of EVD to the wild animals (bats, monkeys and chimpanzees).

The participants' level of preparedness regarding future infectious disease epidemic management in schools was not encouraging. This is premised on the revelation that 49% of the participants reported that their school health personnel as stipulated by the Federal Ministry of Education on School Health Policy. Although, 85% indicated that their schools had stocked first aid kits and 63% have access to the kits. This is not in agreement with the guiding principle of the National School Health Policy of Federal Ministry of Education [26] requirements for the establishment of schools in Nigeria, which stated that 'personnel for school health services shall include medical doctors, nurses, and health educators'. Our finding underscores the need to further encouraged heads of schools to implement Federal Ministry of Education policy on school health services.

Assessment of participants' awareness on the mode of EVD transmission shows that (64%) of the participants reported that EVD can be transmitted through sexual intercourse, breastfeeding (68%) contact/eating bats/monkeys and chimpanzees (90%), touching contaminated objects (91%) and asymptomatic persons (71%). This finding is in agreement with WHO report [27] that Ebola virus is transmitted to people through close contact with the blood, secretions, organs or other bodily fluids of infected wild animals such as chimpanzees, gorillas, fruit bats, and monkeys. Ebola is then spread through human-to-human transmission through direct contact with the blood, secretions, organs or other bodily fluids of infected

people, and with surfaces and materials contaminated with these fluids. Burial ceremonies in which mourners have direct contact with the body of the deceased person can also play a role in the transmission of Ebola.

Most participants in this study have good knowledge on the cure and means of EVD prevention. This was clearly demonstrated by 46% of the teachers indicating that they will isolate the suspected students from others and more than half (55%) of the teachers identified mass media as the most effective means of providing EVD information to the masses. On one hand, this finding coincided with the Liberian Ministry of Health (2015) study on nationwide knowledge, attitudes and practices of EVD where 43% of the participants indicated that they would avoid all physical contact and bodily fluids from any member of their family who contracted Ebola.

This study has contributed to the growing body of knowledge regarding future infectious disease epidemic management in schools. Ebola virus appears to be the deadliest viral outbreak in history, as between 20% and 90% of the infected victims die within a short time of infection. Presently, the virus has neither vaccine nor cure. The first reported case of EVD in Nigeria appeared in July 2014. This manifestation caused a lot of pandemonium in the public domain including schools and the need to have water-tight personal and environmental hygiene becomes imperative [28].

## **5. CONCLUSION**

The study concluded that there was high level of knowledge of EVD process and prevention among school teachers in Bida Local Government Area of Niger State. There was a facility support for all the strategies put in place by the government to manage any future outbreak of EVD and any communicable disease in the country that will affect the normal academic school calendar.

### **Recommendations**

Based on the findings of this study, the following recommendations were made to forestall outbreak of EVD and communicable diseases.

1. There is also a need to establish more school clinics with adequate medical workforce and well equipped with first aid box, tissue papers, hand sanitizers and running tap water.

2. Efforts should be intensified to implements school health policy and comprehensive awareness on EVD through mass media. This perhaps will reduce the epidemics of communicable diseases in schools.
3. Continuing professional training and retraining of all stakeholders on the management and prevention of all communicable diseases.
4. School-based health education on communicable disease prevention should be strengthened.

### Statement of interest

The authors have no any conflict of interest concerning this paper.

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