



Research Note

Some Facts about Ebola Virus Disease and Comments on the Nigerian Situation and Control Measures Taken

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Abstract

Ebola virus disease (EVD) epidemic in West Africa was the most prevalent on record. It originated simultaneously in Democratic Republic of Congo and Sudan in 1976. It subsequently occurred in Gabon, Uganda, Congo, South Africa and Cote d'Ivoire. EVD is caused by five different species of filovirus. Zaire ebola virus (EBOV), Sudan ebola virus (SUDV) and Bundibugyo ebola virus (BDBV) are the ones associated with large EVD outbreaks in Africa. It initially occurred in a village situated near the Ebola River in Zaire hence the name. Infection occurs from direct contact through broken skin or mucous membranes with the blood or other bodily fluids and stool of infected people or if broken skin or mucous membranes of a healthy person come in contact with places contaminated with EVD patient's infectious fluids. The incubation period is from 2 to 21 days. Patients become contagious once they show signs and symptoms of the disease which include sudden onset of fever, intense weakness, muscle pain, headache, and sore throat and in some cases internal and external bleeding. Control of the disease spread includes contact tracing and quarantine of contacts. EVD can only be confirmed through laboratory testing. Effective treatment and vaccine as well as avoidance of animal reservoirs will help prevent further epidemics. Ebola virus outbreak in Nigeria was contained by a quick intervention with massive public health education and coordinated effective Federal, State and Local Government actions which included provision of necessary funds. Only 20 Ebola cases were reported in Nigeria with no new case since early September, 2014. It is recommended that precautionary measures be continued in Nigeria as outbreaks of EVD are usually sudden.

Keywords: Ebola virus, disease, Nigeria situation.

1.0 Introduction

Once in a while some diseases suddenly surface in some human populations and occur at epidemic, or pandemic proportions. An example is SARS (severe acute respiratory syndrome), which occurred in China; Zika Virus which occurred in South America and HIV AIDS (acquired immune deficiency syndrome), which is pandemic occurred and still occurring in many countries including the US and Nigeria. EVD (Ebola virus disease) is another one like these which started in West Africa in 2014 and appears to have been controlled now. It is formerly known as Ebola hemorrhagic fever. It is a severe, often fatal disease, with a death rate of up to 70%.

It affects humans and nonhuman primates (monkeys, gorillas, and chimpanzees).

It is caused by 5 different species of filovirus (Filoviridae), namely, Zaire ebolavirus (EBOV), Sudan ebolavirus (SUDV), Bundibugyo ebolavirus (BDBV), Reston ebolavirus (RESTV) and Tai Forest ebolavirus (TAFV). But Zaire ebolavirus, Sudan ebolavirus, and Bundibugyo ebolavirus are the ones associated with large human EVD outbreaks. Morphological Ebola Virus is filamentous. It is a non-segmented single-stranded RNA virus belonging to the Family Filoviridae, taken from the Latin "filum" meaning, thread-like (see Figure 1) (www.update.com 2014 up To Date).

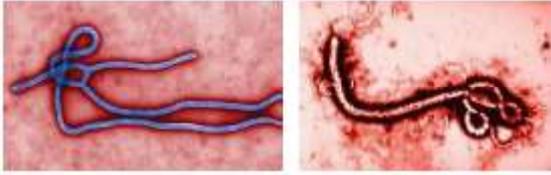


Figure 1: Ebola virus (Filovirus)

Ebola originated simultaneously in Yambuku, in the Democratic Republic of Congo (formerly called Zaire or Congo Kinshasa) and Nzara, Sudan in 1976. The disease occurred in a village situated near the Ebola River from which it took its name. It subsequently occurred again in the Democratic Republic of Congo in 1995, 2007, 2008, 2012 and in Sudan in 1970 and 2004. The other countries where EVD occurred include Gabon (1994, 1996, 2001), Uganda (2000, 2007 and 2013, Congo (2001, 2003 and 2005), South Africa (1996) and in Cote d'Ivoire, West Africa in 1994. (see Figure 2 and List)

2.0 List of Countries In Africa Where Ebola Has Occured

- Democratic Republic of Congo (1976, 1995, 2007, 2008, 2012)
- Sudan (1976, 2004)
- Gabon (1994, 1996, 2001)
- Uganda (2000, 2007, 2013)
- Congo (2001, 2003, 2005)
- South Africa (1996)
- Cote d' Ivoire (1994)
- Guinea (Late 2013)
- Sierra Leone (2014)
- Liberia (2014)
- Nigeria (2014)*
- Senegal (2014)
- Mali (2014)

3.0 Signs and Symptoms of Infection

The typical signs and symptoms of the disease are sudden onset of fever, intense weakness, muscle pain, headache, and sore throat. This is followed by vomiting, diarrhea, rash (Figures 3 - 5) impaired kidney and liver function, and in some cases, both internal and external bleeding.

Laboratory findings include low white blood cell and platelet counts and elevated liver enzymes. The



Figure 2: Map of Africa Showing Countries where Ebola Virus Disease has occurred.



Figure 3: Maculopapular rash on the face (<http://indiaopines.com/ebola-virus-man-made-labs/>)



Figure 4: Maculopapular rash on the skin (<http://indiaopines.com/ebola-virus-man-made-la>)



Figure 5: Ebola virus disease patient with sore throat (<https://heavenawaits.wordpress.com/ebola-virus-information/>)

incubation period, or time interval from infection to onset of symptoms, is from 2 to 21 days. The patients become contagious once they begin to show symptoms. They are not contagious during the incubation period. But the Ebola virus disease infections can only be confirmed through laboratory testing.

4.0 Mode of Infection or Transmission

Ebola virus disease is transmissible from animal to man (zoonanthropotic) through hunting, butchering and meat preparation. It is also transmissible from man to man. For West Africa, the majority of transmissions are mainly from man to man. Infection occurs from direct contact with infected people through broken skin or mucous membranes. It can also occur with blood or other bodily fluids such as secretion (saliva, semen, vaginal secretion) and excretion such as urine, and perspiration, and stool.

5.0 Control

Effective control of nosocomial transmission includes: Early detection of the disease and quick remedial action, strict isolation of patients, practice of droplet contact precautions, compliance with the use of personal protection equipment by nurses, doctors, and any other health worker. Effective control of the disease spread in a community, includes contact tracing and quarantine of contacts.

6.0 The Nigerian Situation

Ebola virus outbreak in Nigeria started in June 2014. It was controlled and contained by a quick intervention with massive public health education using print and electronic media and a coordinated effective Federal, State and local government actions which included provision of necessary funds. The Ebola Virus Disease (EVD) epidemic started in Guinea, West Africa in December 2013 (Altheas *et al* 1925). “An infected airline passenger from Liberia arrived in Nigeria on July 20, 2014 and caused an outbreak in Lagos, Nigeria and subsequently, Port Harcourt. (Altheas *et al*. 2015) His visit initiated the disease in Nigeria. “The man who died in a hospital five(5) days later, set off a chain of

transmission that infected a total of 19 people of whom seven (7) died” (<http://www.who.int/mediacentre/news/statements/2014/nigeria-ends-ebola/en/>)

Some measures taken within Nigeria: people were advised to wash their hands frequently with running water. They were advised to use hand sanitizers, avoid shaking of hands and embracing people at churches and public gathering places. Coffins were no longer brought into churches before burial. This however, eased after Nigeria was declared Ebola disease free by WHO (World Health Organization), students entering schools as well as people going into public places such as banks were temperature screened. Federal and state hospitals created isolation wards to handle positive cases if any. It is necessary to note that only 20 Ebola cases were reported in Nigeria with no additional cases since declared Ebola free in early September, 2014.

6.1 Specific Actions Taken in Nigeria

People coming into the country were made to fill a screening form that gave information about their name, date of birth, passport or identity card, mode of entry, arrival date in country, address abroad, and address while in Nigeria.

Ebola symptomatic review was carried out. These include: history of contact with someone who has been sick with symptoms of Ebola disease, contact with someone who died in the past three weeks and history of participation in a funeral. The person’s body temperature was next taken before being allowed into the country (see Figure 7).

People leaving Nigeria for other countries were also screened for Ebola before departure by filling screening form and having their body temperature taken (see Figure 8). If negative with symptoms, this was stamped on their forms and the form was subsequently presented to the immigration officer before the traveler was allowed to depart. Ebola alert leaflet was freely distributed to people at the airport and elsewhere and put on sign boards (Figure 5).

6.2 Control Measures Taken In Nigeria.

The following are precautionary measures which the public were instructed to follow:

These were efforts made by Nigeria to control Ebola.

- i. Protect yourself and your family from Ebola Virus Disease.
- ii. Inform family members, neighbors and friends about the signs, symptoms and simple preventive measures against Ebola Virus Disease:
 - a. Keep your house and environment clean always.
 - b. Wash your hands with soap and clean water always.
 - c. Avoid eating improperly cooked “bush meat”.
 - d. Avoid forest animals that are sick or found dead.
 - e. Avoid eating fruits partly eaten by animals.
 - f. Avoid contact with the blood or body secretions of infected animals or humans (dead or alive).
 - g. Avoid traditional burial practices such as embalming, washing or touching of dead bodies.
- iii. Provide information on any sick person(s) with any of the signs and symptoms of Ebola Virus Disease to the nearest designated isolation center or health facility immediately for medical attention.
- iv. Cooperate and adhere to government health instructions if you have the signs, symptoms or have had contact with an infected person.

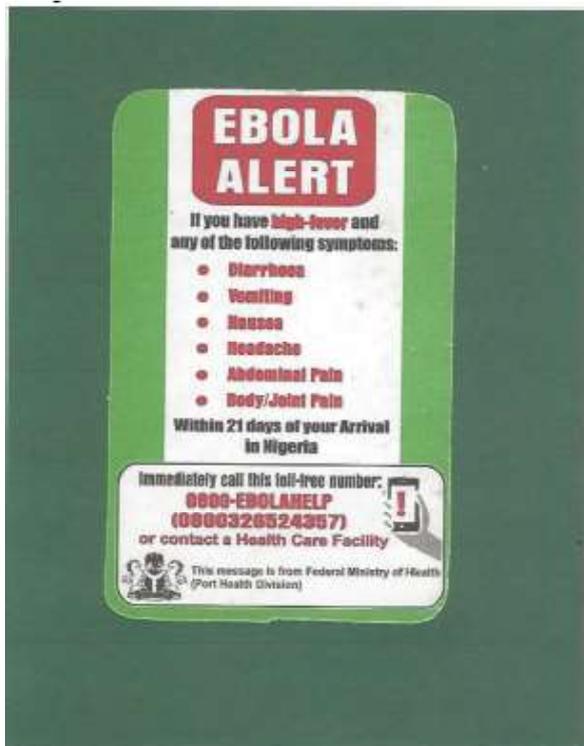


Figure 6: Ebola Alert Leaflet designed and used in Nigeria.

- v. Support the isolation of persons suffering from Ebola Virus Disease to avoid the spread of the disease within the community.
- vi. Accept to wear protective clothing such as gowns, gloves, face mask and goggles each time you visit an Ebola Virus Disease patient in the health facility to protect yourself from getting infected with Ebola virus.
- vii. Report the death of suspected Ebola Virus Disease persons to the nearest health facility.
- viii. Obtain clearance from Health authority before moving corpses from abroad or from one state to another.



Figure 7: Prof. Alex Acholonu being checked for Ebola fever at Murtala Muhammad Airport on arrival at Nigeria.



Figure 8: Prof. Alex Acholonu being checked for Ebola fever at Murtala Muhammad Airport on his departure from Nigeria to the U.S.

7.0 The Uncertainties about Ebola Virus

Effects of convalescence blood on patients suffering from Ebola virus disease, is not yet known. Immunity conferred to a person who recovers from the disease

is not yet known. The natural reservoir host of the Ebola virus disease is not surely known. Fruit bats are considered reservoir hosts but this is speculative. It is made because the related virus, Marburg virus was isolated from the bats captured at a cave in Uganda and reported in 2009. Mode of transmission from reservoir host to wild apes (wild primates) and humans are not known. (A reservoir host is a host that a parasite is maintained in nature and acts as a source of infection to other animals and man.)

8.0 Conclusion

Investigations on Ebola should be continued to get satisfactory and scientific answers to the uncertainties expressed above. While the Ebola epidemic has subsided or now gone, and was less a problem in Nigeria than in several other African countries, precautionary and control measures taken in the country are encouraged to be continued. This is more so since outbreaks of Ebola are usually sudden. As a case in point, there is a sudden outbreak of Ebola again in the Republic of Congo as reported by the news media on 11th of May, 2017. Also, prevention is better than cure.

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Appendix

Ebola Screening Form

FEDERAL GOVERNMENT OF NIGERIA

1. Last Name:	2. First Name:	3. Sex:	
4. Date of Birth	5. Passport or identity card (number, country, dates)	6. Mode of entry	
		Air: Airline flight no: Seat no:	Road: Point of entry: Name of transport co:
7. Arrival date in country:	8. Telephone No.:	9. Address abroad:	
10a. Address in Nigeria:	10b. Email Address:		
11. Symptomatic review	Yes	No	Not Known
a. Fever			
b. Vomiting			
c. Diarrhoea			
d. Headaches			
e. Muscular pain			
f. Joint pain			
g. Weakness			
h. Blood from nose or mouth, blood in vomit or in stool, dark or bloody urine			
12a. History of contact with someone who has been sick with vomiting, diarrhea or bleeding in the last 3 weeks? If so, list where the person lived and has travelled in the last two months.	Yes	No	Not Known
12b. History of contact with someone who died in the last 3 weeks. If yes, list where the person died had lived and had travelled in the last 2 months.	Yes	No	Not Known
12c. History of participation in a funeral? If yes, list where the funeral was held. List where the person who died had lived and had travelled in the last 2 months.	Yes	No	
13. Any country visited in the last one month?			
Toll free lines for notification of suspect cases: 0800EBOLAHHELP OR 0800326524357			