Short Communication

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EPIDEMIOLOGICAL NOTES ON EBOLA VIRUS DISEASE IN NIGERIA

AIYEDUN, J.O. and OLUDAIRO, O.O.

Department of Veterinary Public Health and Preventive Medicine, University of Ilorin, Nigeria.

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ABSTRACT

The recent outbreak of Ebola Virus Disease (EVD) in West Africa and the sensational news and report of confirmed cases in Nigeria sparked off considerable but justifiable concerns and political commitments, not only in the West African Sub-region but in other parts of the world. EVD is a rapidly fatal and highly contagious disease, killing more than 50% of its infected victims. The global implications of the disease, beyond the immediately affected geographical region, are enormous, especially on international trade, travels, health, sport, political gatherings and widespread stigmatization of individuals, countries and even the continents. At present, there is no licensed drug or vaccine to prevent or cure the disease. The constraint of rapid dissemination of vital information about the disease to rural and poorly accessible areas is a major impediment. Inadequate health facilities, deep rooted socio-cultural taboos, belief and practices collectively constitute serious stumbling block to controlling the disease. The natural reservoir host of Ebola virus remains unknown. However, on the basis of available evidence, researchers believe that the virus is zoonotic (animal borne) with bat being the most suspected reservoir. The potential transmission of EVD is considerable and the task of controlling it is daunting.

Key words: *Epidemiology, Ebola Virus Disease, Zoonosis, Nigeria.*

BACKGROUND INFORMATION

Ebola virus disease (EVD) is a severe, often fatal illness in humans that first appeared in 1976 in two simultaneous outbreaks, in Nzara, Sudan, and in Yambuku, Democratic Republic of Congo. The latter was in a village situated near the Ebola River (Francis *et al.,* 1976, George *et al.,* 1999). The current EVD outbreak began in Guinea in December 2013 and thereafter spread to Guinea, Liberia, Sierra Leone, and later Nigeria. The first case in Nigeria was a Liberian-American, who flew from Liberia to Nigeria's most populated city of Lagos on 20 July 2014. On 22 September 2014, the Nigeria health ministry announced, "As of today, there is no case of Ebola in Nigeria." According to the WHO, 20 cases and 8 deaths had been confirmed, including the imported case, who also died. Four of the dead were health care workers who cared for the index case (WHO, 2014, Umeora *et al.,* 2014, CDC, 2010).

The WHO's representative in Nigeria officially declared Nigeria to be Ebola free on 20 October after no new active cases were reported in the follow up contacts, stating it was a "spectacular success story" (WHO, 2015).

Figure1: EBOLA VIRUS

It has caused significant mortality, with reported case fatality rates of up to 70% and specifically 57–59% among hospitalized patients. Ebola virus disease was first described in 1976 in two simultaneous outbreaks in South Sudan and Democratic Republic of the Congo (Muyembe-Tamfun *et al.,* 1999); the present outbreak is the 26thin history and the first to occur in the West African subcontinent. The outbreak began in Guinea in December 2013 and then spread to Liberia and Sierra Leone. An outbreak of twenty cases occurred in Nigeria and one case occurred in Senegal. Several cases were reported in Mali, and an isolated case occurred in the United Kingdom and another in Sardinia. Imported cases in the United States and Spain led to secondary infections of medical workers but did not spread further. As of 2nd December 2015, the World Health Organization (WHO) and respective governments worldwide have reported a total of 28,638 suspected cases and 11,315 deaths, though the World Health Organization believes that this substantially understates the magnitude of the

*Corresponding author:*Oludairo, O.O.
E-mail address: olaaiyedun@yahoo.com and oludairo@hotmail.com
Present address: Department of Veterinary Public Health and Preventive Medicine, University of Ilorin, Nigeria.

outbreak (CDC, 2001, WHO, 2014, Mbonye *et al.*, 2014). On the 7thof October 2015, all three of the most seriously affected countries recorded their first joint week without any new cases, raising hopes that the epidemic might finally be coming to an end. However, as of November 2015, while the large-scale epidemic has ended, sporadic new cases continue to emerge, frustrating hopes that the epidemic can be declared over (WHO, 2015).

The natural reservoir host of Ebola virus remains unknown. However, on the basis of available evidence, researchers believe that the virus is zoonotic (animal borne) with bat being the most likely reservoir. Several animal reservoir hosts, including bats, rodents, ungulates and canine have been implicated in the transmission of the disease to human populations (Umeora *et al.*, 2014).

Diagnosis of Ebola virus disease could be done in laboratories with biosafety level 4 using, antigen-capture enzyme-linked immunosorbent assay (ELISA), IgM ELISA, polymerase chain reaction (PCR), and virus isolation. Diagnosis of the disease could be done within a few days of the onset of symptoms. Tests could be carried out in patients in the course of the disease or after recovery for IgM and IgG antibodies; the disease can also be diagnosed retrospectively in deceased patients by using immunohistochemistry testing, virus isolation, or PCR (Busico *et al.*, 1999, WHO, 2014).

WHO estimated that the current outbreak in West Africa likely began in December 2013, but was belatedly detected due to weak disease surveillance and detection capacities of the affected countries (WHO, 2014). The Ebola virus that is circulating in West Africa is not new, but the current Ebola outbreak has infected and killed more people than all previous outbreaks combined. Ebola virus initially spreads to people through coming into close contact with infected wild animals. Spread from person to person can then occur through direct contact with the blood and other body fluids of infected people who have symptoms. Semen can contain virus for three months after apparent recovery from the illness (CDC, 2001, Casillas *et al.*, 2003). EVD in humans usually begins suddenly with fever, headache, joint and muscle aches, sore throat and intense weakness. Stomach cramps, diarrhoea and vomiting may occur. Some individuals may develop a rash, red eyes, hiccups, bleeding (from nose or mouth), blood in diarrhoea or vomit. In severe cases patients develop failure of the liver and kidneys (Lamunu *et al.*, 2002, Roddy *et al.*, 2012, CDC, 2010). Diagnosis of Ebola requires blood tests in a specialist laboratory. Other tests may also be carried out at the same time to ensure other important infections (e.g. malaria or typhoid fever) are not missed. There is no cure for this disease, and antibiotics are not effective. Severely ill patients require intensive supportive care Georges *et al.*, 1999, Lloyd *et al.*, 1999, PHE, 2015).

ANIMAL TO HUMAN TRANSMISSION

It is not entirely clear how an Ebola outbreak starts. The initial infection is believed to occur after an Ebola virus is transmitted to a human by contact with an infected animal's body fluids. Evidence strongly implicates bats as the reservoir hosts for Ebolaviruses. Bats drop partially eaten fruits and pulp, then land mammals such as gorillas feed on these fallen fruits. This chain of events forms a possible indirect means of transmission from the natural host to animal populations (Kass, 2014, FMH, 2014).

HUMAN TO HUMAN TRANSMISSION

Based on a limited number of studies it is believed that human-to-human transmission occurs only via direct contact with blood or bodily fluids from an infected person who is showing signs of infection or by contact with objects recently contaminated by an actively ill infected person (Mbonye *et al.*, 2014). Other possible methods of transmission are currently being studied. The time interval between exposures with the virus to onset of symptoms is two to twenty-one days. Because dead bodies are still infectious, the handling of the bodies of Ebola victims can only be done while observing proper barrier/separation procedures. One study suggested that the virus can live up to 7 days in a deceased individual (CDC, 2010, Roddy, 2012).

AIRBORNE TRANSMISSION

Airborne transmission has not been documented during Ebola outbreaks; however in February 2015 a group of researchers published a paper suggesting, "It is very likely that at least some degree of Ebola virus transmission currently occurs via infectious aerosols". Commenting on the study, an infectious disease specialist said that while the study raised issues "it would be rare; as the study points out, it has never been demonstrated in humans (WHO, 2014).

SEXUAL TRANSMISSION

According to information distributed by the WHO in September 2014, "No formal evidence exists of sexual transmission, but sexual transmission from convalescent patients cannot be ruled out"(WHO, 2015). There is evidence that live Ebola virus can be isolated in seminal fluids of convalescent men for 82 days after onset of symptoms. The WHO based their new recommendations on a March 2015 case in which a Liberian woman who had no contact with the disease other than having had unprotected sex with a man who had had the disease in October 2014 was diagnosed with Ebola (Mbonye *et al.*, 2014). While no evidence of the virus was found in his blood, his

semen revealed Ebola virus RNA closely matching the strain that infected the woman, however "doctors don't know if there was any fully formed (and therefore infectious) virus in the man's semen." It is known that a male's testes are protected from the body's immune system in order to protect the developing sperm, and it is thought that it may be that this same protection may allow the Ebola virus to survive in the male testes for an unknown time (Muyenbe-Tanfun *et al.,* 1999, WHO, 2015).

CONTAINMENT AND CONTROL

Surveillance and contact tracing
Contact tracing is an essential method of preventing the spread of the disease. This requires effective community surveillance so that a possible case of Ebola can be registered and accurately diagnosed as soon as possible, and subsequently finding everyone who has had close contact with the case and tracking them for 21 days. However, this requires careful record-keeping by properly trained and equipped staff (Muyenbe-Tanfun *et al.,* 1999, Kass, 2014, WHO, 2015).

COMMUNITY AWARENESS

To reduce the spread, the World Health Organization recommended raising community awareness of the risk factors for Ebola infection and the protective measures individuals can take. These include avoiding contact with infected people and regular hand washing by using soap and water (Lloyd *et al.,* 1999). A condition of extreme poverty exists in many of the areas that have experienced a high incidence of infections. According to the director of the NGOPlan International in Guinea, "The poor living conditions and lack of water and sanitation in most districts of Conakry pose a serious risk that the epidemic escalates into a crisis. People do not think to wash their hands when they do not have enough water to drink (WHO, 2015, FMH, 2014).

TRAVEL RESTRICTIONS AND QUARANTINES

There was serious concern that the disease would spread further within West Africa or elsewhere in the world therefore travel restrictions and strict quarantine for people from Ebola ravaged countries were effected to curb the spread (WHO, 2014, Mbonye *et al.,* 2014).

TREATMENT

No proven Ebola virus-specific treatment presently exists, however measures can be taken to improve a patient's chances of survival. Ebola symptoms may begin as early as two days or as long as 21 days after one is exposed to the virus. They usually begin with a sudden influenza-like stage characterized by feeling tired, fever, and pain in the muscles and joints. Later symptoms may include headache, nausea, and abdominal pain. This is often followed by severe vomiting and diarrhoea. In past outbreaks it has been noted that some patients may experience the loss of blood through bleeding internally and/or externally (Muyenbe-Tanfun *et al.,* 1999). Data published in October 2014 showed that bleeding had been a rare symptom in this outbreak. Another study published in October 2014 suggested that a person's genetic makeup may play a major role in determining how an infected person's body reacts to the disease, with some infected people experiencing mild or no symptoms while some progress to a very severe stage that includes massive bleeding (Roddy *et al.,* 2010, WHO, 2015).

CONCLUSION AND RECOMMENDATIONS

Ebola Virus Disease is a highly contagious disease which as high morbidity and mortality. It has no local remedy and could manifest in various forms depending on the organ affected.

The disease could be prevented and controlled by improving health promotion practices such as strengthening standard infection prevention and control practices within the community like hand washing and food safety practices; Collaborating with surveillance teams to promote early detection and reporting among at-risk and vulnerable groups; Working with local/national authorities to identify at-risk groups and risky behaviour(s); Avoiding contact with symptomatic EVD patients and/or their body fluids; Avoiding contact with corpses and/or body fluids from EVD deaths. Efforts should be made to build collaborative links between human, animal and environmental (port and border post) health services.

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