

# FACTORS HINDERING THE TREATMENT OF EBOLA VIRUS DISEASE IN WEST AFRICA

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## Abstract

The complex nature of Ebola epidemic ongoing in West Africa has brought up a lot of reviews on the causes of Ebola virus disease (EVD) spread and factors hindering the fight against EVD. Here we reviewed different Ebola epidemic chronologically and by population affected. Since recent outbreak in West Africa in December 28, 2013 in Guinea and its spread to neighbouring countries with fatality case rate of 25% to 90% and over 5000 people infected, efforts have been made to curb the disease spread by various government organisations and non-government organisations. We made use of data collected by various organisations working to treat the victims of EVD and working towards controlling the spread of EVD such as world health organisation and Centre for disease control, it is from the data collected that mathematical models are used to assess the impact of the disease in the west African region and globally. The work elaborated factors militating against the curbing of the spread of EVD in west Africa such as; Superstitious belief of the communities affected by EVD, poor economy in the region affecting health infrastructure, lose border control in the west African region, shortage of health workers fighting the epidemic, poor handling of patients and corpses by the affected community members. This work points out the progress made to curb the spread of EVD; diagnosis and treatment of EVD, precautions, health awareness on the epidemic, vaccine trials and polices put in place to stop the spread of Ebola virus disease.

Keywords: Ebola Virus Disease, epidemic, mathematical models, west Africa, data collection, superstitious belief, poor infrastructure, shortage of health workers, border control, vaccine trials, policies, health awareness, diagnosis and treatment.

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## INTRODUCTION

Ebola Virus disease was previously known as Ebola haemorrhagic fever. This virus is transmitted to individuals from wild animals and birds (bats); it then spreads from human to human contact.

According to World Health Organisation the average fatality rate of Ebola Virus Disease is 50% and the fatality case rates have varied from 25% to 90% in various epidemic of Ebola Virus Disease.

The first outbreak of Ebola Virus Disease took place in Central African region but most recent and ravaging outbreaks are taking place in West African region. The Ebola Virus Disease which is an acute haemorrhagic fever disease is often untreated and does not have a known vaccine to prevent this disease. The first Ebola Virus Disease was discovered in 1976 in Nzara, Sudan and Yambuku Congo; subsequently it occurred in areas around

Ebola River from which the Virus took up its name from. Ever since then there has been episodes of Ebola Virus Disease epidemic in Central Africa and East Africa but most current epidemic with the highest fatality rate so far recorded in the world broke out in March 2014 in Guinea and the outbreak has been considered most complicated Ebola outbreak since the inception of Ebola Virus Disease in 1976.

The West African Ebola Virus Disease epidemic which broke out in Guinea in March 2014 affected countries which share common boundaries with Guinea and these countries include Sierra Leone and Liberia. Also there was one air traveller from Liberia who brought EVD to Nigeria and another one traveller from Guinea brought EVD to Senegal by road. According to WHO, Guinea, Sierra Leone and Liberia have been mostly affected by EVD since history.

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*1<sup>st</sup> International Conference on Public Health, 13<sup>th</sup> - 14<sup>th</sup> May 2015, Colombo, Sri Lanka*

On August 8<sup>th</sup> World Health Organisation Director-General Margaret Chen declared EVD epidemic an outbreak which must be considered as a public health Emergency of international concern.

Ebola virus belongs to virus family Filoviridae and have sister viruses like the Cueva viruses and Marburg viruses. There are 5 species of Ebola virus identified so far: Zaire Ebola virus, Bundibugyo Ebola virus, Sudan Ebola virus and Thai forest Ebola virus. Africa have experienced large outbreaks of Bundibugyo Ebola virus, Zaire Ebola virus and Sudan Ebola virus and currently the most adverse and complicated Ebola epidemic in West Africa since 2014 till date has been identified to belong to the Zaire Ebola virus species.

According to Centre for Disease Control the natural reservoir host of Ebola virus is unknown but according to evidence, similar viruses are animal-borne and bats are most probable reservoirs. In 2014 and early 2015 the West African Ebola virus disease outbreak had a total weekly case incidence which increased from 35 to 65 new cases in Guinea. At a certain point there were 76 new confirmed cases in Sierra Leone while Liberia continued to show low case incidence (CDC Feb 2015).

### **Transmission and Risk of Exposure**

Fruit bats are the most known natural Ebola virus host. Other suspected hosts are Chimpanzees, Gorillas, monkeys, forest Antelopes and Porcupines found most especially in the rainforest (WHO 2015).

Ebola is spread through human to human contact by direct human contact. Ebola is found in human blood, secretions, organs and every other body fluid.

Health workers and care givers of infected persons with EVD have been mostly exposed to EVD. Burial ceremonies have also exposed people to EVD due to close contact with an infected corpse.

It is also known that people that have recovered from EVD remain infectious because their blood, semen and breast milk will still contain the virus. It takes 7 weeks after recovery from the illness for the Ebola virus to clear from the human system.

### **Symptoms of Ebola Virus Disease**

The incubation period of Ebola virus is 2 to 21 days (3 weeks). Humans are not infectious till they begin to exhibit symptoms. Symptoms of EVD include; fever, tiredness, body pains, headache and sore throat and unfortunately these symptoms mimic other common illnesses in Africa such as malaria, typhoid fever. This is followed by vomiting, diarrhoea, rashes, symptoms of impaired kidney and liver function, and in some cases, both internal and external bleeding (e.g. blood oozing from the gums and blood in the stool). Laboratory findings include low white blood cell and platelet counts.

### **Diagnosis**

It can be difficult to differentiate EVD from other infectious diseases such as malaria, typhoid fever and meningitis. Diagnostic confirmation of Ebola virus infection can be made using the following investigations: antibody-capture enzyme-linked immunosorbent assay (ELISA), antigen-capture detection tests, serum neutralization test, reverse transcriptase polymerase chain reaction (RT-PCR) assay, electron microscopy, virus isolation by cell culture.

Samples from patients are considered extreme biohazard risk; laboratory testing on non-inactivated samples should be conducted under maximum biological containment conditions (CDC 2014).

### **Treatment and Vaccines**

Supportive care-rehydration with oral or intravenous fluids and treatment of specific symptoms, improves survival. There is no proven treatment available for EVD. However, some of the potential treatments involving blood products, immune therapies and drug therapies are currently being evaluated. No licensed vaccines are available yet, but 2 potential vaccines are undergoing human safety testing.

### **Prevention and Control**

EVD outbreak control depends on applying a package of interventions such as case management, surveillance and contact tracing, a good laboratory service, safe burials and social mobilisation. Community engagement is the key to successfully control of outbreaks. Raising awareness of risk factors for Ebola infection and protective measures

that individuals can take is an effective way to reduce human transmission. Risk reduction messaging should focus on several factors:

Reducing the risk of wildlife-to-human transmission from contact with infected fruit bats or monkeys/apes and the consumption of their raw meat. Animals should be handled with gloves and other appropriate protective clothing. Animal products (blood and meat) should be thoroughly cooked before consumption.

Reducing the risk of human-to-human transmission from close contact with people with Ebola symptoms, particularly with their bodily fluids. Gloves and appropriate personal protective equipment should be worn when taking care of ill patients at home. Regular hand washing is required after visiting patients in hospitals, as well as after taking care of patients at home.

Epidemic containment measures including prompt and safe burial of the dead, identifying people who may have been in contact with someone infected with Ebola, monitoring the health of contacts for 21 days, the importance of separating the healthy from the sick to prevent more spread, the importance of good hygiene and a clean environment.

## **METHODOLOGY**

This paper was written based on the information and indices gathered from world health organisation, centres for disease control and prevention and other news agencies.

Blood test for Ebola such as antibody-capture enzyme-linked immunosorbent assay (ELISA), antigen-capture detection tests, serum neutralization test, reverse transcriptase polymerase chain reaction (RT-PCR) assay, electron microscopy, virus isolation by cell culture has been used to diagnose Ebola virus disease and this had been approved by World Health Organisation. This has been used to identify patients. Currently Ebola testing needs a laboratory analysis of the blood for the fragments of Ebola virus genetic materials; it can take 12 to 24 hours to have a correct diagnosis. Rapid blood test for Ebola has also been approved by World Health Organisation.

Corgenix a US based company has developed the ReEBOV Antigen Rapid Test and trials in parts of West Africa have shown 92% success testing rate. The World Health Organization said: "While less accurate, the antigen test is rapid, easy to perform and does not require electricity".

Dr Ben Neuman, a lecturer in virology at the University of Reading, said: "The new test could help to quickly confirm outbreaks in remote areas without the need to send samples to a testing clinic and wait for results (BBC News 27 Feb 2015). "The new test isn't about saving the lives of infected people, but it can help in the long run by making it easier and quicker to detect Ebola outbreaks."

## **FINDINGS**

In December 2013 in Guinea a girl known as Emile Ouamouno who was just two years old living in the village of Meliandou began suffering from a fever, headache and bloody diarrhoea. His family did all they could to save her life but the boy died after a few days his 3 year old sister Philomene and her mother Sia whom was pregnant died also. This was how the outbreak started and killed more than 10000 people subsequently.

It is believed that it was in the village of Meliandou in Guinean forest region which was popular for palm cultivation and processing that Ebola virus disease started and might have been attracted from the fruit bats carrying the virus.

Due to the porous land border crossing system, EVD spread across into Liberia and Sierra Leone.

During that period, health workers did not understand the illness so the hospitals became infectious areas.

Sierra Leone's first diagnosed case was a pregnant woman that was admitted in a hospital in Kenema district on 24th May 2014. The woman had attended the funeral of a well-known traditional healer. The healer was treating Ebola patients whom came from Gueckedou region of Guinea before she died. It was found out that 13 more people who attended the same burial died of the same virus.

According to the WHO 2015 and BBC 27 Nov.2014 "quick investigations by local health authorities

suggested that participation in that funeral could be linked to as many as 365 Ebola deaths".

Subsequently EVD spread into Freetown the capital of Sierra Leone which was overcrowded and got out of control.

Lack of human resources and standard health facilities have limit the fight against Ebola in Liberia, Guinea and Sierra Leone.

The first case in Liberia at the border region was officially confirmed on 23 March 2014 by World Health Organization (WHO). In August 2014 the virus took hold of Monrovia the capital of Liberia in a popular densely populated area called Montserrado district.

Throughout September, Liberia was reporting over 200 new cases per week.

By 23rd September 2014 the world health organisation reported that 61 health workers had already died of Ebola Virus Disease in Sierra Leone alone.

On October 19th 2014 WHO reported that 95 health workers had died in Sierra Leone again.

By February 2015, Guinea, Liberia and Sierra Leone had already lost 490 health workers out of the affected 837 health workers (The economist. 2015).

According to World health Organisation, Ebola deaths Figures up to 12-15 February 2015; 9,380 deaths - probable, confirmed and suspected. (Includes one in the US and six in Mali) 3,900 Liberia 3,408 in Sierra Leone, 2,057 in Guinea and 8 in Nigeria.

## **CONCLUSION**

Mistrust, rumour and confusion about the pattern of infection of EVD paved way for Ebola virus Disease spread and other speculations had it that the western world scientists genetically engineered the virus and spread it in Africa to de-popularize the continent. Other people believed it was a repercussion of war crimes committed during Liberian and Sierra Leonean war times.

People trusted alternative medicine practitioners better than the health workers that came to salvage the situation initially. The society believed so much in the tradition of looking after their sick relatives without minding the consequences of the infection and the society had so much respect for their burial rites irrespective of the cause of death.

Another factor was low use of condoms in sex practices and the Ebola virus thrives in spermatozoa and even seven weeks after curing a patient from Ebola virus disease.

There was lack of basic infrastructure in the region due to long term post war effects, corrupt government, and poverty. These infrastructures include Hospitals, equipment to transport sick people, electricity, assessable roads and potable water to practice good hygiene all these factors contributed to the spread of Ebola virus disease in the affected Africa region.

There were lack of health workers in the region and the Health workers in the region did not understand the disease when it first struck the area and the health workers lacked the preparedness to tackle the epidemic.

There is decline in Ebola virus disease because of improved contact tracing and earlier case identification and improved community engagement with better emergency response.

On 29 April 2015 a total of 33 cases of EVD occurred during the week;Forecariah in Guinea and Kambia in Sierra Leone had 25 cases (76%) of all confirmed cases (WHO Ebola situation report-29 April-2015).

On 6 May 2015 a total of 18 confirmed cases of EVD occurred in the week, Guinea had 9 cases and Sierra Leone had 9 cases (WHO Ebola situation report-6-May-2015).

The Control of outbreak of EVD is dependent on intervention package which includes case management, surveillance and contact tracking, good laboratory service, good burial practice and public awareness.

The community is the key factor to controlling EVD and their involvement in controlling EVD outbreak

leads to success. Community involvement encompasses; community engagement which involves awareness campaign on factors spreading EVD and necessary measures to prevent EVD.

Wild animals should be handled with gloves and cooked properly before human consumption. Infected patients must be isolated, handled with gloves and protective wears without exposing any part of their body

Hands should be washed with running water and soap regularly. Infected and dead corpses should be buried deep down the soil or better still, cremated.

People suspected to have EVD by showing symptoms or that have been in contact with Ebola victims should be quarantined and watched for 21 days for symptoms EVD.

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