Ebola in West Africa

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Introduction: Ebola

Ebola, also known as Ebola hemorrhagic fever, is a rare and deadly virus. The disease is caused by an infection with a virus of the family *Filoviridae,* genus *Ebolavirus*. There are five known species of the virus, of which four are known to cause disease in humans. The first documented case of Ebola was in 1976, near the Ebola River in what is now called the Democratic Republic of Congo, Africa. Since then, outbreaks have sporadically occurred primarily in West Africa (CDC, Ebola).

While the natural reservoir host of the Ebola virus is unknown, scientists have predicted that an infected fruit bat or primate transmitted the disease to the first documented Ebola patient. Once a human is infected, the virus is transmitted by direct contact (through broken skin or mucous membranes such as eyes, nose, mouth) with the blood or bodily fluids (urine, saliva, sweat, feces, vomit, breast milk, semen) of someone who is sick with Ebola, contact with objects (needles, syringes) that have been contaminated with the virus, or through contact with infected animals such as fruit bats, apes, and monkeys. The Ebola virus does not spread through the air or by water. Furthermore, there is no evidence that mosquitos or any other insects transmit Ebola. After the virus enters the host, replication begins, leading to the onset of symptoms (CDC, Ebola).

There are many symptoms of Ebola that are often similar to those experienced with common viral illnesses. Symptoms include fever (100.4°C or higher), headaches, myalgias, weakness, fatigue, diarrhea, vomiting, abdominal pain, and unexplained hemorrhaging. These symptoms last anywhere from 2 – 21 days post-exposure but on average last 8 – 10 days. It is important to keep in mind that the human is only infectious after the onset of

symptoms. Furthermore, the most infectious stage is when there is a high viral count in the body.

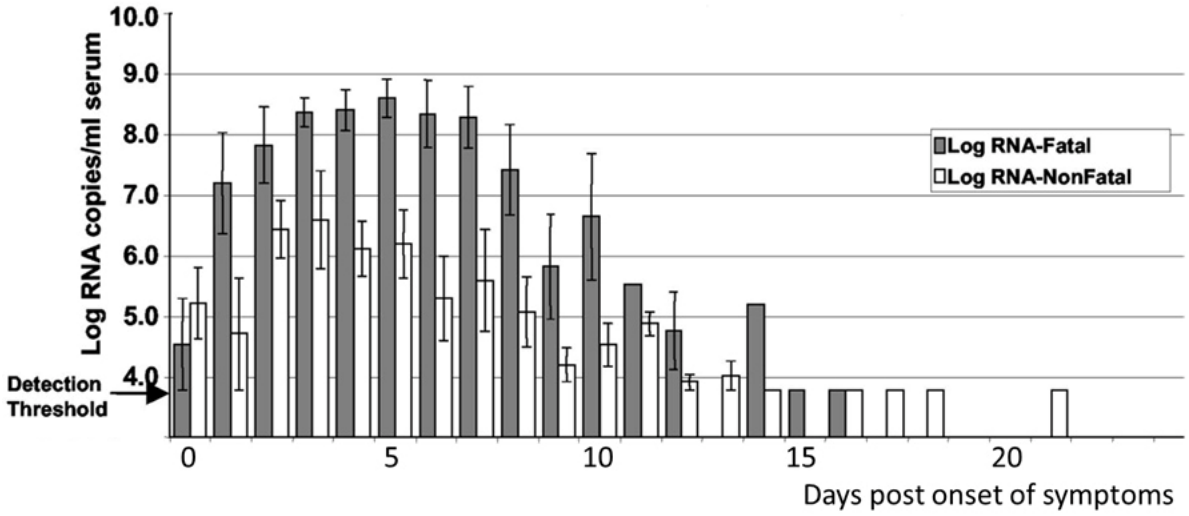

Figure 1. Ebola virus RNA copy levels in sera over time from 45 Ebola Virus Disease (EVD) patients

As illustrated in Figure 1, the person is most contagious from days 3 – 7 post onset of symptoms due to the large quantity of viral RNA in the body. This does not mean that an infected person will not be contagious on the first day, but rather that the statistical likelihood is lower. However, when exposed to a large number of people with the Ebola virus, such as in West Africa, the chances for infection are much higher.

Methodology and Case Studies: West Africa

Figure 2. 2014 Ebola Outbreak in West Africa – Outbreak Distribution Map

As depicted in Figure 2, the 2014 Ebola West Africa outbreak is centered in Guinea, Liberia, and Sierra Leone. Further evidenced in Figure 2 is that Sierra Leone has the highest prevalence of Ebola of the three countries. Along with the three countries mentioned above, Mali also has 1 – 5 cases of Ebola. Whether these cases are related to the outbreak in the other three countries still remains unclear. Furthermore, the 'patient zero' for the current outbreak has not yet been determined.

Sierra Leone

Sierra Leone is the most affected country in West Africa. There have been 6,599 cases of Ebola in Sierra Leone, of which 5,441 have been confirmed to be Ebola. There are various reasons why the incidence rate for Ebola is still increasing in Sierra Leone whereas in the other two countries they are not. Sierra Leone ranks in the bottom ten amongst all countries in the Human Development Index, which assesses healthy living and standards of living for development (WHO). It is also one of the most impoverished countries in the world. These obstacles hinder access to healthcare for the general population. Furthermore, there are shortages of treatment beds for Ebola in Sierra Leone (Associated Press). Without sufficient treatment areas, Ebola-infected patients will either die or transmit the disease to someone else. There's also the issue of having appropriate staff ready to treat the patients. Furthermore, improper burials are also responsible for contributing to the incidence rate for Ebola. Bodies of Ebola victims are contagious and must be buried properly to avoid further infection. The problem arises because cultural practices call for dead bodies to be washed, and in particular female bodies to be washed by women. However, there aren't enough properly trained burial teams nor do they have

enough women to properly wash the female bodies. As a result, the dead bodies often get washed before the arrival of burial teams which then causes more infection. Due to these issues, reducing the incidence of Ebola has been a challenge that many healthcare and public health agencies had not foreseen.

Liberia

Organizations have struggled to prevent the spread of Ebola in Liberia similar to those reasons mentioned for Sierra Leone. However, the situation is exacerbated by the fact that due to the large number of Ebola cases, the Liberian health system is being utilized to its maximum, which causes complications and obstacles for patients not associated with Ebola. Experts state that Liberians have started dying due to preventable conditions such as malaria, diarrhea, and pneumonia whereas the rate wasn't as high prior to the Ebola outbreak (Pizzi, 2014). There are multiple factors worsening this situation. The already strained health system is unable to accommodate for more patients that are created due to the Ebola outbreak. The healthcare workers are also unable to treat the patients due to the lack of proper equipment. Furthermore, patients are worried that they might contract Ebola if they chose to seek treatment in a hospital. As a result, someone who might critically need treatment would not receive it. All of these factors have exacerbated the Ebola outbreak occurring in Liberia as well as the other parts of West Africa.

Analysis

Slowing down and eventually stopping the Ebola outbreak in West Africa is no easy measure. However, there are some steps that can be taken to prevent further spread of the disease. One initiative that needs more emphasis is proper contact tracing. Contact tracing is finding anyone who has come in direct contact with a sick Ebola patient. These contacts

are then monitored for 21 days for signs of infection. If any signs of infection are detected, the contacts are then quarantined and treated (CDC). Due to the poverty and lack of appropriate infrastructure in West Africa, contact tracing has been an obstacle. Many contacts either do not have addresses listed for tracing or their addresses are vague such as "down by the farm road" (Cohen, 2014). When public health workers attempt to locate the contacts, often times they are not available at their provided addresses. This prevents the proper measures from being taken.

In the healthcare setting, there are many more protocols that need to be followed in order to prevent further Ebola infections. The CDC has a manual for treating patients with viral hemorrhagic fevers such as Ebola. In this manual, there are detailed steps on maintaining a standard level of precautions on all patients, appropriate hand washing techniques, isolation techniques, appropriate PPE equipment, safe burial practices, decontamination techniques, and many other useful protocols that would help prevent the spread of Ebola in the healthcare setting (CDC Manual).

Conclusion

Although there are many well-organized protocols that can be set in place to help reduce the incidence of Ebola in West Africa, it is difficult to do so because of the region. Lack of resources and infrastructure prevents the training and proper equipment necessary for treatment from being available. One possible solution to this would be the presence of foreign public health agencies to help train and organize treatment efforts in the affected areas. Furthermore, holding the native governments accountable for the foreign aid would help them efficiently delegate resources. Although the outbreak is far from over, many groups are currently taking steps to ensure that it does not spread.

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