SSPC Issue Brief

Ebola Outbreak: Lessons Learnt and Future Challenges

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The article discusses the devastating effect of Ebola outbreak and challenges in terms of combating this lethal disease. It describes Ebola in brief and explains how the outbreak poses challenges in terms of combating against this particular disease and offers few significant lessons that have been ignored in the past. The article emphasizes on prioritizing activities related to strengthening holistic defense mechanism to combat against natural, accidental or deliberate outbreaks.

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After the devastating effect of Ebola virus across West Africa, where the death toll crossed few thousands within few months, the World Health Organization (WHO) declared Ebola epidemic an international health emergency.[1] Ebola cases were first reported this year in Guinea in March, and later spread across the border to Liberia and Sierra Leone. The outbreak is the largest one recorded in world history till date, which has completely infected three African capitals.[2] Professor Peter Piot, a Belgian microbiologist, presently the Director of the London School of Hygiene and Tropical Medicine was part of the team that discovered the Ebola virus in 1976, said in an interview that he never thought that 'the virus would take this kind of dimension, turning from a small outbreak into a horrifying humanitarian crisis. [3]

In addition, with each passing day, fresh reports related to the spread of this deadly virus is appearing in the media, including in India. Fortunately, the two suspected cases of Ebola have turned out as negative in India; however, the possibility of future outbreak cannot be totally ruled out.

Ebola Virus Disease

The first question that comes up in minds of those who do not know why and how this remotely heard viral disease has taken such a devastating toll on human lives is 'What is Ebola?'.[4] Ebola Virus Disease (EVD), formerly known as Ebola Hemorrhagic Fever, is a severe, often fatal illness in humans caused by genus Ebola virus, which comprises of five distinct species.[4] It is named after the Ebola River in Zaire where the viral disease emerged for the first time in 1976.[5]

In Africa the Ebola infection has been documented through the treatment of infected chimpanzees, gorillas, fruit bats, monkeys, forest antelope and porcupines found infected or dead in the rainforests. Ebola spreads in humans through direct contact (through broken skin or mucous membranes) with blood, secretions, organs or other bodily fluids of infected people, and indirect contact with environments contaminated with such fluids. The incubation period of the infection is 2-21 days after which the virus starts showing its symptoms. The symptoms include acute viral illness and weakness, muscle pain, headache and sore throat. This is followed by vomiting, diarrhea, rash, impaired

[1] "WHO declares Ebola epidemic an international health emergency", Reuters, August 8, 2014. http://www.reuters.com/article/2014/08/08/us-health-ebola-emergency-idUSKBN0G80M620140808

[2] "Ebola Crisis Triggers Health Emergency" Associated Press, July 31, 2014.

[3] R. V. Bredow and V. Hackenbroch, "In 1976 I discovered Ebola - now I fear an unimaginable tragedy: Interview with Peter Piot", The Observer, October 4, 2014. http://www.theguardian.com/world/2014/oct/04/ebola-zaire-peter-piot-outbreak.

[4] "Ebola Virus Disease, Fact sheet N°103", World Health Organization, April 2014.

[5] "Brief General History of Ebola", https://web.stanford.edu/group/virus/filo/history.html

kidney and liver disfunction, and in some cases, both internal and external bleeding. Laboratory findings include low white blood cell and platelet counts as well.[6]

Although Ebola is not a new virus, it is unfortunate that there is still no vaccine or other medicines available for its treatment. Ebola has a high fatality rate of about 60%. Experts, however, consider low risk among travelers of contracting Ebola because the infection requires direct contact with bodily fluids or secretions such as urine, blood, sweat or saliva. Ebola cannot be spread like flu through casual contact or breathing in the same air. However, the patients become contagious once they start showing the symptoms of the disease, and the most vulnerable are health-care workers and those who come in direct contact with the patients.[7]

The WHO appealed for international aid to help affected countries during a press conference, which was held on August 8, 2014 in Geneva, after a rare meeting of the UN Health Body's emergency committee. The committee urged screening of all people flying out of affected countries in West Africa. It also urged the airlines to take strict precautions in order to avoid the spread of the infection across the globe. It, however, also instructed world nations not to stop humanitarian services to the West African countries hit hard by the outbreak. The committee also called on the countries around the globe to be prepared to detect, investigate and manage Ebola cases, if they are reported. WHO director-general Margaret Chan called it the largest, most severe and most complex outbreak in the nearly four-decade history of this disease. "I am declaring the current outbreak a public health emergency of international concern," Chan said, warning of the "serious and unusual nature of the outbreak and the potential for further international spread".[8]

Epicenter and beyond

The latest EVD outbreaks have affected primarily several African countries and most of the cases of human infections and deaths have occurred in these areas. The most affected countries during this year's outbreaks are Guinea, Liberia and Sierra Leone. There are other countries where Ebola virus reached are Nigeria and Senegal. Beyond the African continent, the Unites States and Spain have registered cases of infections with a case of death reported in the United States on October 8, 2014. The Centers for Disease Control (CDC) and WHO estimated total laboratory-confirmed Cases at 4655 and death toll reached 4033 as of October 8, 2014. However, according to CDC, the outbreak in

[6] "Ebola Virus Disease, Fact sheet N°103, World Health Organization, April 2014, http://www.who.int/mediacentre/factsheets/fs103/en/

[7] "Ebola Crisis Triggers Health Emergency," Associated Press, July 31, 2014, http://www.dddmag.com/news/2014/07/ebola-crisis-triggers-health-emergency.

[8] "WHO declared Ebola epidemic a global emergency", New vision, 11 August 2014, http://www.newvision.co.ug/news/658565-who-declares-ebola-epidemic-a-global-emergency.html.

Democratic Republic of the Congo is unrelated to the current outbreak of Ebola in West Africa where there have been 70 cases of EVD reported with 43 deaths.[9]

Challenges

The outbreak poses significant challenges that cannot be met in a day or a week. First of all, as the vaccine would be available only by 2015 [10] the question emerges as to how to combat the deadly virus till then? It also requires huge funding to develop, produce and verify vaccines before applying to humans. Also, it requires advanced and well-prepared public health facilities to combat this dreadful epidemic, which is not available at the moment.

Despite of the WHO's estimation that almost 20,000 people could still be infected with Ebola in Sierra Leone, Liberia and Guinea, there are news reports of inadequate health-care facilities in these countries. The international president of Medicines sans Frontiers (MSF), Dr Joanne Liu, has stated that despite the problem existing for six months now, the response has been too little, and too late. Also, no amount of vaccinations and new drugs are able to prevent the escalating epidemic. She also added that insufficient health-care facilities and surging number of deaths have created a riot-like situation. Since frontline health-care workers are also getting infected, many of their co-workers are leaving the affected places due to fear. This problem has also affected those who are suffering from common ailments such as common cold and flu as entire heath system seems to be crumbling. Although the MSF has doubled its staff of volunteer doctors in the region, it is being unable to cope with the situation.[11]

Seeing the scale of the threat, the government of Saudi Arabia has banned entry of travelers from Liberia, Guinea and Sierra Leone apart from preparing hospitals to respond effectively in case of an outbreak. Saudi officials have also been closely monitoring incoming flights from Kenya, Congo and other countries with reported cases of Ebola. [12]

Lessons

This outbreak poses challenges not only in terms of combating against this particular disease; it also offers few lessons that have been ignored in the past.

9 "2014 Ebola Outbreak in West Africa," Centers for Disease Control, October 8, 2014, http://www.cdc.gov/vhf/ebola/outbreaks/2014-west-africa/index.html

10 "Ebola Vaccine not before 2015, says WHO," Times of India, August 11, 2014

11 "Ebola outbreak: call to send in military to West Africa to help curb epidemic" The Guardian, September 2014, http://www.theguardian.com/society/2014/sep/02/ebola-outbreak-call-send-military-curb-epidemic.

12 Saudi Arabia bans Ebola-stricken countries from Hajj pilgrimage, PBS Newhour.com, October 2, 2014, www.pbs.org/newshour/rundown/saudi-arabia-bans-pilgrims-ebola-stricken-countriespilgrims-ebola-stricken-countries-banned-hajj/.

First, deliberately or accidently, if such outbreak occurs, we need to have an efficient and fully equipped local and global public health system, which unfortunately is not a reality yet. It is true that we cannot assume or detect the cause of the outbreak, or the particular agent behind the outbreak, however preparedness to combat such outbreak has to be there. Early detection of the cause of the outbreak, fast first-level response and well-organized communication mechanism at various levels to alert other agencies or organizations are expected out of an efficient public health system. In case of Ebola outbreak, the first-level response cannot be considered competent enough in view of the fact that no medicines or vaccines were available to treat the patients. Also, the hospitals were not prepared for such an outbreak. Also, it has to be ensured that the health-care workers are comprehensively protected against any such outbreak.[13] The outbreak not only affected the entire mechanism to combat against the deadly outbreak but also discouraged health-care workers from saving lives.

Secondly, production and verification procedure of broad-spectrum vaccines need to be accelerated. In case of Ebola outbreak, WHO stated that an efficient Ebola vaccine will be available by 2015.[14] It is not only development and production of vaccines that matters, but also funding and availability of that vaccine on time, which is a challenge for most countries. Also, all new vaccines need to pass through a multi-level testing and approval process before they can actually be used. It involves (but not limited to) clinical trials, regulatory review and approvals, tracking side effects once the vaccine is administered and quality control.[15] Error! Reference source not found. As the entire process of making the vaccine ready for public use is complex and lengthy, it leaves a room for usage of illegal or unverified vaccines in times of emergency. There are also chances of ineffectiveness of the untested vaccine along with the possibility of unknown side effects, which can pose another potential risk in saving lives.

In view of the fact that presently no vaccine or medicines are available to treat this lethal disease, the WHO allowed the health authorities to use untested drugs to treat patients and called it ethical in the light of the surmounting scale of the outbreak and deaths. However the supplies of treatments were limited.[16]

The untested medicine named ZMapp**,** has so far shown mixed results. Dr. Abraham Borbor of Liberia, who was among the six Ebola patients in the world to receive the drug ZMapp, died. He was the deputy chief medical doctor at Liberia's largest hospital and was among the three Liberians who were treated with the medicine. On the other hand,

[13] "Ebola outbreak: call to send in military to West Africa to help curb epidemic" The Guardian, September 2014, http://www.theguardian.com/society/2014/sep/02/ebola-outbreak-call-send-military-curb-epidemic.
[14] "Ebola Vaccine not before 2015, says WHO", Times of India, August 11, 2014.
[15] "Vaccine testing and approval process, The Centers for Disease Control and Prevention, http://www.cdc.gov/vaccines/resdev/test-approve.htm
[16] "Ethical to use untested Ebola drugs", BBC News, August 12, 2014, http://www.bbc.co.uk/news/world-africa-28754160.

the two Americans who were given this untested medicine survived. A Spaniard infected with Ebola and treated with ZMapp died later. There was no update available for the two other Liberians who were given the untested medicine.[17] Currently, few research organizations are involved in development of an efficient Ebola vaccine. The vaccine development team led by Adrian Hill, professor and director of the Jenner Institute at the University of Oxford, has come up with a vaccine, which is safe for human use. After conducting clinical tests, it has been found that the vaccine is safe for human use; however its effectiveness is yet to be tested. Meanwhile, 10,000 doses of the vaccine are being produced for distribution upon confirmation of effectiveness in humans and the team believes that if everything goes fine, the vaccine will be ready for release by the year-end. But Prof. Hill is also concerned that if the Ebola virus mutates, entire testing might have to be done once again, which will obviously impact the timeline to release the vaccine.[18]

The timeline is crucial as with every passing day the deadly virus is spreading across other countries. The Centers for Disease Control (CDC) confirmed the first case of Ebola in the US on 30 September 2014. The patient (Thomas Eric Duncan) travelled Dallas from Liberia recently and kept in isolation at the Texas Health Presbyterian Hospital. Health authorities are identifying other people who may have been exposed to Ebola, to try and isolate the virus if it has spread. Thomas Frieden, the director of CDC believes that there are no chances of transmission to anyone while the patient was travelling as he did not show any symptoms then, however people are in panic mode. [19] However, the patient has died later and a Texas health care worker, involved in the treatment of the patient, has been found positive to Ebola test. Dr. Frieden believes that although the worker wore all essential masks, gloves and gown during the treatment procedure, could not identify a specific breach of protocol that might lead her to get infected. CDC is now considering all health care workers, who were involved in the treatment of Thomas Duncan, to be potentially exposed to the dreadful disease. [20]

Reaching Indian Shores?

Alarming bells are ringing for India too. A country with huge population and inadequate health-care facilities certainly need to pay immediate attention to this issue. The threat increases seeing the number of Indians living in West Africa. During his recent visit to the US, Indian Prime Minister Narendra Modi discussed the threat posed by Ebola with the US President Barack Obama. "We have shared concerns over the Ebola crisis, and

[17] "Liberian doctor dies despite experimental Ebola treatment", CBS News, August 25, 2014, http://www.cbsnews.com/news/liberian-doctor-dies-despite-experimental-ebola-treatment/

[18] "Ebola vaccine safe, but effectiveness being tested: Oxford researcher, City News September 24, 2014, http://www.citynews.ca/2014/09/20/ebola-vaccine-safe-but-effectiveness-being-tested-oxford-researcher/

[19] "First Ebola case in US reported as Modi leaves after discussing issue" Times of India, October 2, 2014, http://timesofindia.indiatimes.com/world/us/Officials-confirm-first-Ebola-case-diagnosed-in-US/articleshow/43935267.cms.

[20] "First case of Ebola transmission in US" Times of India, October 13, 2004.

India has committed to spend 10 million dollars to contain the disease," Modi said after their first summit meeting that held on 30 September 2014 in Washington. [21]

Considering the potential threat posed by EVD, Indian authorities have increased strict screening for the Ebola virus at air and sea ports over the past two months. The government has bolstered the surveillance and is conducting detailed medical examinations of high-risk passengers, including checking their travel history, taking their body temperature and placing under quarantine people with possible symptoms of infection. The government has also identified one hospital with a dedicated isolation facility in each state to admit people with Ebola-like symptoms. These hospitals are equipped to handle sample collection, diagnosis and treatment of Ebola cases. According to the Union health minister Harsh Vardhan, "the health ministry is providing technical and material support to states for preparing health facilities with dedicated isolation wards, enabling them to provide diagnosis, treatment and care, and infection control under proper guidelines." He further emphasized that India has an efficient surveillance program running and are fully prepared to deal with any eventuality."[22] However, the preparation cannot be considered sufficient and full-proof in terms of maintaining the availability and consistency of advanced health care facilities across India.

Peter Piot resonated this concern loudly in his recent interviews by explaining how this situation would turn into a pandemic and why he is more concerned about India than an outbreak in Europe or North America. He centered his fear on the expatriates who work in trade or industry in the affected region and their possible travel to India after exposure to the virus. This could very rightly make things worse for the health care apparatus in the country. He categorically pointed that in public hospitals of India, doctors and nurses rarely wear protective gloves or gears which could help this virulent virus to spread.[23]

Time has therefore, come to prioritize activities related to strengthening holistic defense mechanism to combat against natural, accidental or deliberate outbreaks. Ebola outbreak also teaches a strong lesson -- not to consider such kind of occurrences as a fallacy. We are living in the time of highly advanced technologies, where everything ranging from health-care facilities to communication can be made better and effectual in terms of fighting such outbreaks. Efficient vaccines and medicines to treat Ebola will certainly be developed and distributed, however what matters is time. Late response means loss of more lives and hence it requires immediate concern from governments and scientific communities around the world.

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[21] "Fighting Ebola to nuke deal: Modi, Obama pledge to deepen India-US ties", Firstpost, September 30, 2014, http://www.firstpost.com/world/modi-obama-want-deepen-ties-discuss-nuke-deal-trade-facilitation-1738043.html.

[22] "India ramps up Ebola screening at airports", Hindustan Times, October 13, 2014, http://www.hindustantimes.com/india-news/india-on-alert-ramps-up-screening-for-ebola-at-airports/article1-1274928.aspx.

[23] R. V. Bredow and V. Hackenbroch, "In 1976 I discovered Ebola - now I fear an unimaginable tragedy: Interview with Peter Piot", The Observer, October 4, 2014. http://www.theguardian.com/world/2014/oct/04/ebola-zaire-peter-piot-outbreak.

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The views expressed in this article are solely that of the author.

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