

Review Article

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Current status of Ebola in West Africa and preparedness in Ethiopia

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Abstract

Keywords

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Ebola is a severe, often-fatal, zoonotic viral disease in humans and nonhuman primates (monkeys, gorillas and chimpanzees) that has appeared sporadically since its initial recognition in 1976. It is an RNA virus disease with a family of Filoviridae. There are five species of Ebola virus. Four of them cause disease in humans: Ebola-Zaire, Ebola-Sudan, originated from Africa and now spreading to other continents. There is no reported case of the disease in Ebola-Ivory Coast and Ebola-Bundibugyo virus. The fifth, Ebola-Restonvirus has caused disease in non-human primates. Infected bush meat; body secretions and sexual intercourse are the major ways of transmission. Infection is marked by initial signs of fever, fatigue, muscle aches, dizziness and then bleeding under the skin, mouth and eye. For the diagnosis of Ebola, ELISA tests and PCR are often the major one. There is no effective treatment for Ebola; patients are treated with general supportive therapy. The current outbreak of Ebola virus in West Africa with more than 26 000 cases and 11,000 deaths also demonstrates the long-underestimated public health threat that Ebola virus poses as a natural human pathogen and the decrease status of Ebola in West Africa has observed with different measures. Recently the outbreak of Ebola disease in Western countries of African continent is progressively decreased, some countries are declare Ebola free but in Guinea and Sierra Leone there are cases in a few districts. Ethiopia is prepared by screening test at the airport, identification of treatment center, creation of awareness in people, committed to survey and strengthen of communication channels. Emergency plan of action of Ethiopia is well managed with a free call of 8335 or 8665 for Ebola surveillance identification.

1. Introduction

Ebola is one of the most dramatic zoonotic infections. It is caused by a virus similar in form to Marburg virus but distinguished by differences in antigen testing profile. The virus is named after a river in the Democratic Republic of the Congo (formerly Zaire). Ebola hemorrhagic fever was first recognized in

1976, when large outbreaks occurred in southern Sudan and neighboring northern Zaire (Martin, 2009). Ebola virus causes an acute febrile illness associated with high mortality. This illness characterized by multisystem involvement that begins with the abrupt onset of headache, myalgias and fever and shock & often to bleeding manifestation (Kasper and Hauser, 2005).

Currently, West Africa is facing the largest outbreak of Ebola virus disease (EVD) in history. The virus causing this outbreak, the Zaire Ebola virus, belongs to the genus Ebola virus. Ebola virus is one of the most virulent pathogens among the viral haemorrhagic fevers, and case fatality rates up to 90% have been reported. Mortality is the result of multi-organ failure and severe bleeding complications (Goeijenbier *et al.*, 2014). Ebola, previously known as Ebola hemorrhagic fever can cause disease in humans and nonhuman primates (monkeys, gorillas, and chimpanzees). There are five identified Ebola virus species, four of which are known to cause disease in humans: *Zaire Ebola virus*, *Sudan Ebola virus*, *Tai Forest Ebola virus*, formerly *Côte d'Ivoire Ebola virus* and *Bundibugyo Ebola virus*. The fifth, *Reston Ebola virus* has caused disease in nonhuman primates, but not in humans. On the basis of evidence and the nature of similar viruses, researchers believe that the virus is animal-borne and that bats are the most likely reservoir (Goeijenbier *et al.*, 2014).

As of 8 May 2015, WHO has reported 26 683 cases, including 11 022 deaths, linked to the West African epidemic of Ebola virus disease (EVD) with onset in December 2013. Nine countries have reported EVD cases. Guinea, Liberia and Sierra Leone have experienced widespread and intense transmission. Mali, Nigeria, Senegal, Spain, the United Kingdom and the USA have at some point reported imported cases or import-related local transmission linked to the epidemic in West Africa, but now all except Guinea and Sierra Leone have been declared Ebola-free (ECDC, 2015).

Therefore, the objectives of this seminar are:-

- To know the current status of Ebola in West Africa and to highlight the preparedness of Ethiopia and its emergency plan of action for Ebola.

2. Historical back Ground of Ebola

The *Ebola virus* causes an acute, serious illness, which is often fatal if untreated. Ebola virus disease first appeared in 1976 in two simultaneous outbreaks, one in Nazara, Sudan and the other in Yambuku, in Democratic Republic of Congo. The latter occurred in a village near Ebola River, from which the disease takes its name. Since Ebola discovery in 1976 until December 2013: 23 outbreaks, 2388 human cases including 1590 deaths are recorded (WHO^d, 2015).

The first outbreak of Ebola (Ebola-Sudan) in 1976 infected over 284 people, with a mortality rate of 53%. A few months later, the second Ebola virus emerged in Yambuku, Zaire, *Ebola-Zaire*. It has the highest mortality rate of any of the Ebola viruses (88%), infected 318 people. *Ebola Reston* was first identified in 1989 when infected monkeys were imported into Reston, Virginia, from Mindanao in the Philippines. Fortunately, the few people who were infected with *Ebola Reston* (seroconvert) never developed Ebola hemorrhagic fever. *Ebola Cote d'Ivoire* was discovered in 1994 when a female ethologist performing a necropsy on a dead chimpanzee from the Tai Forest, Cote d'Ivoire, accidentally infected herself (Waterman, 1999).

3. Classification of Ebola virus

The genus Ebola virus is divided into five species (*Zaire*, *Sudan*, *Ivory Coast*, *Bundibugyo*, and *Reston Ebola virus*). All except *Reston Ebola virus* species cause diseases in humans (Mike^a and Daniel, 2015). The structures of Ebola viruses contain single-stranded, infectious RNA genomes. The virus genomes contain seven genes. The genomes of the five different Ebola viruses differ in order and the number and location of gene overlaps. As with all filoviruses, Ebola virions are filamentous particles that may appear in the shape of a shepherd's crook, of a "U" or of a "6," and they may be coiled, toroid or branched (Ascenzi *et al.*, 2008). The protein shell encloses the tubular helical nucleocapsid. Surface transmembrane glycoproteins of the virion provide the binding and fusion with the cell membrane, and penetration into the cell. Glycoproteins are responsible for almost all the virulence. Hence, monocytes, particularly macrophages, are the first cells infected, triggering apoptosis in lymphocytes which leads to inhibition of the immune response, including reduced production of interferon, favors the rapid spread of the virus in the body (Ascenzi *et al.*, 2008).

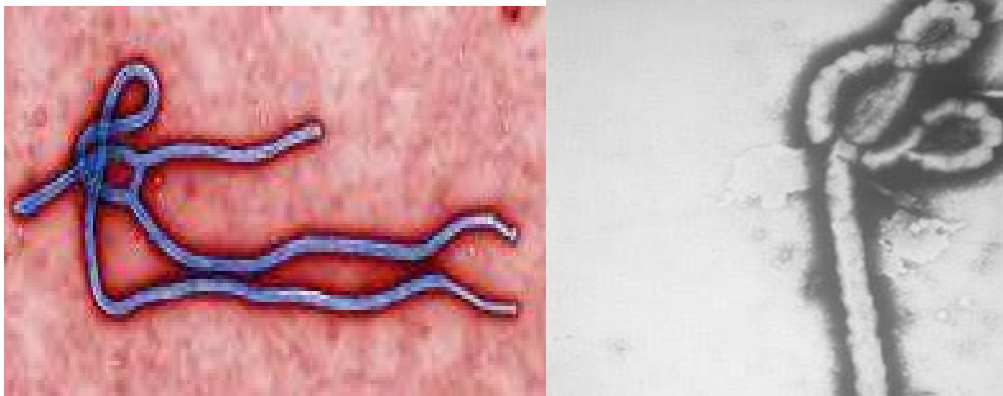


Figure1: Ebola virus under Electro -microscope **Source:** (Alemayehu, 2014)

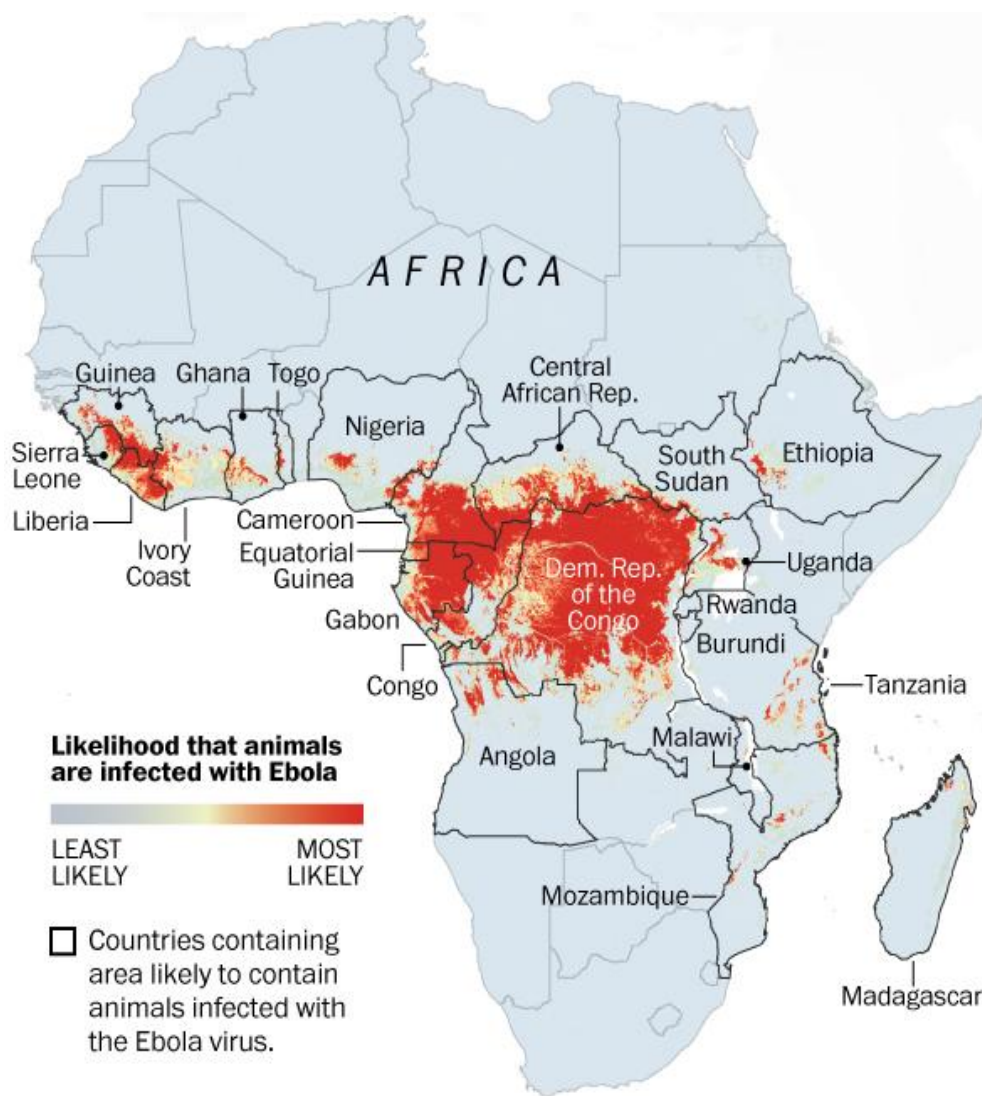
4. Epidemiology

Ebola hemorrhagic fever typically appears in sporadic outbreaks, there is increasing frequency of outbreaks in Sub-Saharan Africa of which significant ongoing outbreaks in wild (endangered) non-human primate species (chimpanzees) is reported. The exact origin, locations and natural habitat of the virus is not known. However, on the basis of available evidence and the nature of similar viruses, researchers believe that the virus, is zoonotic (animal borne) with four of the five subtypes occurring in an animal host native to Africa (Eliasetal.,2014).

The emergence of Ebola viral infections is currently ongoing in several African countries that include Zaire, Guinea, Liberia, Ivory Coast, Sierra Leone and Nigeria. The challenge is unprecedented because these countries have worst physician-patient ratios and weak health services (Surender *et al.*,2015).The disease distribution is typically occurs in outbreaks in tropical regions of Sub-Saharan Africa.The largest outbreak to date is the ongoing 2014 West Africa Ebola virus outbreak, which has caused a large number of deaths in Liberia, Sierra Leone, and Guinea. The *Zaire virus*, since it was first recognized in 1976, has caused multiple large outbreaks in Central

Africa, with mortality rates ranging from 55 to 88 percent. It is the causative agent of the West African epidemic. The *Ivory Coast virus* has only been identified as the cause of illness in one person, and that individual survived. The exposure occurred when an ethologist performed a necropsy on a chimpanzee found dead in the Tai Forest, where marked reductions in the great ape population had been observed. (Formenty, 1999)

The *Bundibugyo virus* emerged in Uganda in 2007, causing an outbreak of Ebola virus disease with a lower case-fatality rate (approximately 30 percent) than is typical for the Zaire and Sudan viruses (Jonathan, 2008). The Sudan virus has been associated with a case-fatality rate of approximately 50 percent (Onyango, 2007).The fifth Ebola species, the Reston virus, differs markedly from the others, because it is apparently maintained in an animal reservoir in the Philippines and has not been found in Africa. The Ebola Reston virus was discovered when it caused an outbreak of lethal infection in macaques imported into the United States in 1989. None of the personnel who were exposed to sick animals without protective equipment became ill, but several animal caretakers showed evidence of sero conversion (Mike^a and Daniel, 2015).



Source: Oxford University

Lazaro Gamio/The Washington Post

Figure 2: areas at risk of Ebola emergence **Source:**(The Washington post,2015)

4.1. Mode of transmission

4.1.1. Human to human

Human to human transmission occurs after direct contact with the blood, secretion or semen of infected patients. It occurs to those in closest contact with the victim. In Africa, limitation on availability of disposable equipment and protective clothing has also aggravated the transmission. But spread via aerosol is under research which is not demonstrated during outbreaks (Martin, 2009).

Disease in human: The pathogenesis begins with Cell entry and tissue damage after entering the body

through mucous membranes, breaks in the skin, or parenterally, *Ebola virus* infects many different cell types. Macrophages and dendritic cells are probably the first to be infected (Mike^a and Daniel, 2015). The disease shows nonspecific flu-like symptoms: abrupt onset of fever, chills and general malaise. Other signs and symptoms include weakness, anorexia; severe headache and pain in the muscle of trunk and lower back, relative bradycardia, a nonproductive cough and pharyngitis. Gastroenteritis with watery diarrhea, nausea, vomiting & abdominal pain are common. Hemorrhage and other findings: Hiccups, chest pain, shortness of breath seizure, & cerebral edema (Alemayehu, 2014).



Figure 3: clinical sign of Ebola in humans

Source: (Alemayehu, 2014)

4.1.2. Animal to human

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 which could be a possible indirect means of transmission from the

natural host to animal population from these fallen fruits (Gonzalez *et al.*, 2007).

A recent study in Central Africa showed that this deadly virus can spread from animal carcasses to hunters and bats could also infect the humans directly (Ebola WS, 2015).

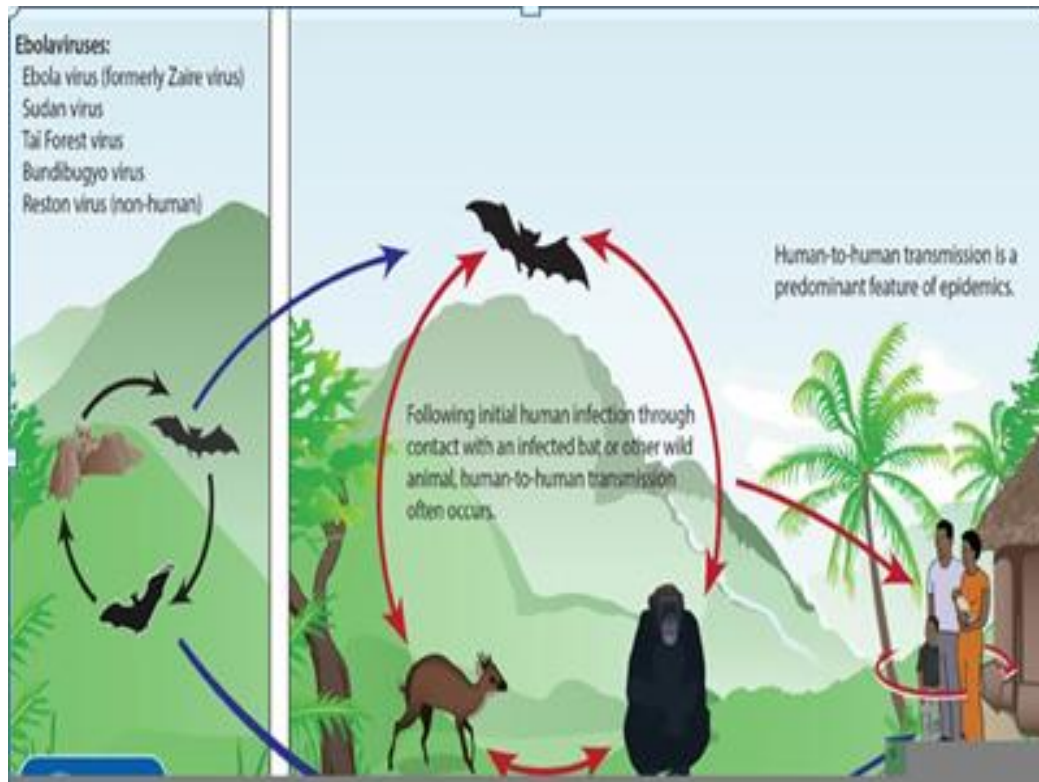


Figure 4: Ebola infection and transmission landscape Source: (Wikipedia^a, 2015)

4.1.3. Animal to animal

Direct and indirect contact between animals, feeding over the garbage which are already infected are the means of transmission of the virus. In domestic animals, in 2012 it was demonstrated that the virus can travel without contact from pigs to nonhuman

primates, although the same study failed to achieve transmission in that manner between primates. Dogs may become infected with Ebola virus but not develop symptoms. Dogs in some parts of Africa scavenge for food, and they sometimes eat Ebola virus infected animals and also the corpses of humans.

A 2005 survey of dogs during an Ebola virus outbreak shows a prevalence of 32% in dogs closest to the outbreak area where those away from the area had only 9% prevalence, though they remain asymptomatic (Weingartlet *al.*, 2013).

The pathogenesis of filovirusinfections is apparently similar in those non-humanprimates and humans.Non-human primates are in general highly susceptible to Filovirus infections. Large outbreaks of lethal Ebola virus infection have been reported in wild populations of gorillas and chimpanzees. Ebola virus causes severe disease characterized at first by fever and depression followed by diarrhea, petechiae, languor, shock and finally death(Elias *etal.*,2014).

4.2. Risk factors

Healthcare providers caring for Ebola patients and family and friends in close contact with Ebola patients are at the highest risk of getting sick because they may come in contact with infected blood or body fluids. Additionally, people can become sick with Ebola after coming in contact with infected wildlife. For example, in Africa, Ebola may spread as a result of handling bushmeat (wild animals hunted for food) and contact with infected bats.Ebola virus has been found in the semen of some men who have recovered from Ebola and there is high possibility of spreading Ebola through sex (CDC,2015).

Tourism is another possible exposure factor following outbreaks (Sharon, 2015). On the other hand movement of people away from affected areas has disturbed agricultural activities. The UN food and agriculture organization (FAO) has warned that the outbreak could endanger harvest and food security in West Africa(FAO, 2014).

5. Current status of Ebola in West Africa

Ebola disease in West Africa is more prevalent due to the fact that, countries with weak health systems and few basic public health infrastructures in place in Guinea, Liberia and Sierra Leone collapsed, fail to preparedness including a high level of vigilance for imported cases and a readiness to treat the first confirmed case as a national emergency, fail to community engagement which underlies the success

of all other control measures and single control intervention (WHO^f, 2015).

The first reported case in the Ebola outbreak ravaging west Africa dates back to December 2013, in Guéckédou, a forested area of Guinea near the border with Liberia and Sierra Leone. As of May 3rd 2015, 26,628 cases and 11,020 deaths had been reported worldwide, the vast major of cases and deaths are from Guinea, Sierra Leone and Liberia(The Economist, 2015).Many of the regions in the three most affected countries are now starting to see a slowdown in the number of infections. The World Health Organization reports that each country now has enough treatment beds to be able to isolate and treat patients with Ebola, and to bury everyone known to have died of the disease (The Economist,2015).

Reports from the 2014-2015 West African epidemics indicate that with adequate supportive care, the mortality associated with Ebola virus disease may be reduced. In the future, specific antiviral therapy may further diminish the morbidity and mortality of Ebola and Marburg virus diseases, and virus-specific vaccination may be able to protect humans against these conditions. Several measures have been implemented to slowdown the current epidemic. These include in the United States, public health authorities monitor healthcare workers who have cared for patients with Ebola virus disease and travelers arriving from Liberia, Sierra Leone, or Guinea. Sincethe World Health Organization declared the Ebola outbreak as Public Health Emergency of Concern, which allows countries to develop national preparedness capacities, including the duty to report significant events, conduct surveillance and contact tracing, as well as exercise public health powers, the United Nations created a special mission to help contain the outbreak and community care centers have been established in parts of West Africa to isolate patients who are awaiting Ebola diagnostic test results, and provide basic care (eg, oral rehydration) to patients who have confirmed Ebola virus disease pending transfer to Ebola treatment units(Mike^b and Daniel,2015).

The CDC currently estimates that actual cases in Liberia, Sierra Leone, and Guinea are two to three times higher than officially reported numbers as indicated in table-1

Table -1 Estimated cases and deaths of Ebola in May 9, 2015. *Int. J. Adv. Multidiscip. Res.* (2019). 6(1): 5-18

Country	No of Cases	No of Deaths	Reported date 9 May 2015
Liberia	10,564	4,716	outbreak ended 9 May 2015
Sierra Leone	12,492	3,904	6 May 2015
Guinea	3,592	2,387	5 May 2015
Nigeria	20	8	outbreak ended 19 October 2014
Mali	8	6	outbreak ended 18 January 2015
United States	4	1	outbreak ended 21 December 2014
United Kingdom	1	0	outbreak ended 10 March 2015
Senegal	1	0	outbreak ended 17 October 2014
Spain	1	0	outbreak ended 2 December 2014
Italy	1	0	12 May 2015
Total	26,683	11,022	as of 9 May 2015

Source: (Wikipedia^a, 2015)

5.1. Sierra Leone

The first case in Sierra Leone was nearby across the border with Guinea on May 2014. According to tribal tradition, they washed for burial and this appears to have led to infections in neighboring towns which come up the large outbreak of the disease. According CDC report up to 9th may 2015, the total number of cases were 12,492 of the 3,904 were died as indicated on table 1. Due to this fatality disease, the government of Sierra Leone has done legal measures quarantine the hot spots of the epidemic, shut its borders for trade with Guinea and Liberia and closed some schools in an attempt to slow the spread of the virus and the government began to deploy troops to enforce quarantines. After series straggles of the ministry of health of the government with international supportive agency, they come up today's lowest level of infection. According to WHO Situation Report, the incidence of case was rapidly decreasing in Sierra Leone on January 2015 (philstar, 2015). Ebola disease surveillance and health promotion amongst others and collaboration with national authorities (MSF, 2015). On April 5th WHO report that there was a sharp drop and a downward trend cases with no reports of unsafe burials Sierra Leone even though there is active Ebola transmission in few districts (Wikipedia^b, 2015).

5.2. Liberia

According to the New York Times, in Liberia, the first outbreak of Ebola disease was reported in Lofa and Nimba counties in late March 2014. The number of cases which are recorded according to WHO report up to May 6, 2015; 10,324 cases and 4,610 deaths. Due to geographical linkage of Liberia with Guinea and Sierra Leone the government had made legal actions like; close its borders, with the exception of a few crossing points such as the airport, where screening centers would be established, Schools and universities were closed, and the worst-affected areas in the country were placed under quarantine and banning of football events. In November 2014, the rate of new infections in Liberia appeared to be declining and the state of emergency was lifted. The drop in cases was believed to be related to an integrated strategy combining isolation and treatment with community behavior change including safe burial practices, case finding and contact tracing (The New York Times, 2014).

The last known case of Ebola died on 27 March 2015, and the country is conducting the 42-day countdown to be officially declared free of the disease. But with the outbreak still ongoing in neighboring Guinea and Sierra Leone, so it can't be sure to say that Ebola is over just yet. Vigilance against re-emergence is a key and close surveillance is crucial. Currently the country is free of Ebola after WHO officially declare on May 9th, 2015 Liberia is free of Ebola transmission (MSF, 2015).

5.3. Guinea

The outbreak of Ebola in Guinea was covered the entire country due to low health facility and geographical location to other Ebola endemic Countries. According to WHO report on April 26, 2015; the numbers of cases were 3,588 of whom 2,379 were died. The number of cases in Guinea keeps fluctuating, although it has significantly fallen. The high level of stigmatization and reticence, particularly towards recovered patients, is still a problem (MSF,2015). Médecins Sans Frontières (MSF), center for disease control and prevention (CDC) and WHO assisted the Ministry of Health of Guinea by establishing Ebola treatment centers in the epicenter of the outbreak (NPR, 2015). The continued occurrence of unsafe burials in Guinea accounts 60% of Ebola cases over the most recent reporting period are all attributable in part to continued difficulties with community engagement. Currently in this country there is a transmission in a few districts due to sexual intercourse that are recovered from the disease and unsafe burial (WHO^c, 2015).

5.4. Nigeria

The Ebola virus was introduced into Nigeria on 20 July 2014 in Lagos from Liberia. With this single case there was a set off chain of transmission that infected a total of 19 people, of whom 7 died. In response, the Nigerian government observed all of for signs of infection and increased surveillance at all entry points to the country. WHO commends the Nigerian Government's strong leadership and effective coordination of the response that included the rapid establishment of an Emergency Operations Centre (BBC News, 2014).

WHO, United States Centers for Disease Control and Prevention (CDC), Médecins Sans Frontières (MSF), UNICEF and other partners supported the Nigerian Government with expertise for outbreak investigation, risk assessment, contact tracing and clinical care. Strong public awareness campaigns, teamed with early engagement of traditional, religious and community leaders, also played a key role in successful containment of this outbreak (Tarik,2014).

Nigeria has revised its national preparedness and response plan to ensure that the country is well prepared for other imported cases of the disease. Currently Nigeria is Ebola free by combining action of Nigeria's government and other international

governmental organization like; WHO and CDC since October 20 after 42 days of incubation period for Ebola which is twice the maximum incubation period of Ebola virus (Fasina, 2014).

6. Preparedness of Ethiopia for Ebola

Ethiopia has been categorized by the World Health Organization (WHO) as "level 2" risk of transmission of the EVD through the importation of the virus by travel via Ethiopian Airlines, which has several flights to and from countries in high risk areas. In addition, there are a number of inter connected flights, which can possibly bring travelers from affected countries into the country. In-country international airports such as Bahir Dar, Dire Dawa and Mekele and could be the routes of entry of the affected individuals. Land crossings and sea ports could also be possible routes of entry for the affected individuals as most of the borders are porous, specifically through Kenya, a country which is already designated as "a high risk", and other routes through Dewele, Gambella, Metema, and Somali region borders (Relief web,2015).

So far no Ebola case is detected in Ethiopia. On the current status of Ebola virus disease in Ethiopia and across the globe is given to the journalists, screening of the incoming passengers using advanced camera screening is continued at Bole, Bahir Dar, Mekelle and Dire Dawa International airports, incoming passengers through eight border crossing areas are screened by infrared thermostat, isolation centers are well equipped and ready to handle Ebola outbreaks, 30,000 personal protective equipment's, essential drugs and supplies are available at all national and regional outbreak management centers, three Bio-safety level laboratories are fully equipped with qualified laboratory personnel's and equipment, reagents and supplies, Procurement of advanced mobile lab. Which is partly handled by WHO is in progress Training of health care providers on prevention and management of Ebola outbreak is ongoing. So far, 2,300 hospital staffs are trained and they are cascading the training, Regular contact tracing and close follow up is performed on people who are leveled as high and low risk (EPHI^a,2014).

A social mobilization guide line that is developed for the prevention and control of Ebola has been distributed to all regions in order to guide appropriate implementation. Different educational and information materials are produced and distributed to all regions and Assessment of the National preparedness on Ebola prevention and control was done by international

assessors and the feedback that the assessors provided has assured that Ethiopia is on track, similarly, the national Ebola technical working group has performed regional assessment on the prevention and control of Ebola, Ethiopia has sent 189 health and related professionals to assist the effort of curbing the Ebola outbreak in Liberia and Sierra Leone. When they back home, finishing their mission, they are quarantined for 21 days in centers which are organized to serve this purpose. The preparedness for the prevention and control of the outbreak will continue until WHO declares its elimination (EPHI^a, 2014).

These professionals are expected to play significant role in organizing a strong community response to stamp out the disease. With the help of other health workers and community health agents on the ground, the health workers can tap into their rich experience of implementing the health extension program and use it to successfully supervise and run the community treatment centers that are set up in Sierra Leone and Liberia. Ethiopia's team of health professionals were consist of medical doctors, nurses, field epidemiologists, environmental health professionals and public health specialists, who will support the strengthening of national health systems and Ebola outbreak response efforts in the affected West African countries (WHO^c, 2015).

The National technical committee has also briefed about the current level of Ebola prevention and control status of preparedness in Ethiopia to the Ethiopian Broadcasting Corporation. Printing of 1,000,000 copies of Amharic version brochures by the Federal Ministry of Health is on process to disseminate to all Regions of the country (EPHI^b, 2014). An external Ebola virus disease preparedness assessment was conducted in Ethiopia, 2-8 December 2014, to assist the country to effectively and safely detect, isolate, investigate, and report potential EVD cases and prevent an outbreak from occurring. To accomplish this goal, the team conducted scoping activities, stakeholder meetings, site visitations, and a table top simulation exercise to explore what systems were in place and what areas of preparedness could be focused on and strengthened (WHO^a, 2015).

The assessment team concluded that Ethiopia's preparedness is progressing well in line with National EVD Preparedness and Response Plan developed by the national EVD Technical Committee under the leadership of the Minister of Health in April 2014. The joint team to strengthen Ethiopia's EVD preparedness

was composed of experts from Ethiopia's Federal Ministry of Health, Ethiopian Public Health Institute, WHO, Centers for Disease Control, UNICEF, WFP, and Public Health England (WHO^a, 2015).

During the month of September 2014, WHO continued to work with EPHI, the Addis Ababa City Health Bureau and partners to coordinate and provide EVD sensitization trainings to several frontline groups including Ethiopian Airlines and airport staff, airport security personnel (part of the Federal Police), airport taxi drivers, police officers, UN volunteers and a number of hotel staff. Health workers at Felegehiwot Hospital in Bahir Dar also received the EVD training. The WHO Ethiopia Country Office facilitated and supported the training of five senior laboratory technologists from EPHI and the National Animal Laboratory at the South African National Institute for Communicable Diseases. The training was conducted in the first week of October 2014 as the report of WHO. The lab technologists were trained on RT-PCR (real time Polymerase Chain Reaction) and BSL-3 (Bio-Safety Level 3), returning with the necessary skills for laboratory testing of Ebola and they bring the required reagents provided by WHO (WHO^b, 2015).

Ethiopia also conducted a detailed EVD training for its technical officers at central and field levels focusing on Epidemiology, preventive measures, surveillance, contact tracing and for several preventive activities. As with other diseases, WHO actions for EVD preparedness and response include disease surveillance and information-sharing across regions to watch for outbreaks; technical assistance to investigate and contain health threats when they occur – such as on-site help to identify sick people and track disease patterns; advice on prevention and treatment options; deployments of experts and the distribution of health supplies (such as personal protective equipment for health workers); communications to raise awareness of the nature of the disease and protective health measures to control transmission of the virus; and activation of regional and global networks of experts to provide assistance, if requested, and mitigate potential international health effects and disruptions of travel and trade (WHO^b, 2015).

Ethiopia addresses remaining gaps that have been identified in the areas of implementation (Addis Ababa, Humera and Moyale) during joint monitoring missions carried out by the ERCS, Federal Ministry of Health (FmoH) and national task force for EVD preparedness. It includes: development of Information,

Education and Communication (IECS) materials (on audio media); Training of additional volunteers on social mobilization, training of volunteers on existing volunteers on Disease surveillance and management of safe and dignified burial; pre-positioning of personal protective equipment (PPE), and; training of volunteers on the use of personal protective equipment (PPE). As noted, 95 per cent of the activities planned as per the agreed Emergency Plan of Action (EpoA) have been carried out (Relief web, 2015).

6.1. Emergency plan of action of Ethiopia

Following the EVD outbreak in West Africa, the Ethiopian authorities has taken precautions to prevent the virus from entering the country. The FMOH have carried out activities including the training more than 200 health workers on EPD preparedness (the risk factors, symptoms, and key steps to preventing transmission of the virus); as put in place disease surveillance systems, established an isolation unit and pre-positioned Personal Protective Equipment (PPE) for use by its frontline staff in high risk situations. Further EVD preparedness training is planned to the Journalists at the federal level and various regions in addition to staff from various development sector offices. The FmoH has a developed National EVD preparedness plan of action, in collaboration with

stakeholders includingwith stakeholders such as ERCS, Medicines Sans Frontiers (MSF), the United Nations Children’s Fund (UNICEF)and World Health Organization (WHO), which have all been allocated into sub-groups based on their area of expertise. The FmoHhas established Taskforces for EVD preparedness (IFRC, 2015).

Ethiopia has not experienced EVD in the past, and the population has limited knowledge of the virus, and social mobilization / awareness raising activities are required to address the population’s fears and misconceptions surrounding it, specifically related to transmission and behaviors required to avoid risk. The Taskforce has identifiedpriority areas for the implementation of the EVD preparedness PoA as those that border neighboring countriesincluding, Kenya, Somalia and Sudan.The ERCS in accordance with the country PoA has proposed socialmobilization activities in 10 of the most at risk sub-cities of Addis Ababa, as well as the border towns of Humera(Tigray Region) and Moyelle (Oromia Region). The ERCS will participate in the established Task force and sub-committee meetings; as well as follow up andinformation sharing on EVD with branch offices and volunteers in order to ensure disease surveillance (IFRC, 2015).

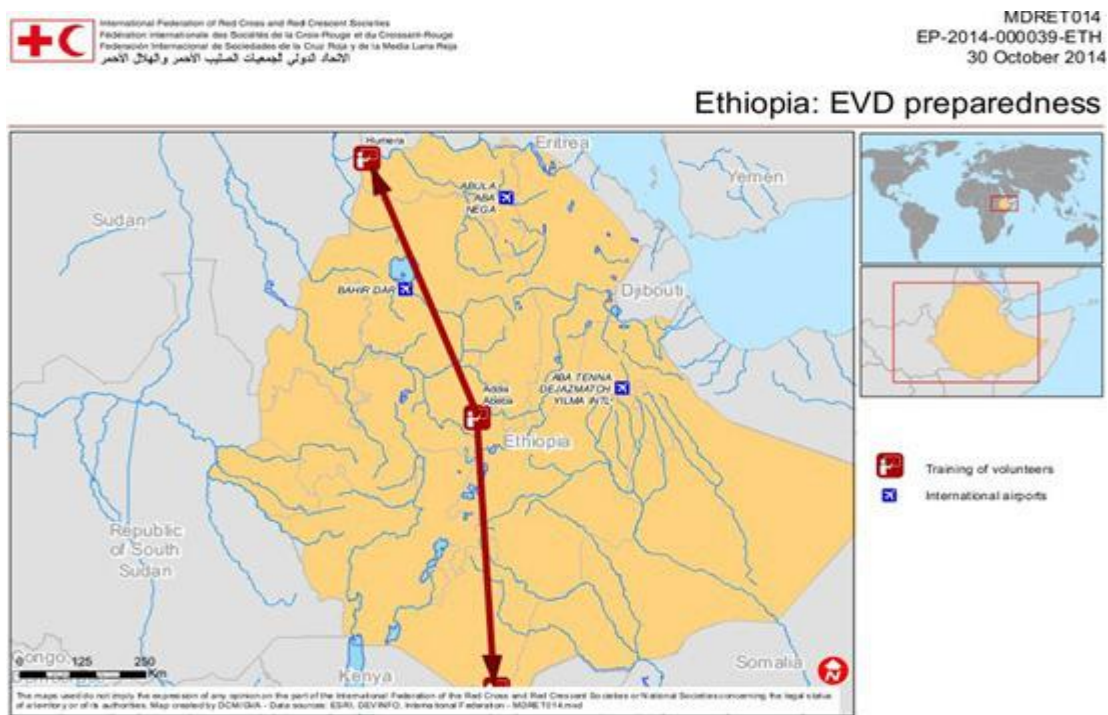


Figure 5: Ethiopia: Ebola virus preparedness **Source:** (IFRC, 2015)

ERCS is a member of the task forces for EVD preparedness, which have been established by the Public Health Emergency Management Institute, part of the Federal Ministry of Health at National, Federal and Regional levels; as well as a Social Mobilization Taskforce. ERCS has contributed to the National EVD preparedness Plan of Action, which has been developed by the FMOH, specifically focusing on social mobilization activities with the “Local Edir and Women association” in the Addis Ababa Administration and border regions. ERCS is also participating on the preparation and production of EVD related Information, Education and Communication materials (ERCS, 2015). If you or someone you know comes from Ebola endemic areas and have severe fever, headache, vomiting & diarrhea symptoms, please contact the front desk or call Ebola hotline toll free immediately 8335 or 8665 (EPHI^a, 2014).

7. Prevention and Control

The phrase “Prevention is better than a cure” could not be more true when no known cure is available. Some basic preventative steps can and should be taken to prevent contracting Ebola: Do not travel to outbreak countries unless absolutely required, avoid known outbreak areas, adhere to basic hygiene, wash your hands often, avoid physical contact with infected persons, do not under any circumstances handle remains of infected people, do not consume “Bush Meat”, do not handle items that may have been handled by an Ebola patient, wear protective attire if you must be near an infected individual, do not visit hospitals where Ebola is being treated, after visiting an infected area or person monitor your health for 3 weeks and maintain good general health and diet to maintain a healthy immune system (Noren, 2015). Vaccines are currently being researched by several companies and many show great promise. However, human trials have not yet been done on these vaccines and their efficacy in human hosts is unclear (Charles and Melissa, 2015).

To control the outbreak, enhancing communication across borders with respect to disease surveillance will assist in the control and prevention of more cases in this EVD outbreak. Keys to controlling EVD outbreaks include: -Active case identification and isolation of patients from the community to prevent continued virus spread, identifying contacts of ill or deceased persons and tracking the contacts daily for the entire incubation period of 21 days, investigation of

retrospective and current cases to document all historic and ongoing chains of virus transmission, identifying deaths in the community and using safe burial practices and daily reporting of cases. Education of health-care workers regarding safe infection-control practices, including appropriate use of personal protective equipment, are essential to protect them and their patients because health-care-associated transmission has played a part in transmission during previous outbreaks (Meredith and Dixon, 2014). Treatment is supportive but effective in reducing mortality, rehydration and intensive care. BCX4430, Z-Mapp and hyper immune globulins (Alemayehu, 2014). Additional supportive measures may be needed depending upon the patient’s clinical presentation. These include: Antipyretic agents, analgesic agents, antiemetic medications and anti-motility agents (Mike^b and Daniel, 2015).

8. Conclusions and Recommendations

Recently, discovered in West Africa and Central Africa, the Ebola virus causes, high-mortality epidemics but it has showed a progressive slow down in Ebola endemic countries. Currently Liberia and Nigeria declare Ebola free after they have done legal measures and improved the health management system. Fruit bats are probably the reservoir of the virus. The initial human infection results from contact with infected bush meat, and usually takes place in poor and inaccessible areas. Transmission occurs during patient care at home, funeral rites or hospital dissemination. Ethiopia has developed its own plan of action with collaboration and other interest groups for prevention of Ebola. It develops a Task force for EVD preparedness and this taskforce has identified priority areas for the implementation of the EVD preparedness PoA as those that border neighboring countries including, Kenya, Somalia and Sudan.

Based on the above conclusion the following recommendation are forwarded:

- ❖ To prevent and control this virus the government should strengthen surveillance communication channels, screening tests at the airport, identification of the treatment center, development and distribution of pamphlets and it should be committed for task force establishment.
- ❖ Each and every person should be aware of the nature, distribution, mortality and morbidity rate of the virus to minimize the risk of infection in the area.

- ❖ Avoid entry of visitors into the patient's room and Laboratory personnel either who are in the laboratory or the patient care area, need to wear routine clinical laboratory PPE.
- ❖ Procedures that can increase environmental contamination with infectious material or create aerosols in hospital setting should be minimized.
- ❖ Blood, suctioned fluids, excretions and secretions should be disposed of in a sanitary sewer.
- ❖ Animal handler's wear in the farm or in zoo garden must be aware and taker of themselves from touching contaminated and died carcass without PPE.

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