



## Socio-cultural Determinants of Spread of Ebola Outbreak in West Africa 2014- 2016: Lessons Learnt

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### Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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### Commentary

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Ebola is one of the most deadly infectious diseases known to man. It is a viral disease which is transmitted from animal to man (zoonotic) [1]. Ebola as a zoonotic disease for which no cure has been found, requires intensive efforts at prevention and control. Health inequalities due to socio-cultural factors coupled with geographical factors have perpetuated the disease among humans. This needs to be addressed to stem the re-emergence and spread of Ebola in West Africa and indeed in the world at large.

Ebola is a haemorrhagic fever disease known to cause outbreaks in equatorial Africa since 1976, however the 2015 to 2016 epidemic in West Africa is the widest, biggest; most persistent and devastating outbreak ever recorded [2]. The World Health Organisation (WHO) "declared the deteriorating situation in West Africa a Public

Health Emergency of International Concern (PHEIC), which is designated only for events with a risk of potential international spread or that require a coordinated international response" [3]. Ebola virus is a "single-stranded RNA virus" with five sub-types or species identified in different parts of Africa, named after the location where they were isolated: "Ebola virus (EBOV) also called Zaire, Sudan, Bundibugyo, Tai Forest and Reston. Each sub-type presents with different severity as indicated by their case fatality rates (CFR) ranging from 41% to 89%, the *Zaire specie* has the highest case fatality rate" consequentially, it causes more severe disease [4]. The natural wildlife host of the *Zaire specie* has been suggested to be fruit bats though other primates have been implicated [3]. The main specie that was implicated in the 2014 to 2016 outbreak was the *Zaire specie* hence the

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devastating effect of the outbreak due to its high case fatality rate [3,5].

A summary of the cases as provided by the WHO, 2018 elucidated the severity of the outbreak in different countries affected as indicated by the varying case fatality rates. The three most affected countries were Sierra Leone, Liberia and Guinea [3].

There were 14124 cases in Sierra Leone with 3956 deaths. This gives a case fatality rate of 28%. Liberia had a total of 10675 cases and 4809 deaths giving a case fatality rate of 45% [6]. Though Guinea had less number of cases with a total of 3811, the number of deaths were high compared to the number of cases with a case fatality ratio of 67% [6]. The data above include the confirmed, probable and suspected cases put together as shown in Table 1.

This implies that the outbreak caused more deaths per infected person in Guinea out of the three most affected countries. Secondary infection (through health facilities) in Mali produced the highest case fatality rate of the 2014 to 2016 outbreak with six deaths out of eight cases to give a case fatality rate of 75% [3]. The other countries affected by the outbreak were Nigeria, Senegal, Italy, Spain, United States and United Kingdom bringing the total number of confirmed, probable and suspected cases to 28,652 and the total number of deaths

to 11,325 to give an overall case fatality rate of 40% [6].

Ebola virus disease is highly contagious. It has an average incubation period (the period between infection and first manifestation of symptoms) of 4 to 10 days but it can be from 2 to 21 days [6]. Transmission of Ebola Virus disease is by “spillover” event to humans through contact with infected animals such as fruit bats and other primates [6].

EBOV is thought to be introduced into humans when a person has direct contact with blood, body fluids, or organs of infected animals (e.g., fruit bats, chimpanzees, or gorillas) or prepares meat from infected animals. Infection in human communities is sustained through person-to-person contact, often from symptomatic persons to caregivers in homes and health care settings, where infection-control practices are inadequate and personal protective equipment is unavailable or in short supply. The principal mode of transmission in human outbreaks is person-to-person transmission through direct contact with a symptomatic or dead cases. Because corpses have high viral loads, funerals and burials accompanied by ceremonial washing and touching of deceased persons often are responsible for multiple chains of transmission [7].

**Table 1. Countries with widespread transmission and other countries affected during the epidemic [3]**

Country	Total Cases (Suspected, Probable, Confirmed)	Laboratory Confirmed Cases	Total Deaths
<b>Countries with Widespread Transmission</b>			
Guinea	3,814	3,358	2,544
Liberia	10,678	3,163	4,810
Sierra Leone	14,124	8,706	3,956
<b>Affected Countries</b>			
Italy	1	1	0
Mali	8	7	6
Nigeria	20	19	8
Senegal	1	1	0
Spain	1	1	0
United Kingdom	1	1	0
United States	4*	4	1
<b>Total</b>	<b>28,652</b>	<b>15,261</b>	<b>11,325</b>

Source: CDC, 2017

\* While there were 11 patients with EVD in total treated in the United States, only four patients became ill after they arrived in the United States, either after exposure in West Africa or in a healthcare setting

According to WHO, 2018 the initial symptoms of Ebola virus disease include “sudden onset of fever fatigue, muscle pain, headache and sore throat. This is followed by vomiting, diarrhoea, rash, bleeding from gums, blood in the stools and symptoms of impaired kidney and liver function” [3]. These symptoms are unspecific and could be seen in other viral diseases such as Lassa fever, measles and other tropical diseases like malaria thus making the clinical diagnosis difficult. Other unspecific laboratory findings are low platelet and leucocyte counts and deranged liver enzymes which again are unspecific for Ebola virus disease [3]. A case definition is therefore used to describe cases for uniformity and prompt intervention.

Case definition during an Ebola outbreak as recommended by the World Health Organization (WHO), 2018 is by laboratory isolation of the virus from the patient's samples for confirmed cases; probable cases were assumed cases as evaluated by a physician or anyone who had epidemiological link such as physical contact or contact with blood or body fluids of a confirmed case; suspected cases were “any person, alive or dead, suffering or having suffered from a sudden onset of high fever and having had contact with a suspected, probable or confirmed case; a dead or sick animal” [8]. Presence of unspecific signs and symptoms in anyone with sudden onset of high fever was also considered as suspect case [8].

Ebola virus Disease is diagnosed after confirmation of the virus in whole blood samples of live humans or oral fluid specimen of dead cases stored in “ethylenediaminetetraacetic acid (EDTA) and universal transport media” respectively before being subjected to test in the laboratory. Though they are different laboratory tests that can be used, the WHO recommended laboratory tests are “Automated or semi-automated nucleic acid tests (NAT) for routine diagnostic management or rapid antigen detection tests for use in remote settings where NATs are not readily available” [3].

There is no known cure for Ebola virus disease however, supportive therapy using oral rehydration therapy and intravenous fluids increases survival [3]. A vaccine called rVSV-ZEBOV was developed by WHO, CDC and other foreign collaborators that was tested in Guinea and showed high protection against the Ebola virus during 2015. The trial was carried out among 11841 participants, 5837 participants at

risk received the vaccine and reported no incidence of Ebola Virus Disease. Conversely, there was an incidence rate of 0.38% among participants at risk who did not receive the vaccine [3].

Ebola outbreak had enormous impact on the most affected three West African countries. As reported by a survey on the socio-economic impact of Ebola by WHO, 2018 anthropologically, all ages were affected however, the active population (15-40 years) were the bulk of the cases with women (50.8%) being more affected than men (49.2%). The education sector was not spared as death of teaching staff and students, reduced school attendance and school closure was marked. Social life which includes attending ceremonies and social gatherings were negatively affected. It ultimately had impact on poverty due to disruption of agriculture and transportation leading to an increase in the proportion of the population living below poverty level in these countries. For instance, poverty rate increased by 2.2, 5.5 and 13.8 per cent in Guinea, Liberia and Sierra Leone respectively. Necessarily food security as indicated by the prevalence of under-nutrition was negatively affected with an increase in 4.2, 4.1 and 1.7 in Liberia, Sierra Leone and Guinea respectively in 2016 [3].

People were afraid to engage in their economic activities due to fear of contamination by the virus. Hence many businesses were closed due to fear or death of the business owners, this further to reduced household incomes. The private sector in Liberia lost 50% of their private sector workforce [9]. Sierra Leone, Liberia and Guinea lost \$2.2 billion of gross domestic product (GDP) in 2015 due to Ebola which led to food insecurity and had negative effects on human capital development. The Macro-economic impacts of Ebola on the GDP of the West African region is shown in Table 2. Ebola had a huge negative impact on the health care sector. Health workers who had the highest risk of infection had 881 cases in West Africa with 513 deaths, this led to “8% reduction of healthcare workforce from Ebola in Liberia and 23% decrease in health services delivery in Sierra Leone” [9].

Many factors contributed to the spread of the outbreak. These include biological, psychological, geographical, social and economic factors fuelled by health inequalities. According to the Dalghren and Whitehead model of social determinants of health proposed in 1991

as cited in Graham in 2004 [10] individuals with their inherent characteristics have different factors that affect their health. These include their lifestyles, social interactions, living and working conditions, culture, environment, and socioeconomic factors.

With regards to the Ebola outbreak in 2014 to 2016, the inherent characteristics which constituted the first layer of the Dalghren and Whitehead model of social determinants of health that enhanced the spread of the outbreak was that the population most affected were the active age group which constitute the labour force of the countries affected. These groups of individuals were easily mobile, consequently they carried the virus to wherever they emigrated thereby enhancing the spread of the virus across a wide area. The women were more affected than the men with statistics showing 50.8% of cases were women as opposed to 49.2% of men [11].

The individual lifestyle of the most affected population contributed to the dissemination of the virus. Ebola virus disease is a neglected tropical disease which was hitherto confined to the rural area of equatorial Africa but spread to West Africa [12]. Many of the rural populace engaged in hunting of bats, monkeys and other wild primates for food called “bush meat”. Contact with the body fluids of an infected wild animal during its preparation as staple food leads to spread of the virus from animal to man [3,6].

At the “Social and community network” layer, women are usually the caregivers in the home in most West African societies. Women by virtue of their being the caregivers in the home whenever an individual is sick easily come in contact with body fluids of cases such as vomitus, saliva, sweat, blood, semen, urine or faeces. Coincidentally, the virus is only transmitted by sick people through their body fluids thus putting women at greater risk of spreading the virus [3,6].

High degree of migration is characteristic of West African countries. Migration rates in these

countries is more than seven times higher than other parts of the world [13]. People were highly mobile across porous borders due to war and unemployment in the most affected countries in search of better living conditions resulting in the spread of the Ebola virus. The entrance and transmission of the virus in the urban areas which were crowded contributed immensely to the widespread of Ebola [6,13,14].

Cultural practices centred on death and funeral of cases aggravated the spread of the virus. Traditional burial rites which involves touching and bathing of the deceased reinforces the transmission of the virus [14]. WHO, 2018 reported the extensive impact of such practices on transmission of the virus [13].

Reports by Guinea’s Ministry of Health, indicated that 60% of cases in that country could be linked to traditional burial and funeral practices. WHO staff in Sierra Leone estimated that 80% of cases in that country were linked to these practices. Some mourners bathe in or anoint others with rinse water from the washing of corpses [3].

Traditional healers have been a part of informal health care delivery in West Africa for centuries. Patronage of traditional healers who were the usual primary caregivers before the outbreak continued during the outbreak undermining the benefit of early presentation to the hospital and propagating the spread of the virus [13]. False claims of cure for the disease by traditional healers and myths about the disease such as drinking or bathing with salt as treatment; belief that Ebola was caused by “cursed dishonest hunters” heightened the transmission of the virus [14]. Denial of the existence of the virus and unfamiliarity with the virus and its control measures including disinfecting houses, barrier nursing and checking for fever accounted for obstruction of health interventions fuelling the spread of Ebola virus disease [12]. This was further expressed as distrust among the people of the health care facilities which are seen as “places of contagion and death” rather than a place for treatment [13].

**Table 2. West Africa region: Macro-economic impacts of the Ebola virus disease, 2004-2017**

<b>Country</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>
	<b>(US\$ million)</b>			
GDP change in Low Ebola scenario	-1,799.8	-3,411.7	-4,750.0	-4,697.0
GDP change in High Ebola scenario	-2,317.3	-4,426.4	-6,230.4	-6,691.6

Source: UNDG, 2015

Fear and stigmatization of affected persons and health workers played a prominent role in spreading the virus. Community resistance of surveillance and hiding of cases at home coupled with fear of disallowing “dignified burial and funeral” for deceased cases resulted in further spread of the virus [13]. Victims and their families failed to notify the appropriate authorities because of fear of rejection and stigmatization from the communities [14]. Health workers were seen as reservoirs of the infection and as such were rejected by their family and community, the fear stem from myths that Ebola was purposely injected into the community members in the guise of vaccines [15]. Survivors of Ebola were also subjected to the same fate, in some instances they were rejected by their family members and their belongings were burnt [14,16].

There were inadequate health infrastructures in the most affected countries. The rural areas of West Africa with its attendant health inequalities encourages the spread of the virus. Guinea, Sierra Leone and Liberia were one of the underprivileged countries in the world, some of them have been ravaged by conflicts which led to damaged health infrastructures. These countries were just trying to recover after the conflicts when the Ebola virus disease struck making them vulnerable to wide spread of the virus and poor efforts at containment [13]. The situation was compounded by the inadequacy of available health services to manage such an outbreak due to inexperience [14]. Moreover, there was shortage of health workers who were competent in managing the disease. As reported by WHO, the doctor to population ratio in the three most affected countries was about two per 100,000 population prior to Ebola Virus disease. This number was further depleted with almost 700 health workers being infected by the end of the first year and death was recorded in about half of them [13]. The few available were afraid of dying while caring for patients under suboptimal conditions. The health workers had to work with inadequate essential supplies such as personal protective equipment, while they were not adequately remunerated, this led to an industrial action that slowed down the control of the disease with enhancement of its spread [13,14,17].

Giving the perniciousness of the Ebola virus disease and its huge encompassing impact in the affected West African countries, the following recommendations could subdue the spread of

such deadly virus in future. There is a need for the containment team both at local level and international partners to acknowledge existing culture of the affected people, with a view to provide culturally sensitive solutions to their health care. For instance, the traditional burial practices which fuelled the spread of the virus can be modified to modern hygienic culturally sensitive burials devoid of practices involving contact with the deceased or bathing of the deceased but still upholds dignified burial of the deceased.

The United States Agency for International Development has outlined a seven-pronged target for Ebola recovery in West Africa which include “food security; health services and health systems; innovation technology and partnerships; governance and economic crisis mitigation; and global health security agenda [18]. These proposed strategies when broken down into feasible workable parts captures the following recommendations.

Health interventions should be implemented with the full participation of the affected community to encourage ownership and avert community resistance of such laudable efforts. This can be achieved by proper community entry and engagement through community leaders and other stakeholders in the community. By so doing, effective communication with subsequent dissipation of fear, myths and suspicion will be attained. This will achieve reduction in the spread of the virus.

Scaling up of health services delivery in the poorest undeveloped countries to reduce health inequalities such as food security and improved living conditions will go a long way in averting the outbreak of curtailing the spread of an outbreak. Strengthening of surveillance systems to enhance contact tracing and monitoring is crucial to curbing the future emergence and subsequent outbreak of the virus.

Empowering Governments in West Africa to build a sustainable economy embedded in peaceful coexistence will reduce the health inequalities, reduce food insecurity and ensure adequate preparedness to reduce the spread of Ebola in future.

## **COMPETING INTERESTS**

Author has declared that no competing interests exist.

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