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Review Article

Ebola: History and some implications for Africa

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Abstract

The Ebola disease derives its name after a small river, the Ebola River, flowing through the former Zaire (present day DR Congo) and was formally named in 1976. The disease belongs to the category of diseases referred to as "haemorrhagic fever"; the causal agent – a filovirus (from Latin "*filo*" = thread) belonging to the Filoviridae family. The treatment of Ebola has been only symptomatic, i.e. based on mitigation of the symptoms related to the infection, such as kidneys and liver. An effective vaccine has not been developed yet, even though rigorous attempts have been made and reported. Ebola has been primarily found in the Ivory Coast, DR Congo, Sudan, Gabon and other equatorial African countries. Based on the data obtained during the latest epidemics, people are strongly advised to avoid direct contact with patients, avoid buying bush meat in street markets and not handle dead bats, megabats, monkeys or gorillas. Estimated data suggest that more than 5,000 of these animals have died. The disease was also diagnosed in patients in the USA and Europe. The epidemic afflicted West Africa and had significant implication on their economy in terms of lost production, higher fiscal deficits, rising prices and lower real household incomes, leading to greater poverty.

Keywords: zoonosis; reservoir; natural focus; monkey; pteropus; flying bat; West Africa.

INTRODUCTION

In 2014, great attention was paid to another epidemic, caused by the Ebola virus, which spread not only within equatorial African countries (endemic occurrence of the disease), but also to the USA and several European countries by infected travellers (especially health care workers). This disease obtained its name after a small river Ebola, which flows through the area of former Zaire [present day Democratic Republic of Congo (DR Congo); Dobsonova, 2009].

The Ebola disease along with a very similar (or related) disease "Marburg fever" belongs to the category referred to as "haemorrhagic fevers". The causative agents of these diseases are related viruses of the genus *Filovirus* (from Latin "*filo*" = thread) belonging to the family *Filoviridae*. Both diseases are zoonoses, i.e. diseases transmitted between animals and humans. There are various species of reservoir animals (the disease persists in populations of the reservoir animal species without repetitive contact with the primary source of infection – and infected human). The main route of transmission of the diseases to humans is contact with infected body fluids of animals. However, the causative agents do not penetrate through intact skin. They can penetrate through various skin injuries and through mucous membranes. The infection route by inhalation is less important (Dobsonova, 2009).

The incubation period (time since the infection is established to the appearance of clinical symptoms) is from 2 to 25 days, although almost 96% of clinical symptoms may appear in the first 14 days after infection. The most important clinical symptoms are as follows: severe onset of high body temperature accompanied by excruciating headaches, pain of joints and muscles (Meltzer et al., 2014). Severe

diarrhoea resembling typhus or dysentery is not uncommon. As the disease progresses, bleeding into various internal organs occurs and paleness of the patients can be observed. Later on, they suffer from bleeding from all natural body apertures including the eyes. The symptoms are terrifying, and so medical staff and other patients escaped from provisional hospitals during the first epidemics of Ebola. This led to spreading of the disease to surroundings and, e.g. in Zaire, the government ordered hermetic isolation of epidemic regions by military forces (Dobsonova, 2009).

Bleeding into the digestive tract is accompanied by vomiting of black digested blood. Blood also discharges from mucous membranes in the oral cavity, including gums and the tongue mucosa flakes off. Because of the disintegration of meninges, the brain is surrounded by blood fluid. This can be observed during necropsy of cadavers. The sepulture of dead patients must be prompt, because of the decomposing blood and other body fluids that have a bad smell and are highly infectious. Moreover, people living in the vicinity, as well as other patients, medical and service staffs might be affected by panic (Dobsonova, 2009).

During the first nine months of the epidemic in 2014, WHO workers performed an analysis of clinical symptoms of the disease in 1,415 patients from the following countries in West Africa: Guinea, Liberia, Nigeria and Sierra Leone. Both men and women were equally represented. The ages of the most of the patients were between 15 and 44 years. The infection was also detected in 158 (11.1%) medical workers. Clinical signs, such as fever, fatigue and vomiting have been the most frequently observed symptoms (87.1%, 76.4% and 67.6% of patients, respectively). Nevertheless, the frequency of occurrence of other symptoms was also high: diarrhoea (65.6%), inappetence (64.5%), headache (53.4%), abdominal pain (44.3%), arthrodynia (pain of joints; 39.4%), and muscular pain (38.9%). Less frequently, patients suffered from disorientation (13.3%) and coma (5.9%). Bleeding from various body apertures was observed in more than 40% of patients (WHO Ebola Response Team, 2014).

The treatment of Ebola is only symptomatic, i.e. mitigation of the symptoms related to the affected kidneys and liver. Its success is very low, because 30% to 90% of patients die in unconsciousness after failure of vital organs. The patients are treated behind a barrier and all equipment, which they come in contact with, must be disposed of or sterilised. Sera containing antibodies are available only in a limited quantity, thus spread of these causative agents out of endemic Africa might have had severe consequences (Dobsonova, 2009).

As for safety measures, it is necessary to strictly avoid buying the so-called "bush meat" at marketplaces in regions with the occurrence of Ebola epidemics: Ivory Coast, Democratic Republic of Congo (DR Congo), Sudan, Gabon and other equatorial African states. In the wild, under no circumstances should dead animals such as bats, megabats, monkeys or gorillas, be approached as it was estimated that the disease killed more than 5,000 of these animals (Palmer et al., 2011; Weingartl et al., 2013).

The first aim of this work is to draw up a summary of previous large epidemics of Ebola disease, describe causes of their emergences and to analyse the progress of the recent epidemic. The second aim is to describe the economic impacts of Ebola on West African countries that have experienced the epidemic.

Data on the occurrence of Ebola cases were obtained from published reports by the World Health Organization (WHO, 2014), and economic data were obtained from the Food and Agricultural Organization (FAO) of the United Nations (UN) reports (FAO, 2014c-e) and World Bank (2014).

THE HISTORY OF EBOLA: TRENDS AND IMPLICATIONS

First epidemic (1976–1979), discovery of causative agent and search for its sources

A teacher named Mabalo Lokela, was the first person that described the case of Ebola disease. Mr. Lokela came with febrile illness to a missionary hospital in Yambuku in northern Zaire (present DR Congo) in late August 1976. Nuns argued that he suffered from malaria. After administration of antimalarial drugs, he was allowed home. Unfortunately, he returned one week later in a very serious condition, vomiting and bleeding from all body apertures (including eyes) and died on 8th September 1976. Subsequently, his body was washed according to a local custom by many of his relatives and friends. A few days later, similar clinical symptoms as in Mabalo appeared in many of these persons, including many missionary workers (Dobsonova, 2009).

Because of panic, the patients and medical staff from many hospitals fled during the first weeks of this epidemic, as well as whole families from almost 50 affected villages. Despite the hermetic isolation of the affected region by military forces the disease spread to the capital Kinshasa. One year later, the epidemic was stopped after the establishment of strict measures based on isolation of ill people (Dobsonova, 2009). In total, the disease was diagnosed in 319 persons and 281 (88.09%) of them died. The last case was diagnosed in 1977 (Table 1).

Table 1. Serious epidemics caused by Ebola virus

Epidemic	Year	Country	Genotype	No. of		Lethality
				Cases	Deaths	(%)
I	1976	Sudan	Sudan	284	151	53.17
	1976			318	280	88.05
	1977	DRC	Zaire	1	1	100.00
	1979			34	22	64.71
Subtotal	**1976–1979**			**637**	**454**	**76.48**
II	1994	Ivory Coast	Tai Forest	1	0	0.00
	1994	Gabon	Sudan	52	31	59.62
	1995	DRC	Zaire	315	254	80.63
	1996	Gabon		31	21	67.74
	1996	SA (from Gabon)		1	1	100.00
Subtotal	**1994–1996**			**400**	**307**	**61.60**
III	2000	Uganda	Sudan	425	224	52.71
	2004	Sudan		17	7	41.18
	2001–2002	Gabon	Zaire	65	53	81.54
	2001–2002	Congo		59	44	74.58
	2003	Congo		143	128	89.51
	2003	Congo		35	29	82.86
	2005	Congo		12	10	83.33
	2007	DRC		264	187	70.83
	2008	DRC		32	14	43.75
	2007	Uganda	Bundibugyo	149	37	24.83
Subtotal	**2000–2008**			**1,201**	**733**	**64.51**
IV	2011	Uganda	Sudan	1	1	100.00
	2012			24	17	70.83
	2012			7	4	57.14
	2012	DRC	Bundibugyo	57	29	50.88
Subtotal	**2011–2012**			**89**	**51**	**69.71**
V.	2014*	Guinea, Liberia, Nigeria, Sierra Leone, Spain, USA	Zaire	8,997	4,484	49.84
Total	**2014***			**8,997**	**4,484**	**49.84**
Total	**1976–2014***			**11,324**	**6,029**	**66.16**

Source: WHO (2014a-c). Note: DRC = Democratic Republic of Congo; *Until 15th October 2014

In 1976, similar illness had appeared in Sudan two months before the epidemic in Zaire broke out (Dobsonova, 2009). Three hundred and eighteen persons became ill and 280 (88.05%) of them died. Another epidemic appeared in Sudan in 1979, when 22 (64.71%) patients died from a total of 34 persons affected by the disease (Table 1).

Within the framework of an extensive epidemiological investigation, samples of blood and body fluids from many dead patients were sent those days to well equipped laboratories in the USA and England. This led to the discovery of the virus. Although the way of spreading of the causative agent was the same, it was found that these two epidemics in Zaire and Sudan were not associated. The virus spread via the ritual of washing of dead patients by their relatives and also via contaminated needles and medical equipment. The Ebola virus did not spread beyond African countries (Dobsonova, 2009).

According to WHO data, the Ebola disease was diagnosed with a total of 637 patients in the first large epidemic between 1976 and 1979. Out of these, 454 (76.48%) died (Table 1). Despite extensive investigations performed in regions with the occurrence of Ebola epidemics, both in Zaire and Sudan, the virus was detected neither in domestic (pigs, cattle, poultry, sheep and goats) nor in wild animals. Later, isolated causative agents from both countries were subjected to genotyping and it was found that they were genetically different. They were designated as the genotypes "Zaire" and "Sudan" (Palmer et al., 2011).

Table 2. Genotypes of Ebola virus diagnosed during the years 1976–2014

Genotype	Years	Country	No. of		Lethality
			Cases	Deaths	(%)
Zaire	1976–2008	DRC, Congo, Gabon, South Africa (from Gabon)	1,329	1,053	79.23
Sudan	1976–2012	Sudan	792	426	53.79
Tai Forest	1994	Ivory Coast	1	0	0.00
Bundibugyo	2007–2012	DRC, Uganda	206	66	32.04
Reston	1989–1996	USA	17	0	0.00
Zaire	2014*	Guinea, Liberia, Nigeria, Sierra Leone, Spain, USA	8,997	4,484	49.84

Source: WHO (2014a-c). Note: RSA = Republic of South Africa; * Until 15th October 2014; DRC = Democratic Republic of Congo

Second epidemic (1994–1996)

The second epidemic of Ebola disease broke out in Gabon in 1994. First, the genotype "Sudan" killed 31 (59.62%) out of 52 infected persons and subsequently genotype "Zaire" was the cause of death in 21 (67.74%) out of 31 patients (Table 1). The source of infection was a dead chimpanzee found by indigenous people and consumed by 19 of them. The number of infected persons rose after funeral rituals associated with washing of dead patients (Dobsonova, 2009). The infection spread further by an ill patient in South Africa in 1996. Fortunately, the Ebola epidemic did not break out there. The genotype "Zaire" spread in the DR Congo, where 254 (80.63%) out of 315 patients died (Table 1).

In 1994, a researcher reported another case of a dead chimpanzee due to Ebola infection. This genotype was described as "Tai Forest" according to a primeval forest, where the animal was found. However, the designation "Côte d'Ivoire" has also been used. The infected researcher was saved by physicians and the Ebola virus did not spread among other persons coming in contact with him (Dobsonova, 2009; Table 1).

Third epidemic (2000–2008)

In the third epidemic, a total of 1,201 persons were infected with Ebola virus, out of which 733 (64.51%) died. Three genotypes were associated with this outbreak of Ebola disease: "Zaire", "Sudan", and a newly described genotype "Bundibugyo" (Table 1). Reservoir of the Ebola virus was not found (source of infection for the first patients); however, a suspicion appeared that chimpanzees and other animals (e.g. domestic pigs) might have been infected from bats, megabats and other flying mammals. Many infection trials were performed, but the efforts to elicit the clinical symptoms of Ebola in these animal species were unsuccessful. Despite this, the suspicion of animal source of infection was expressed more frequently (Dobsonova, 2009; Weingartl et al., 2013). In the early 2007, antibodies against Ebola virus of genotype "Zaire" were found in the blood of numerous bats examined (Pourrut et al., 2007).

An extensive epidemiological study carried out in 2014 has shown that flying mammals are most probably the reservoir animals, infected with Ebola virus, showing clinical disease only sporadically. When these animals are caught by other animals or humans, the infection could be transmitted secondarily by infected animals or humans (Pigott et al., 2014).

Fourth epidemic (2011–2012)

The following epidemic (so far the least extensive) affected in total 89 persons out of whom 51 (69.71%) died in Uganda and in the Democratic Republic of Congo. The causative agents were genotypes "Sudan" and "Bundibugyo" (Table 1). The origin of human infections was not detected, but the "bush meat" was suspected as a probable source of Ebola virus.

Fifth epidemic (2014)

The last and the worst case of the Ebola epidemic started in the early 2014. A total of 8,997 infected persons were confirmed by WHO until 15th October 2014. Out of them, 4,484 (49.84%) died. The causative Ebola virus of genotype "Zaire" spread not only within countries of equatorial Africa (Guinea, Liberia, Nigeria and Sierra Leone), but was also detected in several people in the USA and Europe (Table 2).

As follows from Table 2, genotype "Zaire" caused the highest number of deaths (almost 80%) during epidemics between 1976 and 2008. During the last epidemic, it caused nearly 50% of deaths until 15th October 2014. It has occurred in the highest number of African countries, but also out of Africa. The severe character of the current epidemiological situation is highlighted by the latest WHO data describing the incidence and mortality of Ebola. There is an evident accumulation of both newly infected and dead persons in Guinea, Liberia, and Sierra Leone from 8th to 15th October 2014 (Table 3).

Some medical staffs were infected and died of the Ebola virus in countries, such as Liberia, Guinea, Sierra Leone and Nigeria (Table 4). The risk of spreading of Ebola virus out of Africa existed when infected physicians, nurses or spirituals left these

Table 3. Occurrence of Ebola virus in affected countries in West Africa in 2014

Country	No. of cases			No. of deaths			Deaths (%)		
	8.10	10.10	15.10	8.10	10.10	15.10	8.10	10.10.	15.10
Sierra Leone	2,789	2,950	3,252	879	930	1,183	31.52	31.53	36.38
Guinea	1,298	1,350	1,492	768	778	843	59.17	57.63	56.50
Liberia	3,924	4,076	4,249	2,210	2,316	2,458	56.32	56.82	57.85
Total	8,011	8,376	8,993	3,857	4,024	4,484	48.15	48.04	49.86

Source: WHO (2014a-c). Note: * until 15th October 2014

Table 4. Ebola virus in health care workers in 2014

Country	No. of cases		No. of deaths		Lethality (%)	
	5.10	15.10	5.10	15.10	5.10	15.10
Guinea	73	76	38	40	52.05	52.63
Liberia	188	209	94	96	50.00	45.93
Nigeria	11	11	5	5	45.45	45.45
Sierra Leone	129	129	95	95	73.64	73.64
Spain	0	1	0	0	0.00	0.00
USA	0	1	0	0	0.00	0.00
Total	401	427	232	236	57.86	55.27

Source: WHO (2014a-c). Note: * Until 15th October 2014

Table 5. Estimated loss in GDP due to Ebola (US$, percentage of 2013 GDP)

Country	Short-term impact	Medium-term impact	
	2014	2015 - Low Ebola	2015 - High Ebola
Sierra Leone	163 million (3.3 pp)	59 million (1.2 pp)	439 million (8.9 pp)
Guinea	130 million (2.1 pp)	-43 million (0.7 pp)	142 million (2.3 pp)
Liberia	66 million (3.4 pp)	113 million (5.8 pp)	234 million (12.0 pp)
Core 3 Countries	359 million	129 million	815 million
West Africa	**2.2 – 7.4 billion**	**1.6 billion**	**25.2 billion**

Source: World Bank, 2014. Note: *All values are expressed in 2013 US$ (pp = percentage points)

medical facilities, as it happened in the USA and Spain.

The implications of Ebola outbreaks for economic growth

Prior to the Ebola epidemic in 2014, Liberia and Sierra Leone had experienced economic growth, and had been among the top ten fastest growing economies in the world, albeit with very low GDP base. At that time, Guinea had attracted major investment in its iron ore industry, and tremendous prospects for very high economic growth (Brookings Institution, 2014). However, the growth rates in these countries were dashed to Ebola outbreaks, and ushered in with a terrible toll on the citizens' wellbeing. Similarly the recent Ebola epidemic has afflicted West Africa. The menace imposed significant economic impact in terms of lost production, higher fiscal deficits, rising prices and lower real household incomes, thus worsening the living conditions of people in the regions affected. It also had implications for the cost of healthcare in those regions (World Bank, 2014).

Arguably, the fear of contact with people with Ebola may have inevitably reduced labour force participation, closed places of employment and disrupted transportation whilst motivating some government and private decision makers to close harbours and airports to traffic (Brookings Institution, 2014). Regrettably, due to the large margins of errors in recording essential information, it has been difficult to accurately estimate the impact of Ebola on the economy of countries affected (World Bank, 2014).

It is of paramount importance to note that Ebola, over and above the tragic loss of lives, also has had adverse implications for agricultural production, trade, and investments in the affected countries. The menace has directly or indirectly affected the economic growth of the regions as shown in Table 5. For instance, it has been clearly shown that Sierra Leone, in terms of sheer numbers, suffered the greatest monetary losses, while Liberia probably suffered the most in terms of

Table 6. Estimated impact of Ebola on national production of the main food crops in Sierra Leone, Guinea and Liberia

Country	Crops	Reduction in production due to Ebola ('000 tonnes)	Value of production loss (US$ millions)[1]
Sierra Leone	Rice (milled)[2]	100	43.0
	Maize	2	0.3
	Cassava in cereal equivalent[3]	37	4.0
	Small grains	4	0.0
	Total	**143**	**47.0**
Guinea	Rice (milled)[2]	55	23.0
	Maize	24	4.0
	Cassava in cereal equivalent[3]	4	0.4
	Small grains	21	2.0
	Total	**104**	**29.0**
Liberia	Rice (milled)[2]	36	15.0
	Cassava in cereal equivalent[3]	19	2.0
	Total	**55**	**17.0**

Source: Compared from FAO (2014c-e). Note: [1]Using international equivalent prices: Thai 100% broken rice at US$ 425/tonne; US yellow maize at US$ 175/tonne; average local price of cassava from Liberia and Sierra Leone, approximately US$ 100/tonne; small grains (sorghum, millets, others) approx. US$ 100/tonne; [2] Milling rate of 66.7%; [3]Cereal equivalent factor of 32%

Table 7. Projected food insecurity position Guinea, Liberia and Sierra Leone for March 2015

Country	No. of		No. of			
			Food insecure people			
	Infected patients	Directly affected households	Poor situation		Borderline cases	
			Baseline	March 2015	Baseline	March 2015
Sierra Leone	20,165	56,641	331,796	613,983	2,182,470	2,087,835
Guinea	3,944	24,674	741,330	1,210,559	3,210,782	2,887,674
Liberia	12,536	39,490	460,437	747,449	1,084,526	1,031,594

Source: compiled by authors from information supplied in FAO (2014c-e)

the destruction of between 6 and 12% of its average GDP due to the impacts of the Ebola disease infections (Table 5). In countries that had had low economic activities, the real and associated impact of such a loss might have been largely destructive, as it reduced not economic activities and incomes due to lower productivity and lack of sound marketing strategies and associated value chains.

Economic implications of Ebola on agriculture

The inhabitants in Sierra Leone, Guinea and Liberia rely heavily on agriculture for their livelihoods (FAO, 2014c-e) although productivity remains generally low. Economically, agriculture accounts for 61.4% of Sierra Leone's GDP, 34.2% of Liberia's, and 20.2% of Guinea's GDP in 2016 (World Bank, 2017). Arguably, the Ebola outbreak during the planting season of 2014 might have significantly affected yields of some staple crops, such as rice and maize during the harvest season in these countries because some farmers were unable to participate in their farming activities due to the epidemic. FAO (2014b) argued that the Ebola epidemic had adverse effects on food and agricultural sectors in the affected countries. With estimated crop losses appearing relatively modest at national level, there seem to be sharp disparities in production between areas with high infection rates and other regions. Farming operations, such as planting and weeding have been heavily affected while movement restrictions and fear of the disease have disrupted agricultural market chains. Table 6 shows a summative view of the agricultural losses occasioned by Ebola menace in Sierra Leone, Guinea, and Liberia.

The inevitable sharp increase in food prices took a toll (prices increased by nearly 150% in Liberia) and led to a dramatic rise in food inflation. The general impact on the health of farmers in the main agricultural production regions, together with the restrictions on the movement of goods and people and the reactions of fear caused by the outbreak seriously disrupted the market chains of agricultural products. This situation significantly increased the risks of food and nutrition security of the populations that depend on it (FAO, 2014a).

In an effort to manage this very precarious situation, the World Food Program (WFP) led a process of supplying food to affected households that were in dire need of food due to the direct and indirect impact of Ebola epidemic, as it disrupted agricultural

and food productions. The main concern was the prevalence of stunted growth in more than 35% of the infected children in the affected countries (World Bank, 2014).

Several coping strategies were recorded, making it possible for rural families to cope with the highly insecure food situation. With varying prevalence, the most common coping strategies reported were (i) consuming less expensive and less preferred food and (ii) limiting portion sizes at mealtimes. In some instances, families borrowed food or relied on assistance from friends/relatives to meet their consumption needs (FAO, 2014c). Among the different income groups, petty traders and unskilled labour had the highest share of food insecure people. Table 7 provides an estimated projection for the deteriorating food insecurity position in the three affected countries under study. The above information in Tables 6 and 7 suggests that the number of people in a poor, food insecure position in the affected countries might drastically increase with a slight decline in the borderline cases. This could either be that all households may have been affected to a varying degree or possibly a decrease in the rate of the spread of the infection.

Implications for health warning systems

It proved basically impossible for health and related professionals to stem the tide of infections in these countries, partly due to weak public health systems and poor facilities, medical equipment and medical staffs (Brookings Institution, 2014). These are arguably some of the most important factors led to the high casualty rate amongst health professionals. It is, however, also important to recognize that attacks on health workers, fuelled by decades of war and distrust of the government, further undercut crucial outreach and educational interventions aimed at sensitizing communities about the virus and breaking the chain of transmission.

DISCUSSION

The WHO workers and other specialists considered the epidemic of Ebola in 2014 as the deadliest since the discovery of Ebola virus. Poverty and insufficient introduction of preventive measures in affected countries (Liberia and Sierra Leone) were among the factors worsening prospects for overcoming the epidemic. The number of beds needed to hospitalize patients "behind barrier" was insufficient. For example, in Guinea there were 160 beds, which was only 76% of the needed capacity. Three hundred and four beds were at disposal in Sierra Leone, but the necessary capacity was 1,148 beds (only 26% of needed capacity was covered). The situation was critical in Liberia. Only 620 beds were at the disposal, whereas the necessary capacity was 2,930 beds (21% covered). Also, reaction of local governments was insufficient despite intensive efforts in the implementation of preventive measures of WHO workers, as well as other organizations, notably, "Doctors Without Borders". For example, leaflets informing people about the routes of infection, possible preventive actions, as well as the necessary steps after the appearance of a suspicion of the disease were not spread as expected (WHO, 2014a).

The recent epidemic started in December 2013, when the suspicion of the first cases of Ebola appeared in districts Macenta and Guéckédou in Guinea. The disease was later confirmed in these cases. As early as in March 2014, rising incidence was observed in two districts in Liberia. Subsequently, Ebola affected the capital Conakry of Guinea. Single cases of infected persons, e.g. in Senegal (one patient) and in Nigeria (20 patients in total; eight patients died) were diagnosed soon enough and the patients were isolated (WHO, 2014). One person died and another was saved in the USA. In Spain, both clinically ill patients survived. All these cases were associated with the stay of the affected persons in regions with the occurrence of Ebola disease, or the infection was spread via a secondary or tertiary route; i.e., infected persons were in contact with patients infected from some primary or secondary sources (WHO, 2014).

Close-monitoring reports regularly published by the WHO confirm the rapidity with which this disease spread, making it close to impossible to accurately assess or even try to predict some form of magnitude of the economic impact (WHO, 2015) occasioned by the spread. The fact that most afflictions occurred in highly populated areas contributed significantly to the spread, and its consequences to the economy of the affected regions. Given the indicated cumulative case of fatality rate of 71% in the three intense-transmission countries (Guinea, Liberia and Sierra Leone) among all probable and confirmed cases that a definitive outcome was recorded (WHO, 2015). Various media reported that in some of Africa's most sought after tourist destinations such as Botswana, Republic of South Africa and Kenya declined between 20 and 70%, even though they were huge distances away from the affected countries where the outbreak proliferated (The Ethiopian Herald, 2015).

The workers of the organisation "Doctors Without Borders" believe that only prompt military intervention based on isolation of affected regions could stop further spread of the causative agent (Arie, 2014). It is necessary to reiterate that only patients with clinical symptoms were infectious to other people (Streinu-Cercel, 2014). In most of viral diseases, causative agents were shed before the occurrence of clinical symptoms, such as in the incubation period (Palmer, 2009). For that reason, measures preventing

persons from affected countries suffering from a febrile illness to enter the Czech Republic were highly effective.

Implications for health warning systems were serious. It was basically proven impossible for health and related professionals to stem the tide of infections in these countries (Gulland, 2014; Hayden, 2014). Notoriously weak public health systems combined with poor facilities, medical equipment and medical staffs had not been sufficient to limit the rate and extent of infections (Brookings Institution, 2014). This is also supported by findings reported earlier (Table 4). These are arguably some of the most major factors that led to the high casualty rate amongst health professionals. Attacks on health workers, fuelled by decades of war and distrust of the government, further undercut crucial outreach and educational interventions aimed at sensitizing communities to the virus and breaking the chain of transmission. These are fatal losses in the battle against a virus with the vigour of the Ebola virus.

SUMMARY AND CONCLUSION

The prevalence of the Ebola virus in West Africa is not a strange phenomenon or are outbreaks of increased infections foreign to this part of the world. In the recent past, at least five major outbreaks have been recorded, yielding very traumatic and economic consequences to the affected people and regions. This article presents a brief historical perspective on the endemic occurrence of Ebola outbreaks and the epidemiological pathway of the disease. It offers clear evidence and discussion on the close-knit relationship between the hosts of the virus and the people being affected, suggesting the vulnerability created by the ignorance and the dangers it has posed to those that disregard the disease. The epidemiological situation in endemic regions of Africa has been considerably complex, complicated and manageable only with difficulties (particularly regarding the poverty and the underdeveloped situation of affected countries). The high degree of uncertainty associated with the future epidemiological path of Ebola has been largely responsible for creating high margins of error in assessing the real impact of such infections. Also, people's apprehensive and adverse responses following the Ebola outbreaks have been mostly responsible for creating high margins of error in analysing the main effects of such infections on the persons affected by the virus.

The important efforts by the WHO and FAO to monitor and ascertain the impact of such responses in primary livelihood activities, such as agriculture and the associated industries and economic activities are discussed. Evidence clearly shows growing incidences of serious economic loss as a result of this human suffering – directly as well as indirectly in associated spheres like value chains and other economic activities.

Poverty and underdevelopment have contributed in perpetuating the occurrence of such outbreaks and the suffering it brings to people. The deadly spiral created in livelihoods suggests that efforts to contain and limit the impact of these outbreaks should include breaking the chains of underdevelopment in the West African countries that have experienced the menace in recent decades.

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