Ebola epidemic of 2014–2015: unresolved ethical issues

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Abstract

Some of the ethical aspects of the management of the Ebola epidemic in Guinea, Liberia and Sierra Leone, which started in January 2014, have been questionable. First, as regards the prevention of the spread of the virus, the necessary epidemiological investigations into the origin of the infection were not carried out adequately and this did not help to curb the spread of the disease. A disparity has been observed between the western and African countries' access to the treatment of patients; this infringes on the principle of equality. This paper also focuses on how the Global Public Goods for Health principle was not fully respected in the management of the epidemic.

Introduction

Two years after the notification of the first case of Ebola, registered in Guinea (1), the number of human cases described in the three main countries affected by the Ebola epidemic (Guinea, Liberia, Sierra Leone) rose to 28,598, the number of deaths amounting to 11,299 (November 18, 2015) (2). Even though the cases of Ebola among humans have declined remarkably since the summer of 2015 and Liberia and Sierra Leone are considered Ebola-free, many issues of this epidemic remain unresolved. This paper considers how some of the ethical challenges have been addressed.

Investigating the origin of the epidemic: unanswered questions

Several scientific works (3,4) agree that the "Guinea" strain is derived from the strain of Ebola Zaire, but it represents a phylogenetically distinct[a] cluster. It is still a mystery how the virus spread from Zaire (now known as Democratic Republic of Congo, or DRC) to Guinea. Many authors affirm that the bat is the source of transmission to humans. To date, the bat species which introduced the Ebola Guinea strain to Guinea or the other regions of Kuengodou has not been identified. A bat has been found infected with the Ebola Guinea strain (5,6), but nobody can establish if this animal represents the source of the virus that spread among humans or if this bat was accidentally infected by the ingestion of human fluid[b] (urine or blood) or by biting the dead body of an Ebola-infected person, since no other bat has been found infected with the Ebola strain that was responsible for the outbreak of the epidemic. Though bats

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are not known to be migratory animals, there are species that migrate up to 2000 km; none of these species are present in Guinea or the neighbouring countries affected by the Ebola epidemic.

Many authors (7,8) attributed the fast and wide diffusion of the Ebola virus from towns to urban areas to the bat migration – they called the phenomenon "the urbanisation of the fruit bat". However, unfortunately, there is no scientific evidence and there has been no epidemiological investigation regarding the presence of Ebola-infected bats in the urban areas of the affected geographical locations. The most intriguing aspect is that, unlike in the past, during this epidemic no sign of a bat or rat bite (the rat is another reservoir of the Ebola virus) has been observed among the people infected with Ebola.

These are not merely scientific disquisitions because as in the case of any epidemic caused by a zoonotic virus[c], the most effective measure of prevention is to eliminate the reservoir. How can we prepare an effective intervention if, after over two years, we still do not know the source of contagion? The elimination of the transmission of Ebola among humans is crucial to controlling the epidemic, but it would certainly not protect us from future outbreaks unless we identified the reservoir exactly (the animal reservoir), which would allow us also to undertake effective preventative actions.

How can we warn the population not to eat bat meat if we are not yet certain that the bat is the source of infection? In the case of the Philippines Ebola strain (Reston strain), the main reservoir is the pig and not the bat. Similarly, the Ebola Guinea strain could have a different animal reservoir from those described for the Zaire and Gabon strains, which have not yet been taken into consideration in the epidemiological investigation of the current epidemic. Therefore, it is crucial to have data on the reservoir to be able to initiate appropriate prevention activities. Until now, no data have been elaborated by the World Health Organisation (WHO) or by any other organisation working on the presence of the virus in the houses of people infected with Ebola, on rat urine, or on fruit contaminated by bat urine or salivary fluid. No investigation of this kind has been carried out and, in any case, no data have been published.

That fruit and food are contaminated with Ebola strains by bats seems to be an assumption in the absence of any scientific evidence. This has caused serious consequences for local populations, such as farmers, who can no longer sell their agricultural products for fear that they are contaminated by the saliva or droppings of bats. Moreover, people are often afraid to approach healthcare facilities as they are anxious that they will catch the Ebola infection, and this has facilitated

the diffusion of the virus (9). In low-income countries such as Liberia, Guinea and Sierra Leone, where agricultural activity represents the main source of subsistence for most people (10–12), banning the sale of local agricultural products or prohibiting their consumption can cause greater damage than an epidemic. In this Ebola outbreak, there is no evidence that measures to ban the consumption of local fruits have been effective in containing the spread of the epidemic. This shows that the epidemiological investigations considered when making decisions to fight the transmission of Ebola have not been very reliable.

Drugs and vaccine

Currently, there are no effective treatments (drugs) against the Ebola virus. However, several drugs have been recommended (13,14). These include Favipiravir, FX06 and ZMapp, which are not yet approved for Ebola by any drug approval authorities anywhere. These have been used for the treatment of only western patients, in spite of the high death rate in Africa. In particular, they were used for foreign healthcare staff infected while working in the countries affected by the epidemic. For an Italian doctor who was infected in Sierra Leone in November 2014, the WHO did provide four drugs. In this case, the doctor was given ZMapp, in addition to the serum of a Spanish nurse who had recovered from Ebola and that of another surviving patient hospitalised in Frankfurt.

The global health community, including WHO, should encourage the production of anti-Ebola drugs, including monoclonal antibody-based therapy, and it should promote the enhancement of local health facilities and ensure that all anti-Ebola drugs are available promptly. This could allow for the administration of these drugs to all healthcare workers and possibly, all Ebola-infected patients with their written informed consent, just as has happened in the occidental countries. The justification that the drugs are not available for everybody is unacceptable and incomprehensible, given that the opposite was the case with the Ebola vaccine. Indeed, the first cases of Ebola were reported in the first months of 2014 and it is not credible that in 6–7 months, the pharmaceutical companies were not able to produce monoclonal antibodies such as ZMapp or antiviral drugs to ensure the availability of a prophylactic treatment in the case of professional exposure (for example, contact with infected Ebola blood) (15–17). The pharmaceutical companies did not provide drugs to 5000–6000 healthcare workers, while at the same time, they prepared a similar amount of vaccine doses to hasten the start of the clinical trials (18–20).

The lack of compliance with the principle of equity is evident in the following: all available although unapproved medical interventions expected to treat Ebola were offered to people hospitalised in occidental countries, where the survival rate was over 90%, while for people admitted in African hospitals, the antiviral antidotes were available only to those enrolled in clinical trials and the mortality rate surpassed 50%. This included 507 deaths among health workers.

The low level of protection for health personnel is another sad aspect of the violation of the equality principle in this epidemic. As Dr Kevin Donovan, Director of the Center for Clinical Bioethics at Pellegrino Georgetown University, argued that African doctors should have had the same opportunity to avail themselves of potentially life-saving intervention (21). Donovan said: "The sad truth is they are working in their own countries, which are terribly under-funded and terribly under-staffed. The reason it worked for the two Americans (Kent Brantly and Nancy Writebol, two humanitarian operators from the United States of America [USA]) is their organisations had the will and resources to pluck them out of danger." This opportunity to receive treatment emphasises the fact that the principle of equality was not observed in the case of local doctors and nurses working in Guinea, Liberia and Sierra Leone.

Despite this inequity in access to unapproved medical interventions for Ebola, the international/global community was not able to exert the necessary pressure on pharmaceutical companies to produce the required number of dosages fast enough for 20,000 infected people.

On the other hand, trials of anti-Ebola vaccines, including those based on an adenoviral vector (cAd3 strain) (22), were approved very soon after the spread of the epidemic. This approval was given in spite of the fact that the pre-existing neutralising antibodies against the cAd3 vector were not assessed in the African population, among whom the Ebola epidemic occurred[d].

Health system intervention

The lack of healthcare centres in rural communities, the absence of appropriate personal protection equipment (PPE), and a weak, if not non-existent, early warning surveillance system have all taken away from the effectiveness of the response to the epidemic (23). The poor healthcare equipment at sites which deal with Ebola is certainly a worrying issue. Poverty is a strong ally of Ebola.

In these countries, among the poorest in sub-Saharan Africa, the State can spend no more than $50 a year on the health of each citizen (24). If we consider that the PPE for a single operator costs more than $70 a day, we can appreciate that no health care facility would be able to comply with appropriate safety standards, causing hospitals themselves to become a source of Ebola infection.

From December 24, 2014 to the end of January 2015, health workers in the north-west of Sierra Leone went on strike to protest against the conditions under which they were working and the inequity between the local healthcare professionals and expatriates in the matter of access to unapproved medical interventions for Ebola, as well as the inequity in economic compensation.

Without any substantial economic intervention, not only for medical aid in the fight against Ebola, but also for food, anti-malaria drugs, antibiotics and safe water, epidemics may

contribute to worsening of the conditions of poverty in the affected populations.

Instead of concentrating major economic resources on the strengthening of local health centres by increasing the number of healthcare workers able to manage highly contagious diseases such as Ebola, WHO gave a mandate to military operators, in particular from the USA and the United Kingdom (UK), to build provisional hospitals. In fact, in the month of August 2014, the US Department of Defense (DoD) sent staff to build field hospitals both in Liberia and Sierra Leone. It also sent operators of the US Army Medical Research Institute of Infectious Diseases (USAMRIID) to established diagnostic laboratory capabilities in Liberia (25). By having delegated the fight against Ebola to the military forces, the international organisations obstructed the improvement of the existing healthcare facilities, making them less safe. In fact, most of the funds provided to fight Ebola have been spent on building new hospitals and not on enhancing the capability of the existing hospitals (26–28).

The risk of contracting Ebola in the public healthcare facilities where Ebola patients are under treatment could stop many civilians from going to these hospitals for ordinary care or for childbirth. This, in turn, would lead to an increase in the number of deaths for reasons other than Ebola infection.

Further, the engagement of military personnel may give rise to the suspicion among the local population that the Ebola virus is a biological weapon released on the local population by the Central Intelligence Agency (CIA), and that the military forces want to experiment and train on the African population (29). The interventions by foreign military personnel, who have a different culture and traditions, have already generated a lot of suspicion and anger, and terrifying events have occurred as a consequence. On September 17, 2014, eight bodies were found in a mass grave near a village in the forest area of Guinea. Three of them had their throats slit. Among them were the bodies of the Vice-Prefect of the region, the Head of Healthcare of the region and three journalists. They were members of a delegation of a prevention mission. The villagers welcomed them with machetes for fear that they had come with the purpose of infecting them (30). It is a widespread belief among the indigenous population that the "whites" extract parts, most likely blood samples, from people infected with Ebola without their consent and awareness (30). The lack of transparency of the international organisations involved in the fight against Ebola also arouses suspicion, as these organisations have never denied, for example, the news that western healthcare staff took blood samples from subjects recovered from Ebola to use the gamma globulins for immunoprophylaxis or research activities. The WHO has not clearly forbidden the DoD, USAMRIID or foreign organisations to carry out these practices, and nor has it clearly denied that these practices were carried out.

Despite the establishment in isolated locations of field hospitals, even with 100–500 beds, there has not been an increase in the facilities that admit sick people. The difficulty of reaching these hospitals, due to the lack of high containment ambulances, and the reluctance of the population to be cured by foreign people who do not speak their language and who do not allow family assistance, limits the effectiveness of this kind of intervention, especially in the case of children. Moreover, one cannot control an epidemic which is spreading across an entire country with just 10–15 hospitals; more medical centres need to be available throughout the country for effective disease control and prevention.

It would be more appropriate to equip the existing healthcare facilities with high isolation rooms for highly contagious diseases and to invest economic resources in the training of personnel in the management of highly contagious cases and in reaching a fast diagnosis. This would help to fight the current epidemic and improve the prevention of potential future outbreaks. The creation of infectious disease units that follow strict safety standards is the main measure for ensuring the prevention of the epidemic (31,32). It should also make future vaccination campaigns less arduous, and provide an opportunity to carry out surveillance activities with the best possible means for identifying onset cases.

Global public goods and the Ebola epidemic

In the current Ebola outbreak, in my opinion, the principle of global public goods (GPG), from which is derived the Global Public Goods for health (GPGH), has not been fully taken into consideration (33). This principle embodies two fundamental ethical principles in the democratic vision of cooperation between states: subsidiarity and solidarity. The GPG principle goes beyond borders and states must act together to provide GPG to everybody. Developed countries should take collective action to improve under-resourced health systems and in favour of poverty reduction, food subsidies and the provision of water sanitation. A communicable disease such as Ebola has important "externality" effects, since preventing one person from contracting it not only clearly benefits the individual concerned, but also benefits others by reducing their risk of infection both locally, as well as at the international level. By focusing on mutual benefit to developing and developed nations, the GPG principle could help improve the health and welfare systems in countries with limited economic resources. In the conception of GPG, a benefit is provided to someone due solely to the fact that the good is being consumed by others (34).

The calculations made by WHO or the Centers for Disease Control (CDC) of the number of victims of the infection do not give the entire picture as Ebola has claimed many more indirect victims. Many people have perished due to the economic crisis created by the embargo on products from these countries, and the decrease in commercial activities because of the isolation into which the inhabitants have been forced, for example, in Sierra Leone. The poverty in which orphans are living needs to be mentioned. The precarious economic situation associated with the Ebola outbreak has resulted in their not having sustenance or access to school (35,36).

The economic situation in which we find the countries affected by Ebola is desperate and disastrous. Sierra Leone has lost 12% of its gross domestic product (GDP) because of the epidemic. Many people have lost their jobs due to the Ebola epidemic and have no social safety net. Given this difficult economic situation, Liberia, Guinea and Sierra Leone asked for the "Marshall Plan" as economic aid. This would include the cancellation of debt up to €187 million. However, the European community has made no such declaration on this issue until now (37).

In addition, during a meeting on November 15–16, 2014 in Brisbane, Australia, the G20 countries said they would not contribute more funds to end the Ebola epidemic. In fact, for the $330 million of humanitarian aid provided, $160 million corresponds to new debt. This will increase the public debt of Guinea, Liberia and Sierra Leone, which will most likely cut social services, including their healthcare systems, to deal with the debt. The remaining $170 million will be used to cancel the previous debt to the International Monetary Fund (IMF) (38).

Each outbreak causes dramatic economic damage. For example, the economic damage resulting from epidemics like SARS or cholera was enormous. In 1990, a cholera outbreak in Peru cost the country an estimated $700 million in lost trade and travel embargoes (39). Three years later, an outbreak of plague in Surat, India cost the country an estimated $1.7 billion in lost trade and tourism revenues (40). The cost of SARS was higher. The National Intelligence Council estimated that the outbreak cost Asian countries (Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam) up to $30 billion (41). Most of this total came from severe declines in the tourism, aviation and restaurant industries (42). In China, Hong Kong, Singapore and Vietnam, the decline in tourism cost $10 billion, as well as 3 million jobs (43,44).

The economic damages caused to each country by this outbreak of Ebola have not yet been made public. Nor has there been any clarification of the intentions of the international community on how it will support them in their economic recovery and in the strengthening of their healthcare facilities. The GPGH principle represents a holistic view of health and the international community should play a crucial role in ensuring health for humanity (39). Ebola is not yet a preventable disease. Indeed, the effectiveness of any licensed vaccines or medicines to cure infected subjects has not been well established. Thus, the efforts to defeat this epidemic and avoid its return in the near future should be based to a great extent on surveillance and rapid isolation of Ebola-positive subjects. For this to happen, the international community must work on hospital preparedness for the proper isolation of suspected and infected cases. It must make sure that there is an adequate number of health workers who are trained in standardised infection prevention and control of highly contagious infectious diseases. Unfortunately, the recent episode in Sierra Leone in which two Ebola-positive people escaped from hospital, with no security employee or health worker preventing them from leaving undisturbed from the Ebola care unit, suggests that the attainment of these goals is still far off (45).

Ebola and quarantine

The issue of quarantine of asymptomatic individuals with possible exposure to infectious agents created a situation of conflict between two ethical principles, namely the ethical obligation to protect public health interests and the individual's autonomy to make choices regarding his/her confinement.

For people with limited resources, staying away from work for a long period of time can push them into economic hardship. None of the African countries provide economic compensation for people in quarantine. Unfortunately, neither WHO nor the European Community gave any indication on this issue, nor provided funds for workers who lost their jobs during quarantine periods in Sierra Leone, Liberia and Guinea (46). In the absence of unequivocal and universal measures on quarantine in the case of exposure to Ebola, different decisions have been taken in different countries. For example, New Jersey (USA) imposed quarantine on Kaci Hickox, a nurse who returned to the USA after working with Doctors without Borders in Sierra Leone. The CDC recommended that people at a high risk of developing Ebola should voluntarily isolate themselves for 21 days. The Judge, La Verdiere, acknowledged that the fact that Hickox had been asymptomatic, and hence unlikely to infect others with Ebola, rendered such measures illegitimate (47). Despite the reported cases of asymptomatic forms (48, 49), quarantine has not even been made compulsory in some western countries. For example, in Italy, the operators who came back home from humanitarian activities in Liberia, Sierra Leone and Guinea either immediately took up work again in hospitals or public offices or voluntarily put themselves under a period of quarantine, while US army soldiers, were forced to spend 21 days in isolation in Vicenza NATO base (northern Italy) before returning to their country.

Furthermore, though scientific evidence has demonstrated that the Ebola virus remains in seminal fluid for up to 80 days after recovery from illness (50), and that it could be sexually transmitted, no massive campaigns have been undertaken to warn people about sexual transmission of the disease. This carelessness regarding the measures that should be taken can result in prolonged transmission of Ebola over time and it could help to explain the sporadic cases of Ebola which have occurred in Liberia even after the WHO declared the country Ebola-free (51).

Conclusion

The outbreak of the Ebola virus has highlighted how there are no boundaries in the spread of viruses and how the danger to the community goes beyond the national borders of the country/countries where the epidemic first occurred. This underlines the urgent need for all countries to work together to prevent the spread of epidemics, since health should be

considered a common good for the community. Since 1970, the CDC has reported that at least 33 new infectious diseases have emerged among humans (52). These include multidrug resistant (MDR) tuberculosis strains, SARS and H5N1, all of which, in spite of having a diverse host range, may represent a danger to the whole of humanity. For the international community, GPGH constitutes a key element of securing health for humanity. In the case of the Ebola epidemic, compliance with GPGH is not yet complete. More efforts should be made to expand the healthcare structures in the affected countries, allowing them to defeat this disease or other communicable diseases through the isolation of suspected cases, infection control and universal health precautions. The international community must make greater efforts to help the civilian population of Guinea, Liberia and Sierra Leone overcome the Ebola virus and the attendant economic crisis.

Notes

a   The Ebola strain involved in the 2014-2015 epidemic is closely related to the Zaire strain, but they are not identical.

b   To date, there is no evidence that the Ebola strains circulating in human beings are the same as those found in animal reservoirs.

c   A virus is defined as zoonotic when some animal represents a reservoir/source for human transmission.

d   The health authorities had never approved the use of adenoviral vectors in human trials (phase III) since the general population could have antibodies against these adenoviral vectors, which are included in the vaccine, and these antibodies could negate the activity of the vaccine. Before the anti-Ebola vaccine, several other vaccines were based on adenoviral vectors [anti-HIV vaccine (53) anti-HCV vaccine (54), but these have never been administrated in phase III trials.

Competing interests: *None*

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Early infant diagnosis and post-exposure prophylaxis for HIV- exposed infants

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Abstract

Recent scientific evidence suggests that early initiation of antiretroviral therapy (ART) among infants exposed perinatally to HIV has beneficial effects on their health and survival, and may even induce remission. This has led to the roll-out of early infant diagnosis (EID) of HIV and early treatment. Also, there is talk of using ART as post-exposure prophylaxis (PEP) to prevent mother-to-child transmission. EID involves carrying out diagnostic tests before initiating ART. In India, current programme design of centralised diagnosis has been resulting in poor access to diagnosis and treatment. To save the lives of HIV-infected infants, it is important to prevent delay. Another issue to be kept in mind is that the results of HIV tests may turn negative after the initiation of ART. This could be due to viral remission induced by ART or false-positive initial results. Differentiating between the two is difficult. To deal with such cases, we need to develop a clinical algorithm

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