Marburg virus outbreak in Ghana

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Commentary

Marburg virus outbreak in Ghana: An impending crisis

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ABSTRACT

Since the initial identification of the Marburg virus in 1967, it has sporadically emerged in several countries throughout Africa, including Zimbabwe, Kenya, South Africa, the Democratic Republic of the Congo (DRC), Uganda, and Zimbabwe. Due to the concurrent occurrence of other epidemics like the coronavirus disease 2019 (COVID-19), this outbreak could endanger the healthcare systems in these many African nations. Recently, two cases of the Marburg virus were detected in Ghana for the first time. However, there has been a noticeable lack of information concerning this recent outbreak of July 2022 in Ghana. Therefore, this article seeks to provide an overview of this outbreak in Ghana to better understand the most recent status and current efforts being made to mitigate the dissemination of the Marburg virus. We also suggest recommendations that may contribute to limiting the burden of this virus.

1. Introduction

One of the most common hemorrhagic fevers, the Marburg virus (MARV) disease is closely related to the Ebola virus (EBOV) disease. The virus is a member of the *filovirus* genus. The first set of cases was confirmed in Marburg and Frankfurt, Germany. Although there have been arguments on the origin, the most substantial evidence points to Uganda. The best scientific evidence indicates that humans can contract the disease from bats or other animal hosts. However, no particular bodily route has been found. Direct contact with the blood or bodily fluids of an infected individual can spread the virus from one person to another, with unprotected contact in homes or healthcare institutions accounting for the bulk of transmissions. Estimates place the incubation period at 3–21 days. After incubation, infected people typically exhibit non-specific acute illnesses with symptoms comprising fever, chills, headache, myalgia, vomiting, and diarrhea [1] (see Table 1).

There have been several MARV outbreaks in Africa, even though they have not garnered the same public attention as its close relatives, the EBOV [2]. Uganda reported outbreaks in 2012, 2014, and 2017, with 15, 1, and 4 cases being found [3]. Africa has been affected by the epidemics, not only in Uganda. Also, there have been outbreaks in central and southern Africa. Until last year, when the World Health Organization (WHO) confirmed Guinea had its first MARV disease, West Africa has been largely free of the disease [4]. However, it is crucial to be aware that viral hemorrhagic illness epidemics have occurred in West Africa, particularly those caused by the EBOV [5].

The WHO reported Ghana's first-ever MARV cases on July 19, 2022 [6].Two contaminated patients tested positive, prompting the announcement. The contact tracing system is active, and 90 people are being monitored now. Given the occurrences in the region over the past ten years involving EBOV outbreaks, the response is not unusual. In addition to testing Ghana's healthcare system, the outbreak could also have an impact outside of Africa.

2. Marburg virus epidemiology and outbreak in Ghana

When examining the epidemiology of MARV, two significant epidemics occurred for the first time simultaneously in 1967 in Belgrade, Serbia, and Marburg and Frankfurt, Germany. These contributed significantly to the development of the first description of MARV disease [7]. The Democratic Republic of the Congo (DRC), Kenya, South Africa, and Uganda have all since reported outbreaks and isolated cases [8]. Two separate incidents of tourists entering an Ugandan cave home to *Rousettus* bat colonies were reported in 2008 [9].The monkeypox virus emerged in the world and started to spread to other nations in 2020, following the coronavirus epidemic. The last time a deadly virus was detected was in Ghana. There have been two documented fatal occurrences in Ghana's Ashanti region [6].

The Ashanti region is one of the most populated cities in Ghana. The first case was a 26-year-old male patient with a history of prior travel. His symptoms started on 24 June and he was hospitalized on 26 June. He died on 27 June. In the second case, the patient was a male aging 51 years. On June 28, he presented to hospital with comparable symptoms. However, he died the same day. Considering these two cases, it was seen that there were fever, malaise, epistaxis, bleeding from the mouth, and subconjunctival hemorrhage. Blood samples were taken from the cases and sent to the Noguchi Memorial Institute for Medical Research (NMIMR) for testing. On July 1, MARV was identified via reverse transcriptase-polymerase chain reaction (RT-PCR). It was delivered to the Pasteur Institute in Senegal on July 12 where the outcomes were verified [10,11].

According to studies, neither dead animals nor any other element was involved in these cases. In addition, it was noted that they avoided social situations for two to three weeks post-symptom onset. When the region was examined in general, it was recorded that a total of 108 people were in contact. They remained in quarantine for 21 days and were kept under observation. Observation procedures were completed on 20 July [11].

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Table 1
(Distribution by countries and years).

Country	Year	Total of Cases	Symptoms	References
Kenya	1980	2	Fever, malaise	[12,13]
	1987	1		
South Africa	1975	3	Dense oropharyngeal secretions	[14]
Democratic Republic of the Congo	1998–2000	154	Fever, headache, nausea, vomiting, loss of appetite	[15,16]
Angola	2004–2005	374	Fever, hemorrhage, cough, diarrhea	[17]
Uganda	2007	4	Headache, musculoskeletal pain, nausea, vomiting, diarrhea, dyspnoea, fever	[18–20]
	2008	2		
	2012	15		
	2014	1		
	2017	3		
Ghana*	2022	110	Fever, malaise, epistaxis, bleeding from the mouth, subconjunctival hemorrhage	[11]

* The latest 108 cases have been identified in the current data for Ghana, and their treatment has ended after 21 days of observation. The first 2 cases detected on 24 June and 28 June lost their lives.

3. Etiology of marburg virus

The natural host of MARV is the African fruit bat *Rousettus aegyptiacus*, a member of the *Pteropodidae* family [21].

The African fruit bat is primarily found in Africa, with less of an abundance on other continents like North America. The virus has also been discovered in chimpanzees and monkeys.

During the initial MARV outbreak, the source of human infection for humans was found to be in laboratory research conducted on imported Ugandan African green monkeys, *Cercopithecus aethiops*. Yet, many of the other outbreaks began in bat-infested mines. Hence, the infection has primarily resulted from extensive exposure to mines and crafts. Due to cultural practices and rather unsafe family care settings alongside healthcare personnel, it then had the potential to proliferate in such communities.

Farms animals need close care so as not to become infected through contact with fruit bats since they may amplify the virus or increase the number of MARV disease outbreaks [11].

Direct contact with the blood, body fluids, and secretions of an infected person is how MARV is transmitted. Such fluids may be transmitted to other individuals by sharing infected materials and surfaces or percutaneous exposure, such as through exposed broken skin or mucous membranes. The transmission also occurs zoonotically, from animals to humans. Examples include consuming or killing diseased animals or coming into contact with infected bats' excrement (i.e., urine or faeces). There is no proof that the virus may be spread by insect bites [22].

Family members may potentially contract MARV when caring for sick relatives or participating in funeral ceremonies that include direct contact with the deceased.

A more severe outcome and possibly a greater mortality rate are linked to virus transmission from contaminated injection material or by needle-stick injuries [23]. In particular, when precautions regarding personal protective equipment (PPE), hand cleanliness, and the safe use of needles and sharps were not performed, healthcare professionals are more at risk when working with patients who are suspected of having or are confirmed to be infected with MARV.

4. Current efforts to mitigate marburg virus in Ghana

In the fight against the epidemic, Ghana's Ministry of Health is in charge of organizing the response efforts and working with relevant partners for the assistance required. Response actions have started, and the Ashanti region health directorate has developed coordination structures in the impacted health districts. Also, a designated hospital has been established in the Ashanti Region to contain and treat more cases [11].

The WHO is sending experts to Ghana in advance of a potential epidemic to help with disease surveillance, locating contacts, and patient treatment preparations. Additionally, the goal of the said experts is to collaborate with emergency response teams and affected communities to inform and educate individuals about the disease's risks and hazards [24]. Epidemiological investigations, such as enhanced surveillance using the Integrated disease surveillance and Response (IDSR) system, continue to be conducted and follow-up of contacts [11]. Health care professionals are currently undergoing sensitization on case definition and infection prevention and control measures. Volunteers for community-based surveillance have also attended an orientation to improve surveillance at the community level. WHO is providing reagents to NMIMR, which conducted the first testing of the samples, as part of its testing support program [11].

Burkina Faso, Côte d'Ivoire, and the surrounding nations have been made aware of the incident and are starting preparation efforts [11] Officials in Ghana are also advising the public to avoid caves and to thoroughly prepare all meat items before consumption.

5. Recommendations

The budget for healthcare should be increased, as should the number of beds and medical staff. In particular in said afflicted regions of the country, epidemiological development, community involvement, and coordinated monitoring programmes are vital. The coexistence of MARV alongside the introduction of infectious variations, such as the delta version of SARS-CoV-2, should be known to medical experts and researchers. It is crucial to make sure that healthcare staff have adequate PPE. The diagnosis of MARV patients depends on the results of proper laboratory testing. In the affected areas, social leaders and healthcare workers must be informed of the risk factors, security precautions for complete animal product production, and procedures for safe burial for people who have died from MARV. Instructions are based on countries that prevent MARV in local regions. Government and stakeholders must work together to ensure rapid containment of MARV during the COVID-19 pandemic so that healthcare systems are not overwhelmed. The WHO should strengthen coordination in MARV-endemic countries and provide continued financial support to reduce the re-emergence of this deadly disease [25,27–32].

Public health workers and physicians need to ensure that the following primary precautions and controls are in place to contain MARV. To avoid contact with blood and bodily fluids, proper hand hygiene should be practised while wearing PPE including gowns, gloves, masks, face shields, and goggles. Patients must be accommodated in a private bathroom or a single room with a dresser. Avoidance of physical contact with infected persons should be emphasised. The management of infected patients, and said transfer to dedicated medical facilities, should be carried out safely. Virus-infected corpses should be safely disposed of. With the application of adequate PPE, wildlife should be handled safely. Procedures that produce aerosols should be carried out carefully, ideally in an aerial isolation room, and with the use of PPE, including respiratory protection. It is important to reinforce good eating habits, such as properly preparing chicken and other animal products before consumption [26,32–36].

6. Conclusion

Two new cases of MARV have been identified for the first time in Ghana, where it is spreading throughout Africa. To halt the spread of this virus in Ghana, the WHO and the Ghana Ministry of Health are

collaborating. Additionally, the WHO is sending specialists to Ghana to assist with the containment of the said outbreak, enabling Ghana to screen additional samples. Healthcare professionals and volunteers in Ghana are examining the information and methods required to combat this disease most effectively. In general, more research will be needed to determine the basis of the infection source. Healthcare professionals will be forced to think of alternative approaches as a result of the growing number of cases not being in contact with one another.

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Authors contribution

Olivier Uwishema: Conceptualization, Project administration, Writing-review and Designing.

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Olivier Uwishema: Reviewed and edited the first draft, supervisor.

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