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The Outbreak of Marburg Virus in Tanzania: An Emerging Global Health Threat

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Abstract:
This article explores the recent outbreak of Marburg virus disease in the United Republic of Tanzania, highlighting the significant global health threat posed by the virus. The article discusses the history of Marburg virus outbreaks in different parts of the world and emphasizes the high fatality rate of the Marburg virus, the lack of specific treatment and vaccine, and the zoonotic origin of the virus as contributing factors to the potential to become global health emergencies. The article suggests lessons learned from previous outbreaks, such as effective surveillance systems, infection prevention, and control measures, international cooperation and research, and community engagement; that can be applied to manage the current outbreak in Tanzania. Lastly, the article discusses the critical role of public health professionals in responding to the Marburg virus outbreak and preventing its spread beyond national borders.

Keywords: Marburg virus, Outbreak, Global Health

INTRODUCTION

Marburg virus disease (MVD) is a rare zoonotic disease caused by the Filoviridae family, like Ebola, that leads to severe hemorrhagic fever in humans and requires assessment under International Health Regulations. It is highly contagious and spreads through direct contact with bodily fluids or contaminated materials, with symptoms appearing within 5 to 10 days, including fever, headache, muscle aches, vomiting, diarrhea, and bleeding including multiple organ failure [1, 2, 3]. Case fatality rates range from 24% to 90% depending on the virus strain and quality of medical services [4, 5], and no specific treatment or vaccine is currently available [5, 6]. Survival rates can be improved through early supportive care, including rehydration and symptomatic treatment, as there is currently no licensed treatment that can neutralize the virus, but multiple blood products, immune therapies, and drug therapies are being developed [7].

ACCOUNT OF PREVIOUS MARBURG OUTBREAKS

The history of Marburg virus outbreaks is atypical, as the initial known outbreak of Marburg virus disease took place in Europe. During the year 1967, laboratory staff members in Marburg and Frankfurt (Germany), and Belgrade, Yugoslavia (now Serbia) contracted an unfamiliar pathogen while handling monkeys that were infected and had been brought from Uganda [3]. This occurrence resulted in the first identification of the Marburg virus during outbreaks in Germany and Serbia in 1967. The outbreaks resulted in 31 cases and seven deaths (23%) [8]. Since then, sporadic outbreaks have been reported in Africa, with the most recent outbreak occurring in Tanzania in March 2023 [4, 8]. Notable outbreaks include Johannesburg, South Africa in 1975 [where out of 3 human cases, 1 (33%) died]; Kenya in 1980 [where reported human cases = 2, reported number (%) of death among cases = 1 (50%)]; Kenya in 1987 [1, 1 (100%)]; Russia in 1990 [1, 1 (100%)]; Democratic Republic of Congo from 1998-2000 [154, 128 (83%)]; Angola in 2004-2005 [252, 227 (90%)]; Uganda in 2007 [4, 1 (25%)]; USA in 2008 [1, 0 (0)]; Netherlands in 2008 [1, 1 (100%)]; Uganda in 2012 [15, 4 (27%)]; Uganda in 2014 [1, 1 (100%)]; Uganda in 2017 [4, 3 (75%)]; Guinea in 2021 [1, 1 (100%)]; Ghana in 2022 [3, 2 (67%)]; and Equatorial Guinea in February 2023, where there were nine laboratory-confirmed cases and 20 probable cases since the declaration of the outbreak from February 13th, 2023 till March 22nd, 2023: out of which there are seven deaths among the laboratory confirmed, and all probable cases are dead [5, 8, 9, 10, 11]. While Marburg virus disease outbreaks have been historically been sporadic, their incidence has been on the rise in recent times.

AN OUTBREAK IN THE UNITED REPUBLIC OF TANZANIA

On March 16, 2023, two villages in the Bukoba district of northern Tanzania reported seven cases and five deaths from an unidentified illness. The Ministry of Health later confirmed on March 21, 2023, that an outbreak of Marburg virus disease had occurred in Tanzania. As of March 22, 2023, eight cases, including five deaths, have been reported in the affected villages of Bukoba district in the Kagera region of Tanzania, with two healthcare workers among the reported cases and one death. This is the first Marburg virus disease outbreak in Tanzania, and the current CFR for this outbreak is relatively high, at 62.5% [4].

GLOBAL HEALTH THREAT

The Marburg virus outbreak is a significant global health threat due to its high fatality rate, transmission through infected animals making it challenging to predict and control outbreaks, lack of specific treatments or vaccines, occurrence in various parts of the world including Europe, Africa, and Asia, and the potential for global spread due to global travel and trade, and classification as a category ‘A’ bioterrorism agent by the Centers for Disease Control and Prevention (CDC), emphasizing the need for preparedness and response systems to prevent international outbreaks [4, 5, 6, 12, 13]. The virus's spread beyond Tanzania is worrying due to its contagiousness and severity, which could cause significant outbreaks in regions with weak healthcare systems and quickly become a global health emergency.

LESSON FROM THE PAST

The lessons learned from previous outbreaks, including Ebola, are relevant to responding to the Marburg virus outbreak in Tanzania. A critical component of a successful response was an effective surveillance system, which involves early detection through active case finding and investigation to allocate resources to respond to outbreaks effectively [10, 14, 15, 16]. Another important lesson is the importance of effective

infection prevention and control measures, which includes contact tracing to identify exposed individuals, isolation of infected individuals, appropriate treatment, and the effective use of personal protective equipment such as face masks, eye protection such as goggles and face shields, gloves and gowns by healthcare workers and other individuals who are at high risk of exposure to viruses, including safe burials [17]. Next, international cooperation is critical in responding to viral outbreaks that cross borders and involves sharing information and best practices, coordinating response efforts, and providing financial and technical support to affected countries; while research can help to improve our understanding of the disease and develop effective treatments and vaccines [18, 19]. Finally, spreading awareness and community engagement are critical for responding to viral disease outbreaks [20]. Community engagement builds trust and support for outbreak response efforts and can involve a range of activities, such as public meetings, working with community members and leaders to raise awareness, identifying, and addressing potential barriers to accessing healthcare services, door-to-door campaigns, social media outreach, and community-based surveillance systems. Educating the public on virus risks, preventive measures, and community actions is essential. Moreover, spreading awareness among vulnerable communities as well as healthcare providers for better preparedness and participation in rapid-response control is crucial [11].

THE ROLE OF GLOBAL OR PUBLIC HEALTH EXPERT

The response to the Marburg virus outbreak in Tanzania requires the involvement of public health professionals due to the potential of the virus to spread beyond borders. They are responsible for providing guidance and support to local health authorities in implementing effective responses by providing technical assistance, training healthcare workers, and coordinating international responses. Additionally, research can be conducted to gain insight into the virus and develop treatments or vaccines to prevent future outbreaks. Public health professionals can also interact with local communities to establish trust, increase knowledge, and endorse prevention and control measures. This may include collaborating with community leaders, promoting educational and awareness initiatives, and engaging local communities in response efforts.

RECOMMENDATIONS

To prevent future Marburg virus outbreaks in Tanzania, several measures must be taken. These include improving surveillance systems with active case finding, reporting, and investigation; implementing effective infection prevention and control measures such as contact tracing, isolation, appropriate treatment, effective use of personal protective equipment, and safe burials; prioritizing international cooperation and research; and creating awareness and community engagement. Public health experts should play a vital role in providing guidance and support to local health authorities, coordinating response efforts, and conducting research. They must also interact with local communities to establish trust, increase knowledge, and endorse prevention and control measures.

CONCLUSION

In conclusion, the recent Marburg virus outbreak in Tanzania underscores the ongoing risk of emerging infectious diseases in Africa and the urgent need for preparedness and response systems to prevent and control outbreaks. Effective surveillance systems, infection prevention and control measures, international cooperation and research, and community engagement are critical components of a successful response to

Marburg virus outbreaks in the past. Public health experts should play a crucial role in providing guidance and support to local health authorities, coordinating international response efforts, conducting research, and building trust. By applying these lessons and working together, the impact of Marburg virus outbreaks can be effectively managed, and future outbreaks of similar viruses can be prevented.

AUTHOR CONTRIBUTIONS

Both the authors have an equal contribution in conceptualizing and writing this article. Both the authors read and approved the final draft before submission.

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CONFLICT OF INTEREST

The authors have no conflicts of interest associated with the matters presented in this paper.

DATA AVAILABILITY STATEMENT

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