Beyond the COVID-19 pandemic in Nigeria: Improving awareness and preparedness for managing Viral Haemorrhagic Fevers

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ABSTRACT

Prior to the COVID-19 pandemic, Nigeria had been affected by outbreaks of Viral Haemorrhagic Fevers (VHF). Outbreaks of Lassa fever and Yellow fever were recorded during the COVID-19 pandemic, and have thus placed multiple burdens on the Nigerian health system. To increase public awareness and ensure adequate preparedness for managing VHF, this perspective article describes the events of VHF during the COVID-19 pandemic in Nigeria. To ensure adequate preparedness for VHF, adequate coordination and delivery of organized public health interventions should be well-planned and thoroughly executed. Also, scaling up of contact tracing and testing activities, and strengthening of routine immunization activity should be sustained. Moreover, adequate community mobilization and participation are keys to ensuring adequate outbreak response activities at the community level.

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Introduction

The COVID-19 pandemic has undoubtedly been a global health crisis that has affected nations around the world, including Nigeria [1-3]. As the world grapples with the ongoing challenges posed by the pandemic, it is crucial to expand our focus beyond COVID-19 and prepare ourselves for other potential infectious disease outbreaks. In particular, the awareness and preparedness for managing Viral Haemorrhagic Fevers (VHFs) in Nigeria require urgent attention.

VHFs encompass a group of severe and often life-threatening illnesses caused by a variety of viruses [4]. These include well-known diseases such as Ebola virus disease, Lassa fever (LF), and Marburg virus disease, among others [4]. While Nigeria has experienced outbreaks of these VHFs in the past, the current focus on COVID-19 has shifted attention away from other significant infectious diseases, leaving the nation vulnerable to potential future outbreaks. Improving awareness about VHFs is essential to ensure early detection, prompt response, and effective management of outbreaks.

Viral Haemorrhagic Fevers before and during the COVID-19 pandemic

Prior to the COVID-19 pandemic, Nigeria had been affected by outbreaks of VHF at different periods, notably the Lassa fever (LF) and Yellow fever (YF) outbreaks in different regions of the country (Table 1) [5]. Before 2018, outbreak trends were seemingly predictable with peaks between November and April annually. However, from 2018 onward, LF and YF outbreaks occur all year round in different parts of the country (Table 1) [5]. LF and YF outbreaks have persisted into the COVID-19 pandemic period. Nigeria recorded a total of 1,178 confirmed cases of LF and 237 LF-related deaths in 2020 across 25 states and 142 LGAs but dwindled by nearly 50% in suspected cases and 115% in confirmed infections in 2021 (Table 1) [6,7]. As of Epi week 5 in 2022, about 211 laboratory confirmed Lassa fever cases including 40 deaths have been reported across 14 states in Nigeria [8].

Similarly, 1,558 suspected cases of YF, 46 YF confirmed cases and 22 YF-attributable deaths have been reported in 481 LGAs across all the states of the Nigerian Federation including the Federal Capital Territory in 2020, and YF cases are increasingly being reported [9,10] (Figure 1). Confirmed cases of YF have been reported from Bauchi, Benue, Delta, Ebonyi, Edo, Ekiti, Enugu, and Oyo aStates [9,10]. Thus, multiple burden of disease has been placed on the Nigerian health system during the COVID-19 outbreak, events for which targeted and proactive response measures are required. In a bid to increase public awareness and ensure adequate preparedness for managing VHF, this study therefore aimed to describe the events of VHF during the COVID-19 pandemic in Nigeria.

Infectivity, pathogenicity and virulence of SARS-CoV-2, Lassa fever, and Yellow fever

The high level of infectivity of SARS-CoV-2, the viral agent causing COVID-19, has been reported by the World Health Organization and the Nigeria Centre for Disease Control [11,12]. COVID-19 has been described as a mildly virulent infection with a case fatality rate (CFR) of 1.8%, thus indicating a reduced likelihood of resulting severity and mortality [11,12]. Available evidence from the WHO posits that human-human transmission of COVID-19 could occur within 2 meters when droplets from infected persons are inhaled by healthy individuals [11]. The inhaled SARS-CoV-2 binds to the epithelial cells in the nasal cavity and undergoes cell division while binding to ACE2, its main receptor. Local propagation of SARS-CoV-2 occurs at this stage, but with a limited immune response [13]. Although the viral load may be low at this stage, infected persons are always infectious. Over the next few days, SARS-CoV-2 travels further along the conducting airways among 80% of COVID-19 cases and stimulates a more robust immune response with symptoms such as fever, cough, body weakness, headache, diarrhea, conjunctivitis etc. [13]. Only 20% of COVID-19 cases progress to the severe stage where self-replicating toxins are released, hypoxia results, and progress to acute respiratory syndrome [13].

Given the highly infectious nature of LF and with a CFR of 20.6%, more LF cases are likely to result in deaths [6]. Evidence abounds that Lassa virus mainly targets dendritic and endothelial cells and attacks most tissues in the body after gaining entry, and thereafter stimulate immune response [14,15]. Pathological changes associated with LF include cough, fever, body weakness, pleural effusion and oedema, and haemorrhagic manifestations etc. [6]. On the other hand, YF also has a rapid transmission

rate and a CFR of 47.8%, thus indicating a high likelihood of mortality when transmission of YF virus occurs from Aedis Egypti, the YF vector, to man [10]. It has been estimated that 15-50% of persons infected with YF have intense viraemia that lasts for the first 3-4 days, after which viraemia and symptoms such as chills and fever gets abated within the next 48 hours [10]. About 15-20% of YF cases progress to the severe stage where symptoms such as fever, relative breathlessness, vomiting, nausea, and haemorrhagic manifestations are evident [16].

Vulnerability to SARS-CoV-2, Lassa fever, and Yellow fever

All population groups are vulnerable to COVID-19. However, a large proportion of the confirmed cases of COVID-19 in Nigeria are males, people in the 21-50 years age group, individuals with underlying illnesses such as diabetes, and older individuals characterized by weak immune system are at greater risk of contracting COVID-19 and dying as a result than the general population [3]. Alsoti, LF equally affects both sexes and all age groups, and especially poses great risk in pregnant women, among whom it causes miscarriage [17]. Also, the presence of bush around residential areas as well as the presence of multimammate rats increase individual vulnerability to LF [18]. Regarding the recent YF outbreak in Nigeria, children aged 0-9 years are mostly affected, with persons above 30 years recording the lowest number of cases. Although response activities have been targeted at addressing these three outbreaks in Nigeria, the shortage of material resources such as the polymerase chain reaction kits have resulted in delayed result turnout time, and diagnosis, thus limiting early commencement of management options and the success of the outbreak responses [18].

Inadequate resources for addressing outbreaks of Viral Haemorrhagic Fevers

The dearth of health workers; doctors, nurses, laboratory scientists, and community health extension workers etc., has resulted in a huge gap to the realization of effective outbreak responses in the management of COVID-19, LF, and YF [18]. To date, there is no known vaccine for the prevention of LF, although certain medications are being used to slow disease progression among cases [19]. For instance, intravenous Ribavirin, an anti-viral medication, is being administered for the treatment of LF cases over a period of 10 days [20]. Ribavirin has been administered in some instances for the treatment of YF, however, the YF vaccine which has been included in the routine immunization schedule for children at 9 months triggers immune response against the YF virus [21]. Due to the existing provisions and highlighted gaps, mitigating further outbreaks of COVID-19, LF, and YF should gain priority.

Lessons Learned and Preparedness for the Future in Managing Outbreaks of Viral Haemorrhagic Fevers

To enable enhanced outbreak response activities, the adoption of a 'one-health approach'; a holistic approach on the understanding and regulation of the environment in the emergence and expression of emergencies presents a promising strategy for adequate response activities for COVID-19, LF, and YF outbreaks. In this regard, we hereby proposed a three-pronged approach. Firstly, adequate preparedness by the national government is quintessential because it presents the opportunity for evaluating the successes and failures of currently implemented outbreak response activities, and to chart an improved course for future responses while building on lessons drawn from the past and present. Also, adequate coordination and delivery of organized public health campaigns in community-wide acceptable modalities regarding VHF should be well-planned. In this regard, health campaigns should be overseen by competent experts in the fields of infectious diseases and community health for an excellent execution of assigned responsibilities and maximization of resources. Since future disease outbreaks cannot be completely prevented, the budgetary allocation for health should be increased to enable adequate deployment of health workers and timely management of health emergencies when they occur. Also, scaling up of contact tracing and testing activities should be conducted and sustained while the outbreaks of VHF are ongoing.

Moreover, strengthening the routine immunization activity and implementation of one-off immunization programs in YF-endemic zones would be an effective preventive measure for LF. The COVID-19 vaccine has been rolled out, while the LF vaccine development is ongoing. Integrating COVID-19 vaccine into routine immunization

activity is required. In addition, incorporating COVID-19, LF, and YF outbreak responses into the national health system will enable the delivery of health services via the horizontal approach while maximizing the available resources, avoiding wastage, and promoting improved responsive action [22].

The national health system requires strengthening through increased provision of resources either through donations from civil-based or religious organizations or private individuals [23]. This will provide an alternative method for generating revenue for the health sector, but trusted professionals should be placed to manage the disbursement of these funds. Community inclusion creates the opportunity for community participation in the response activities, a modality that assures of acceptability, practicability, and sustenance of proposed health interventions in outbreak management [23]. The involvement of community stakeholders such as community leaders, religious leaders, opinion group leaders, teachers, patent medicine vendors, and community pharmacists will enhance the reporting of suspected cases of COVID-19, LF, and YF to enhance disease notification and promote community health. This will therefore enable improved collaborative action towards the reduction of risky activities for these VHFs at the community level.

Conclusion

Prior to the COVID-19 outbreak, Nigeria has been faced with many VHFs including LF and YF, and these have re-emerged amid the COVID-19 pandemic. To mitigate these outbreaks, adequate preparedness, multi-sectoral involvement, and community participation are key requirements. A solid framework is required for the integration of all sectors to ensure community and national health to ensure adequate management of VHF beyond the COVID-19 pandemic.

What is known about this topic

- Nigeria had been affected by outbreaks of LF and YF prior to the COVID-19 pandemic.
- The persistence of LF and YF during the COVID-19 pandemic has placed multiple burden of disease on the Nigerian health system.

What this study adds

- The budgetary annual allocation for health should be increased to enable adequate deployment of health workers and timely management of health emergencies when they occur.
- Scaling up of contact tracing and testing activities should be conducted and sustained while the outbreaks of VHF are ongoing.
- Strengthening the routine immunization activity and implementation of one-off immunization programs in YF-endemic zones would be an effective preventive measure for LF.

Competing interest

The authors declare no competing interest.

Authors´ contributions

OSI, AAA, and AOA conceptualized the study. AAA wrote the initial draft of the manuscript. OSI, AAA, and AOA reviewed the manuscript for intellectual content. All the authors read and agreed to the final version of the manuscript.

Table and figure

Table 1: Summary of 2022 epidemiological week 10

Figure 1: Epidemic curve of Lassa fever infection in Nigeria 2020

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Table 1: Summary of 2022 Epidemiological week 10 data on COVID-19, Lassa fever and Yellow fever since the COVID-19 outbreak

Disease	Confirmed cases	Confirmed deaths	Case fatality rate (%)	States affected/ LGAs
COVID-19	254,989	3,142	1.23	36 (and the Federal Capital Territory)
Lassa fever	1178*	237*	20.1*	25/ 142
Yellow fever	46*	22*	47.8*	36 (and the Federal Capital Territory)/ 481

*Complete data as of 2020

(Source: Nigeria Center for Disease Control. Available at: www.ncdc.gov.ng) [5,6]

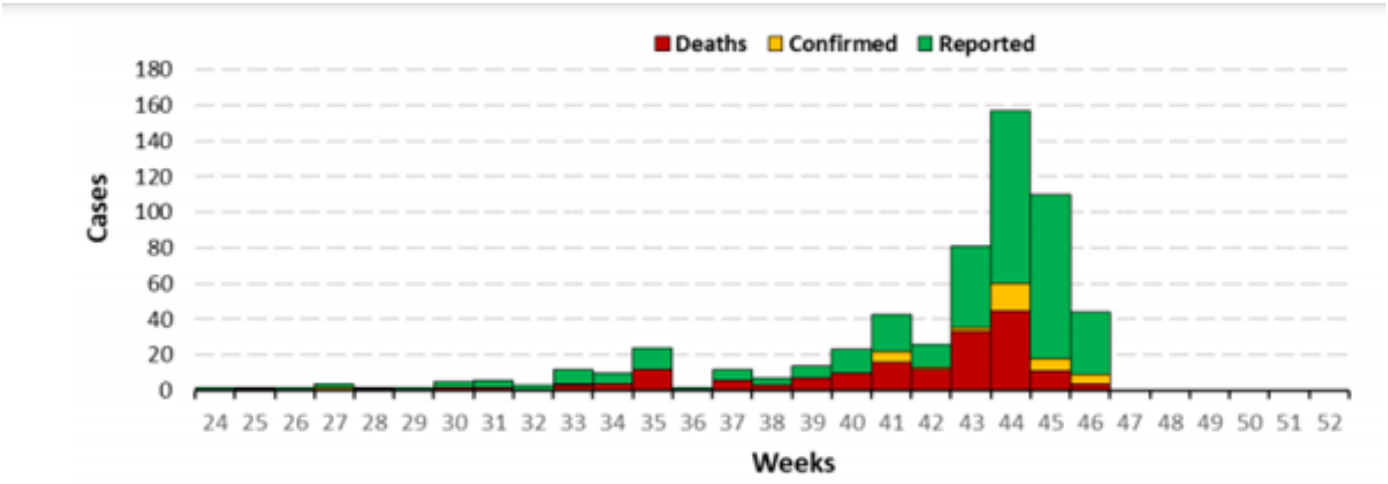

Figure 1: Epidemic curve of Lassa fever infection in Nigeria 2020

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