Human Respiratory Infections in Nigeria

Subjects: Others

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The outbreak of zoonotic diseases presents challenging times for nations and calls for a renewed effort to disrupt the chain of events that precede it. Nigeria's response to the 2006 bird flu provided a platform for outbreak response, yet it was not its first experience with Influenza. Nigeria's interest in animal influenza research was triggered by its negative economic consequence on poultry. This is because the poultry industry is a fast-growing sector and an effective tool for poverty alleviation in Nigeria.

SARS-CoV-2 influenza Nigeria pandemic

1. Introduction

Zoonotic respiratory viruses are responsible for more disease outbreaks at the human-animal interface than any other source [1]. The National Institute of Health (NIH) reported that over 18% of emerging and re-emerging zoonotic diseases are caused by respiratory viruses such as the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), Middle East Respiratory Syndrome Coronavirus (MERS-CoV) and influenza [2]. As a result of global warming, rapidly changing ecology, increased global travel, population growth, urbanization and increasing human disruption to the wild, the world is likely to experience increasing emergence and re-emergence of zoonotic pathogens [3][4][5]. These factors interplay in a complex manner that challenges public health response in mitigating infectious disease spread. There are speculations that the novel SARS-CoV-2 emerged due to the growing desire for bushmeat in Asia [6][7][8][9]. The extensiveness of disease outbreaks and their convoluted spread in the environment, animals, and humans necessitated the World Health Organization's (WHO) Tripartite One Health approach to address future outbreaks and improve surveillance at the human-animal interface [10]. At the centre of the tripartite approach is the Food and Agricultural Organization (FAO), World Organization for Animal Health (WOAH) and WHO partnership to address challenges in humans, animals, and environmental health through a multisectoral and multidisciplinary approach [11], bearing in mind that health cannot be achieved by working in silos.

2. Historical Overview of Influenza in Nigeria

2.1. The Emergence of SARS-CoV-2 in Nigeria

Before the 2019 pandemic, studies have shown the existence of coronaviruses circulating in the wild, especially in Bats [12][13][14]. While other coronaviruses have been shown to have a global presence [15], it was the SARS-CoV-2 pandemic that brought it to the limelight in Nigeria. The novel SARS-CoV-2 was first detected in an Italian traveller

in Nigeria on the 27 February 2020 [16]. Prior to that, Quan et al., 2010 [14] reported the discovery in 2010 of a novel coronavirus from Commerson's leaf-nosed bat (*Hipposideros commersoni*) in Zaria (ZBCoV) 2010 was the first of its kind in Nigerian wildlife, and it positioned Nigeria on the map of coronaviruses endemic countries. Similarly, in another study in 2016, Leopardi et al. [17] detected and identified Betacoronavirus from fruit bats in Ibadan, Nigeria, 2016.

Although countries have now approved guidelines for the treatment of SARS-CoV-2 [18], conflicting information, such as inconsistent scientific findings on treatment and differing recommendations among professionals, were common in the early stages of the pandemic. This was expected because knowledge of the virus was incremental [19][20], although these missteps negatively impacted public perception of the virus. For example, there was no unified guideline on the use of nose masks [21], and this broods more controversy. Other drawbacks unique to the Nigeria setting include; ineffective distribution of relief materials, inadequate healthcare facilities, adoption of foreign containment measures that do not align with domestic economic realities, misleading information from public figures and erroneous belief that the pandemic affects the wealthy who have a high propensity to travel oversea [22][23][24].

The Nigerian government's public health measures/guidelines, such as restrictions on foreign travel and lockdown of major cities, have kept the local transmission in check, as evidenced by the slow epidemic trajectory in the first month [25]. Aside from these measures, before the arrival of the index case, the government had upgraded testing capacity and commissioned a laboratory network, provided isolation centres for case management, set up the Ministerial Expert Advisory Committee on COVID-19 (MEACoC), case management, infection prevention and control, and risk communication as pandemic preparedness [26]. As a novel disease, nations had to rely on new information that guided policies on public health. Some of these adopted interventions, such as 'stay at home' and quarantine, were disproportionately borne by those who were already disadvantaged [27]. Nonetheless, the early approach to containment has been effective, albeit it came at the expense of people's livelihood, education and mental health [28].

2.2. The Impact of COVID-19 on Respiratory Viruses in Nigeria

Due to the similarity in symptoms displayed by other self-limiting respiratory infections such as the common cold, the perception of COVID-19 in Nigeria has been rather simplistic and counterproductive to government restrictions aimed at mitigating its spread [29]. Globally, respiratory outbreaks have been shown to influence seasonal diseases in unique ways because interventions and public health measures in curtailing the outbreaks, such as respiratory hygiene, handwashing, and social distancing, have a ripple effect on other diseases. For example, Yuan et al., 2021 [30] showed a significant reduction in endemic respiratory viruses such as influenza, human coronaviruses (CoV-OC43, CoV-229E), parainfluenza (PIV-2, PIV-4,) and respiratory syncytial virus (RSV). Moreover, several other studies have reported a significant drop in endemic seasonal respiratory viruses in Australia [31], New Zealand [32], China [33], Canada [34], Chile and South Africa [35], thereby further bolstering that COVID-19 interventions produced overlapping positive outcomes for other respiratory viruses [36]. In another study, Swets et al., (2022) reported that co-infection of COVID with influenza ranked high among other viruses in England.

However, co-infection of COVID-19 with influenza and adenoviruses was significantly associated with death [37]. Despite the evidence of co-infection of COVID-19 with other respiratory viruses, such as influenza, and RSV [37][38][39], surveillance of influenza in humans in Nigeria is limited.

2.3. Rising Threats of Novel Zoonotic Spill-Over

The drivers of zoonotic outbreaks are intertwined in a web of complex events, making it impossible to understand one facet independent of the other. Before the 2019 pandemic, there has been growing evidence of the close relationship between human health and a healthy ecosystem [40]. The rising zoonotic disease outbreaks reflect a recent tapering interface between humans and animals. Several factors such as man's increasing encroachment into the wild, illegal wildlife trade, rising global population and food insecurity, and disruption of the ecosystem through urbanization may have significantly contributed to spillover events [41][42][43][44]. On the other hand, the fast pace of technological advancement facilitates the rapid spread of outbreaks since the time it takes to travel between continents is shorter than the incubation period of most pathogens. This means nations must grapple with the consequences of emerging and re-emerging pathogens [45].

The last two decades have witnessed several zoonotic outbreaks. Notably, SARS-CoV in 2003, which originated from bats and civets, Highly Pathogenic Avian Influenza (HPAI) H5N1 in 2002 and 2006, and Middle East Respiratory Corona Virus (MERS-CoV) in 2014 from dromedary camels, Ebola outbreak from bats in Western Africa in 2014, re-emergence of Monkeypox virus in 2017 and 2022, and the recent SARS-CoV-2 in 2019 [46][47]. An important risk factor synonymous with these outbreaks is the unregulated wildlife trade. However, the wildlife trade has been linked to disease outbreaks in humans and livestock, leaving substantial economic losses in international trade [48][49]. Food insecurity, poverty, cultural practices, and corruption remain major drivers of the wildlife trade. This emphasizes the socioeconomic dimension of zoonotic disease. Hence, there is a higher risk of zoonotic spillover from areas where the wildlife trade is rife.

2.4. COVID-19 in Africa: Pandemic Preparedness in Diagnostics, Case Management and Vaccination

A critical step in pandemic preparedness is effective disease surveillance. COVID-19 reinforced that disease surveillance measures in most African nations are inadequate due to diagnostic insufficiency, geographical/cultural barriers, and poor data management [50]. For instance, epidemics such as Ebola have been actively spreading for over a month before being detected [51]. Although travel and movement were restricted in many countries at the onset of the COVID-19 pandemic, there is little evidence to suggest that these restrictions were imposed early enough or strictly enough across Africa. For example, the initial airport surveillance in Nigeria, Ivory Coast and Egypt focused on individuals with recent travel history to China [52]. However, recent genomic surveillance demonstrated how COVID-19 was predominantly initiated in Africa via trade-related interactions and importations from Europe. The study reported about 757 transcontinental introductions of the SARS-CoV-2 into Africa between 2020 and 2021 [52]. Taken together, this suggests that disease surveillance towards pandemic preparedness needs to be expansive and continuous. The major drawback to more effective disease surveillance in many African

nations is inadequate funding for these countries' health and research sectors. Kapiriri et al. [53], studied the pandemic preparedness plan of 18 African nations and highlighted that pandemic preparedness was not generally considered a priority. The countries have various needs in their budgets that must compete for the limited funds.

In addition to disease surveillance, public health education is crucial to pandemic preparedness. However, the learning crisis, absence of compulsory education, and low school completion rates in most African countries pose a significant challenge to the use of education in pandemic preparedness [54]. The COVID-19 pandemic highlighted the impact of education, or the lack thereof, on upholding or endangering public health. For example, students of health professions in sub-Saharan Africa demonstrated adequate knowledge of COVID-19 transmission and prevention because public health is included in their curricula [55]. This demographic, however, only represents a small population of the entire African populace. Therefore, it is necessary to educate non-health professions students on the rudiments of public health as a means of pandemic preparedness. Additionally, intensive public health awareness which is aimed at educating people with no formal education is a critical approach to pandemic preparedness in Africa. Another study on selected countries in south, east and west Africa showed that even where these were practised initially, a decline in adherence to handwashing as the COVID-19 pandemic progressed was prevalent [56].

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