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REVIEW

Lessons from the coronavirus disease 2019 (COVID-19) pandemic response in China, Italy, and the U.S.: a guide for Africa and low- and middle-income countries



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ABSTRACT

Africa can be “left behind” after other advanced continents recover from the coronavirus disease 2019 (COVID-19) pandemic as reflected by the global pandemic of HIV/AIDS. In this paper, we summarize potentially adaptable, effective and innovative strategies from China, Italy, and the U.S. The purpose is to help African countries with weaker healthcare systems better respond to the COVID-19 pandemic. China, being the first to report COVID-19 infection swiftly swung into anti-epidemic actions by the use of innovative risk communication and epidemic containment strategies. Italy and U.S., the next rapidly hit countries after China, however, experienced sustained infections and deaths due to delayed and ineffective response. Many African countries responded poorly to the COVID-19 pandemic as evidenced by the limited capacity for public health surveillance, poor leadership, low education and socioeconomic status, among others. Experience from China, Italy and U.S. suggests that a better response to the COVID-19 pandemic in Africa needs a strong public health leadership, proactive strategies, innovative risk communication about the pandemic, massive tests and isolation, and scaling-up community engagement. Lastly, African countries must collaborate with other countries to facilitate real-time information and experience exchange with other countries to avoid being left behind.

1. Introduction

The coronavirus disease 2019 (COVID-19) with no prediction has been a threat and challenge to global health. Striking the world at the time it did, led to so many unforeseen drawbacks arising from the need to divert funds, manpower and resources towards the battle against the virus.¹ January 30, 2020 remained remarkable as the World Health Organization (WHO) declared the COVID-19 epidemic a public health emergency of international concern.^{2–3} As of December 5, 2020, over 66 million confirmed cases and over 1.5 million deaths have been recorded globally.⁴ At a mortality rate estimated at 2%–4%; seemingly higher than that for the influenza pandemic, the disease was tagged very high risk by the WHO risk assessment report.²

The outbreak of COVID-19 was in late December 2019 with symptoms including fever, malaise, dry cough and shortness of breath.⁵ Geriatrics and people in immunocompromised states or with underlying

health problems have been reported to be at greater risk of encountering debilitating health consequences. The etiology was speculated to be linked to a popular seafood market in Wuhan city of China.⁵

The established transmission modes include respiratory droplets and person-to-person contact. Most researchers estimate that the incubation period ranged from 1 to 14 days, with an average of 5 days.⁶ Following the outbreak, health care workers resorted to palliative care using existing drugs,⁶ and several strict measures were conceptualized and implemented to detect, curb and control the spread of the disease.⁷ These measures include heightened surveillance and rapid identification of suspected cases, followed by patient transfer and isolation, rapid diagnosis, tracing, and follow-up of potential contacts. Social distancing, use of masks and improvement in personal hygiene have also been emphasized.^{8–9} Those measures were adopted from existing guidelines established from experiences garnered during previous disease outbreaks

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like the severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome.

Although not fully anticipated, some preparedness against epidemics and pandemics is expected at the global and regional/country levels⁹⁻¹⁰ to avoid the disastrous effect; as evidenced in past outbreaks such as the Black Death¹¹ and influenza virus pandemics.¹² Upsurge of the infection emanating from intensified international travel, trade and migration, as well as increasing human population density and contact between humans and wild animals, highlights the need to be proactive against potential outbreaks.¹³

In spite of the substantial efforts geared towards global health surveillance and capacity development, a huge proportion of the world, mostly the developing countries, are not equipped to handle the challenges and consequences of many pandemics, including COVID-19. Based on the report by WHO-supported Joint External Evaluation, not many countries are wholly compliant with the International Health Regulations (2005), a marker for evidence-based capacity to alleviate public health risks.¹³

Africa recorded over 2 000 000 confirmed cases and over 53 000 deaths after its first case in Egypt on February 14, 2020.^{4,14} This has led to the emergence of queries as to how long the situation can be properly managed based on the gaps and inadequacies in the health, infrastructure, manpower and finance in the developing nations.¹⁵⁻¹⁶ To further emphasize the threat of COVID-19 transmission in Africa, the spread of the disease has been projected at 10 million cases within three to six months.¹⁷

Nigeria confirmed its first case of COVID-19 on the 27th of February, 2020 and has witnessed a further spread across more states within the country.¹⁸ With a dense population of about 200 million people and other socio-economic factors of concern, Nigeria is particularly vulnerable for severe set-back by the pandemic.¹⁹ From evaluation of the 2013–2016 Ebola virus epidemic, evidence supports that the severity of COVID-19 might be exacerbated by frail state of the health systems in West Africa.²⁰ Our current response to the COVID-19 outbreak indicates that we have not learned valuable lessons from the previous outbreaks as the extra mortality was to a large extent determined by the lack of quality healthcare.

In low and middle income countries (these lapses arise from and revolves around our limited capacity for public health surveillance and outbreak response, including deficiency in supply of testing kits, treatment, quarantine and isolation facilities, etc.¹⁶ Asides problems involving immediate pandemic prevention and control, inadequacies include the lack of funds towards medical research and education, deplorable state of health amenities, poverty arising from unemployment/under-employment, lack of basic social amenities, poor leadership/governance, all of which could culminate into disastrous consequences amidst the COVID-19 outbreak.²¹⁻²²

To fight against the COVID-19 for better outcomes, this study explores adoptable, effective and innovative strategies from China, U.S. and Italy. We will focus on the allocation of funds towards health care and medical research, disease surveillance and control measures, risk communication and health promotion; public aid and social support, and commitments of the government. This review will help inform health policy and implementation of an effective and sustainable intervention for the prevention and control of the COVID-19 pandemic now and potential against future epidemics/pandemics.

2. Lessons from China, Italy and U.S.

With no immediate vaccines and antiviral medication for COVID-19, China being the epicenter of the outbreak swiftly swung into action in managing the epidemic. Typical measures include the use of existing traditional public health epidemic containment strategies of testing, isolation, quarantine, physical distancing, and community containment.²³ These tactics immediately yielded positive result in containing the out-

break. China's actions gave us hope to control the COVID-19 spread without a vaccine or antiviral therapy.

Italy and U.S., the next two epicenters immediately after China, however, suffered from rapid increases in cases of infections and high COVID-19-related deaths even at the early phase of the pandemic.²⁴⁻²⁵ The situation in Italy remains a public health emergency of great concern²⁶ with speculations that the causalities are on the high side because a greater proportion of its citizens are well advanced in age.²⁴

As observed in Italy, factors responsible for this dire situation are a complex mix of poor risk communication to the populace which led to a false sense of security, political considerations of infringement on people's right to freedom, initial hesitation of the government to carry out community wide containment and especially, non-compliance of the citizens to prevention and control measures.²⁷⁻²⁹ An important lesson from this is that in any pandemic or epidemic, delayed response stemming from unpreparedness and or political biases will no doubt worsen an already critical condition.

Similarly, the U.S. is well-known as a wealthy country, armed with numerous high technological and biological tools to fight an outbreak. However, the country remained highly vulnerable to the COVID-19 epidemic. Obvious factors include but are not limited to delays in travel restrictions from Europe, delays in measures to enforce social distancing and face masks across the country, and a downplay of the effects of the virus by the U.S. government.

With threat of the same epidemic, different countries had very different results. This creates a situation to investigate and possibly adopt approaches. From China and other advanced nations to control and prevent COVID-19 in Africa.

2.1. Diversion of resources to health care and research

In China, health workers were sent from different provinces to Wuhan City, the epicenter of the outbreak; several large field hospitals were erected to match up with the teeming number of infected COVID-19 patients.³⁰⁻³² while infected patients were managed through supportive care and treatment of symptoms³³⁻³⁴ funds were released by the central government for research into pharmaceutical counter measures (vaccines and antivirals). In a relatively short time, China was able to provide the genome sequence of the novel coronavirus. This facilitated the production of diagnostic tools for use across the globe³⁵ and the release of national standardized guidelines for diagnosis and treatment.³⁶⁻³⁸

Lombardy—the first hit region in Italy, responded to the outbreak by increasing the capacity of the intensive care unit (ICU)²⁴ in pre-selected hospitals based on their emergency preparedness framework from lessons learnt during the 2009 influenza pandemic.³⁹ To reduce risk of within-hospital transmission, ICU cohorts were created in areas separate from other ICU beds. In light of shortage of facilities to match up with the increasing number of persons critically ill from suspected COVID-19 infection, mechanical ventilation was provided in triage areas pending the time of confirmation of diagnosis of the virus. Additionally, non-life-threatening procedures were cancelled to make available more personnel and facilities to receive other patients.²⁴ With increased stress on their health care system⁴⁰, emergency funds and other resources were released by the Italian central government and stricter community containment measures were adopted.

However, the U.S. government downplayed the threat of the COVID-19 pandemic during its early stage despite the awareness of the problem across the globe.⁴¹ A likely reason could be that U.S. leadership false assuming no greater threat of this pandemic than influenza.⁴¹ Other reasons include decentralized governance with main duty for health being led by individual states and lack of coordinated actions at the national level. Furthermore, there was inadequate production of testing kits and insufficient personal protective equipment (PPE) which led to under-detection of the cases and further spread of the virus.⁴¹

2.2. Border control measures

After knowing the widespread of the novel coronavirus infection, China immediately put most strict community containment measures in place; including temporary shutting down borders of a metropolitan city with a population of more than 10 million to restrict both domestic and international travels.⁴²⁻⁴³ although some travel bans were selectively lifted later after the epidemic was under control by and large, other measures were still in place to prevent potential new waves of infections. At the seaports and airports, international travelers are subjected to immediate testing, temperature checks, in addition to compulsory quarantine for two weeks at government designated facilities.⁴⁴

On the contrary, there was an inconsistent measure for travel ban, and promoting face masks and social distancing in the U.S. The U.S. government banned the travel from China during the early period of the epidemic, but they were reluctant to ban the travel from Europe. This inconsistent measure contributed to the first rapid increase of the epidemic in New York and other states on the east coast. The lack of travel ban in the U.S. has been driven primarily by a bid to prevent an economic downturn and to satisfy public sentiments.⁴¹ This could have contributed to the high number of cases in the country.⁴¹

Similarly, despite an early detection of the virus in Italy, the country employed a strategy of selective lockdown rather later to restrict travel around the Lombardy. This selective point travel ban caused mass relocations of people from this city to many other areas within the country as well as many other countries outside of Italy, further facilitating the spread of the virus and fueling the pandemic.⁴⁵⁻⁴⁶ In Italy, Lombardy is one of the wealthiest city and contributes largely to the nation's economy.⁴⁵ It hindered the government from taking action sooner. This delay in action caused an exponential increase in the epidemic, thereby increasing the difficulties in curbing the spread of the virus.

2.3. Risk communication, health promotion and education

Timely and appropriate communication of COVID-19 risk may also play an important role in controlling the pandemic in China. There was a dissemination of relevant information across board on the facts, myths, and appropriate behaviors that should be adapted during the epidemic.⁴⁷⁻⁴⁸ This communication was carried out across all levels of public administration and via multiple routes including social media platforms, daily text messages. All messages are from one source: Chinese Centre for Disease Control and Prevention (China CDC). Other means for risk communication include, phone calls from public health officers, posters, and erection of billboards at strategic places.

In addition to the broad risk communication, education messages are also spread with special emphasis on hygiene practices- frequent hand-washing, proper home ventilation, cough etiquette; and compulsory use of face masks.⁴⁹ Frequent disinfection of public places is a general practice in China, and this measure was heightened in the course of the epidemic.⁵⁰

Similarly, Italy provided relevant information to health workers and other vulnerable groups; guidelines for preventive measures in community settings, and helplines for easy communication.⁵¹ Contrariwise, in the U.S., there was slowness in the dissemination of relevant information to the general public, which caused disarray amongst the public and underestimation of the potency of the virus.⁴¹ This has been linked to the fear of the impact of the COVID-19 pandemic on the economy, leading to the reduced promptness in implementing the appropriate measures to curb the spread of the virus.

2.4. Public aid, social support and price regulation

To ease financial burdens of all individuals in the community, and to encourage honest self-reporting of infection, the Chinese government made all tests and treatments free of charge since the onset of the outbreak.⁵² Although, medical services are currently being co-paid for by

patients who are infected with the virus, testing remains free for all citizens.⁵² Meanwhile, the government closely monitored the cost of daily needs, especially food products to prevent price hiking. Relief materials were supplied to poor communities by volunteers, charity organizations, and corporate bodies.

In the U.S., collaborative efforts between the national health commission and non-governmental organizations ensured that online psychological crisis response. Government supports were also provided for healthcare workers, patients and healthy individuals.⁵³⁻⁵⁴ Last, social support services and financial compensations were provided by the U.S. government to vulnerable groups to encourage adherence to important anti-epidemic measures, including isolation and quarantine.⁵⁵ Similarly, the Italian government provided psychosocial services during the lockdown.⁵⁶

2.5. Disease surveillance

The disease surveillance system hosted by China CDC was effective in gathering data on the threats of COVID-19⁴⁷ and response from the massive anti-epidemic actions through early warning, provision of up-to-date data on prevalence and incidence, description of transmission characteristics, and information sharing between health care workers in different regions of China.⁵⁷ The country was able to notify WHO about the outbreak faster than it did with SARS almost two decades ago.⁵⁸ This improvement in disease surveillance reflected the preparedness of China for managing urgent epidemics like COVID-19.⁵⁹

Likewise, the U.S. CDC utilized surveillance networks to track and provide regular updates and data on the prevalence of COVID-19 cases in the country which informs the country's public health response to the disease.⁶⁰ However, the CDC's action against COVID-19 in the U.S. impeded by political issues, reduced their efficiency in monitoring the epidemic. In Italy, the national disease surveillance system worked efficiently, and it allowed the country to detect the pandemic early detection and disseminate information to its citizens effectively.⁵¹

2.6. Strong political will/commitments of the government

A massive anti-epidemic measure can be possible only if the government takes a proactive approach and makes commitment to implement it. In addition to enforcing strict comprehensive and thorough prevention and control measures, the Chinese government acted under the robust leadership of The Communist Party of China. They put people's lives before economy. In addition to their own people, China has been of tremendous support to WHO, with a donation of \$50 million USD to the organization.⁶¹

Contrarily, the U.S. federal government failed to implement a centralized strategy to harmonize the response of its local governments to the outbreak. Although, the State governments took up the responsibility, they were limited in implementing many anti-epidemic measures due to lack of constitutional power to exercise authority between jurisdictions and unified guidance for inter-state collaboration.⁶² Inconsistent governmental actions encouraged the non-compliance to the COVID-19 control measures among its citizens, thereby exacerbating the widespread of the epidemic.⁶²

On the other hand, the Italian government was proactive in their response by declaring a state of health emergency, entrusting the Civil Protection Department to coordinate the response nationally and enacting decrees to ban social gathering.⁵¹ This measure might have played some role in fighting against the COVID-19 epidemic in the country.

3. Way forward for low- and middle-income countries (LMICs)

Since the first COVID-19 cases were reported in Africa, the continent has worked hand-in-hand with the WHO, Africa CDC, and other local health agencies to contain the outbreak. A number of measures

were implemented, including community lockdowns, air traffic restrictions, setting up and strengthening of surveillance teams, setting up and equipping laboratories for testing, making and implementing plans for quarantining suspected cases, implementing policies on social distancing, risk communication and constant provision of updates on the outbreak. Without doubt, these measures have worked for China. But a question remains for resource limited LMICs, that is, how feasible are these measures to them?

Practicability of these successful anti-epidemic measures is being hindered in LMICs by a number of factors as described at the beginning of this article. Prior to the COVID-19 pandemic, LMICs depended funding from foreign agencies and organizations to fight against other prevalent diseases such as HIV/AIDS, malaria, and tuberculosis.⁶³ The COVID-19 pandemic has added more disease burden, thereby causing further strain in the health care systems.⁶⁴ According to the World Bank, sub-Saharan Africa spent 5.2% of its GDP on health, and this was by far lesser than the average global 9.9% of GDP.⁶⁵ Gabon, Angola, and Eritrea had the lowest health expenditure as a percentage of GDP in sub-Saharan Africa with values of 2.78%, 2.79%, and 2.87% respectively.⁶⁵

With these in mind, LMICs must adopt or develop anti-epidemic measures suitable to their social, economic, political and health standing in order to control the COVID-19 epidemic.

In adopting the lockdown protocol in LMICs, movements were limited within the countries as was seen in restriction of gatherings involving many people (such as churches, mosques, night clubs, casinos, ceremonies, and schools) during the pandemic period. With a GDP increase of only 3.6% in 2019, Africa still has a lot of individual living in poverty.⁶⁶ A lot of its population run individual small-scale businesses. Instituting a lockdown measure would mean the cutoff of the means of survival for those individuals. It is therefore worth suggesting that governments of individual countries device the best ways to deal with the outbreak that fit their context or population's needs and status. There should be a plan where these people can still work and be protected. If a lockdown is inevitable, volunteer groups could be formed in the communities to help people purchase necessities since most people will not have the resources to purchase enough items to last for more than a week. These volunteer groups will be adequately trained and their routine will be regimented to ensure their safety as well as the safety of those they serve. In this way, LMICs may be able to reduce the number of persons who need to go out. Additionally, adequate measures should be taken to sustain good and sound mental health status during lockdown.⁶⁷⁻⁶⁸ Furthermore, air traffic restrictions should be enforced earlier enough to further delay or reduce the importation of cases.

Effort should also be devoted to increase awareness of COVID-19 in different communities in Africa via offline and online technologies.⁶⁹⁻⁷⁰ National disease control agencies, non-governmental organizations (NGOs), and healthcare institutions of individual countries need to keep working towards educating the masses about the epidemic and prevention of the disease during the isolation and lockdown periods.

Education and risk communication should be tailored to the needs of local communities and people.⁷¹ People from the lower economic class in these communities need extraction addition in risk communication. These people are more likely to be affected by the negative consequences of the pandemic rather than the positive effect from taking prevention measures.⁶⁴

In a study by Abdelhafiz et al among Egyptian adults, it was reported that knowledge about the COVID-19 disease was lower among the elderly, rural dwellers, and people of low socio-economic status.⁷² The government should liaise with traditional, religious and community leaders to pass on information to citizens in a way they will understand, for example through town criers and volunteers. The government should be aware that simply demanding uninformed persons to remain at home will not be effective until the reason for such action is understood.

To this effect, the Slum and Rural Health Initiative, a Nigeria-based NGO, developed infographics in over 70 languages, and these focused on educating people living in underserved settings.⁷³ Similar initiatives would enhance the passage of health information to people, and foster good health practices without high costs, such as regular hand washing, early reporting of symptoms and social distancing.

Inadequate access to basic healthcare facilities and shortage in medical personnel in African countries present another challenge in the fight against COVID-19.⁶³ There is shortage of ICUs which are essential in treating infected individuals with the available ones concentrated in specialist or tertiary hospitals.⁷⁴ To make the situation worse, LMICs depend on other nations for medical supplies including testing kits. As part of the WHO COVID-19 monitoring and evaluation framework, only about 15% of African countries had a self-assessment reporting, substantially below the low limit of 60%.⁷⁵

As used in China, incorporating mobile testing units to boost test capacity would be a practical measure in Africa. For example, South Africa's National Health Laboratory Service in April 2020 announced increases in mobile testing units to 67⁷⁶ and over 5 million people were tested in 5 months, the highest number in Africa.⁷⁷ Also, sufficient funds should be allocated to research⁷⁸ and training of health professionals for effective handling of epidemics.⁷⁹

Furthermore, like in China, Italy and the U.S., public health surveillance in Africa can be strengthened by partnering with information and communications technology companies. With such collaboration, African countries can develop their own database to support effective monitoring of an epidemic, and policy making for future pandemics.

4. Conclusion

China's success in controlling the COVID-19 outbreak was multifaceted, including high levels of preparedness, decisive anti-epidemic actions; initial and continuous resort to strict measures, diversion of resources to health care, large amount of research, and strong commitments of the government, and active participation of all Chinese people.

Governments in African countries can learn from China to enhance emergency responses to pandemics, to be more proactive and committed in the planning and implementation of long-term strategies for future pandemics. Moreover, there should be promotion of hygiene and public participation as a regular practice in all communities in Africa. Liaising with medically sophisticated countries will facilitate the exchange of real-time information ensuring that gaps existing between the advanced countries and LMIC like Africa are bridged. African countries should also develop their own capacities to make their own anti-epidemic materials such as PPE, and testing kits.

Credit author statement

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Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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