

Preparedness for Emerging Infectious Diseases in a Global Turbulence Era

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Abstract

This paper discussed the preparedness for emerging and reemerging diseases with tremendously increasing incidence in the past few years and possible ways to overcome these EIDs in the near future. Since 1970, over thirty new emerging and re-emerging infectious diseases have evolved both locally and globally, most of which are from wildlife/zoonotic origin. Human activity has been the key driver of this emergence with enormous effects on global economic stability and significant threat to human existence and progress. The roadmap to a healthy society is based on leveraging on the success achieved in the past and continually putting machinery in place against unforeseen future EIDs. There must be ongoing health surveillance and meaningful investment in the health sector of every country. Sustained effort must be put in place to develop vaccines against recurring EIDs. This paper also presents the imperativeness of the individual member of the community to prepare to tackle EIDs by becoming aware of the likelihood of occurrence, understanding the strategies for prevention of the spread of infections so as to reduce the threat it poses on public health and global economy. This can be achieved through effective communication.

Keywords: Emerging infectious diseases, Preparedness, Health communication,

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Introduction

An emerging infectious disease (EID) is a disease which is infectious, whose incidence has increased recently, in the last two decades, and could increase in the near future (WHO, 2014). Cases of emerging infectious diseases are increasing around the world leading to loss of many lives and destruction of countries' economy especially that of developing countries. Historically, emerging diseases have been in medical literature since 1960s, (Ndow, Ambe, & Tomori, 2019), but was not a subject of great interest until Lassa fever and Ebola fever appear abruptly in mid-1970s and the appearance of other serious infectious disease like HIV/AIDS in the 1980s (Jones, 2008), with the sudden emergence of coronavirus disease (COVID-19) in 2019 which led to global pandemic that occasioned the loss of many human lives globally. The recent COVID -19 pandemic revealed how poorly prepared most developing countries were for such occurrence. This paper was written to address preparedness for future emerging infectious diseases.

Since the year 1940, for every ten years, there has been a steady increase in the number EID events from wildlife-related zoonosis (Jones, 2008). Human activity is the primary driver of this increase, with loss of biodiversity being a leading mechanism (Kessing, 2010). In recent times, there have been reports of war, insurgency, natural disasters in different parts of the world with grave consequences of the world economy and possibilities of increasing frequencies of EIDs. The risk of emerging and reemerging infectious diseases is now high globally and it is not likely that emerging diseases will be eradicated in the foreseeable future due to the way pathogenic organisms are undergoing rapid genetic changes and forming new phenotypic properties and due to consistent changes in the host environment. There is therefore need for every country and the World Health Organization to prepare for a possible resurgence of EIDs in troubled zones and other part of the world. We would use the word 'PREPARATION' to highlight key areas to focus on in order prevent predictable catastrophic effect of any possible EIDs in our present turbulent world.

Preview of Emerging Infectious Diseases

EIDs have been described as diseases caused by infectious pathogens that have recently evolved and entered a given population for the first time, or diseases that had occurred before but whose incidence, impact and geographic range had increased or are expected to increase within a given time frame (Ndow et al., 2019). The use of the term EIDs became widespread in the 1970s and early 1980s after the outbreaks of genital herpes and HIV (Fleming, McQuillan, & Johnson, 1997). In 1995, the Centre for Disease Control (CDC), launched the Emerging Infectious Diseases Journal, dedicated to disseminate information on the emergence, prevention and elimination of EIDs rapidly and reliably (Ndow et al., 2019). Specifically, in the last 35 years, not fewer than thirty new EIDs have emerged and almost all of them are of zoonotic origins (Nii-Trebi, 2017). Human behavior and climatic changes are the key elements that promote the outbreaks of most EIDs in the presence of other factors that are related to the disease causing microbes (Nii-Trebi, 2017). Environmental factors such as deforestation, natural disaster and modern agricultural practices, all these causes changes in the ecological adaptation of the microorganisms making it easy for them to form new phenotypic properties (Defo, 2014).

The key factors that drive EIDs in any community have been broadly classified into five: pathological, human, environmental, political and other factors (Woolhouse & Gaunt, 2007).

1. Pathological factors
 - a. Adaptation of the pathogen to a new host

- b. Virulence of the pathogen
- c. The mode, speed, and ease of transmission
- d. Replication cycle
- e. Mortality rate
2. Human factors
 - a. Demography and behavior of the people
 - b. Low or lack of immunity (high susceptibility to new infection)
 - c. International travel
 - d. Poverty
 - e. Dependence on animal source for food, farm work and other labour
3. Environmental factors
 - a. Harsh weather and climatic changes
 - b. Changing ecosystem
 - c. Drought and famine
4. Political factors
 - a. Lack of political will to mitigate and manage EIDs
 - b. Poor healthcare facilities and personnel to manage EIDs
 - c. Inadequate public health programs
 - d. Poor economic development
 - e. Social instabilities (insecurity, civil war) and inequalities
5. Other factors
 - a. Technology
 - b. Bioterrorism

Some examples of newly emerging infectious diseases in the last three decades include: human immunodeficiency virus(HIV), cryptosporidiosis, hepatitis C virus, E Coli 0157:H7, Ecoli 0104:H4, H1N1 influenza, H5N1 Influenza, H7N9 influenza, H3N2v influenza, SARS, MERS-CoV, SFTSV bunyavirus, Hantavirus pulmonary syndrome, Zika virus, Nipah virus, Hendra virus, and global pandemic COVID-19. Examples of old re-emerging infectious diseases in the last 30 years include: West Nile virus, Methicillin-resistant *Staphylococcus aureus*, Marburg hemorrhagic fever, Human monkey pox, Plague, Chikungunya fever, Cholera, Human African trypanosomiasis, Yellow fever, Dengue, Adenovirus, Listeriosis, Ebola hemorrhagic fever, Drug-resistant malaria, Diphtheria, Rift valley fever, Typhoid fever, and Drug-resistant tuberculosis. Anthrax has been classified as deliberately emerging infectious disease because of its use in bioterrorism (Ndow, et al., 2017). Looking at how emerging diseases had evolved in the last few years and the five key factors that drive EIDs in any community across the globe, it is not likely that the world will be able to overcome outbreaks of EIDs in a near future. It is therefore imperative to find a better way of providing people with health communication.

Re-Emerging Infectious Diseases in Nigeria

In Nigeria, Lassa fever has been re-emerging and is almost becoming an annual event with increasing incidence and prevalence between January and March during the dry season (Tambo et al., 2018). In 2015, Lassa fever spread to about 20 states and occasion the death of more than 100 people. The disease spread from Nigeria to Benin (a neighboring country) and led to death of 23 out of 68 reported cases (Tambo et al., 2018) yet the response is still poor. Ebola virus incidence in Nigeria in was in 2014 received a rapid response from Nigeria Government and the support of Technical and Development Partners which resulted in

effective control of the outbreak (Musa, et al. 2015). It is possible that the response would not have been that active if the case has started in Nigeria but the case had already started in Guinea in December 2013 (Mbonye, et al., 2014) and had been already declared as a Public Health Emergency of International Concern (PHEIC) in August 2014 (WHO Response Team, 2014). Despite the response, 14,413 confirmed and probable cases were recorded with a total of 5777 deaths across eight countries; seven of which are in Western African sub-region (WHO Response Team, 2014). The index case in Nigeria was a traveller from Liberia who had contracted Ebola before travelling to Nigeria.

Severe Acute Respiratory Syndrome Coronavirus2 that caused Coronavirus Disease 2019 (COVID-19) started in Wuhan City in China in 31st December, 2019 and by 27th February, 2020, the first case in Nigeria was confirmed (Nigeria Center for Disease Control, NCDC). Unlike the response to Ebola Virus Disease, the response was not very active at the initial stage and by the first week of June, there were 12 289 confirmed cases of COVID 19 in Nigeria, despite the lockdown and all preventive measures that were put in place.

Education on Emerging Infectious Diseases

The case of COVID-19 in Nigeria proved that Nigeria was not prepared to handle such emergence. Initially there was public fear of the disease but with inconsistent approach to preventive strategies, Nigerians have various perceptions about the disease. Some believe it does not exist, some say it is an exaggerated event (Ilesanmi & Afolabi, 2021).

There is need for regular education of the populace on emerging infectious diseases. The vicious cycle of ignorance, poverty and disease must be broken through regular education at all levels using all available means. Tangible section of school curriculum should be devoted to health education at the primary, secondary. Also, particular attention should be given to the girl child who will later become the mother that will determine to a great extent the health status of the family.

Furthermore, health education program should be placed on the social media, interpreted to local languages and acted out in drama for the message to reach all and sundry. Educative banners, bill boards, handbills can also be used. Religious leaders should be brought together, educated and trained on reaching out to the people in various religious gatherings.

Moreover, health promoting practices like regular hand washing at home and in public places should be enforced as done during the COVID-19 pandemic.

Proposals on Prevention of And Combatting Emerging Infectious Diseases

The infection control units of each State and Nation should regularly engage specialists in Public health to put up proposals for effective prevention and control of EIDs in the community. The proposal should address issues of preventive measures to reduce the spread of any future emerging cases. Provision of ready screening equipment to enhance early screening and diagnosis, provision of ready places for isolation of identified cases, Preventive strategies are focused on the isolation of patients and careful infection control, including appropriate measures to be adopted during the diagnosis and the provision of clinical care to an infected patient.

Analysis of Data on Emerging Infectious Diseases

Available data on emerging infectious diseases should be regularly analyzed, interpreted and applied for early identification of new EID, re-emerging EIDs and prompt management. There are many publications and reports on EIDs in various journals across the globe as well as advances in medical research and technological capabilities to diagnose and effectively manage emerging infectious diseases. So many research and diagnostic laboratories have

been established across the globe over the years to help in early diagnosis of EIDs and development of effective vaccines (Ndow, et al., 2019). The governments should look into the multiple scientific ideas within and outside the region to gain insight to how emerging infectious diseases can be prevented, Moreover, there is increasing need for more research laboratories and funding to combat the ever increasing menace of EIDs in our turbulent world with increasing human population and international travels.

Roadmap to a Healthy Society in a Turbulent World

The roadmap to a healthy society is based on leveraging on the success achieved in the past and continually putting machinery in place against unforeseen future EIDs. There must be ongoing health surveillance and meaningful investment in the health sector of every country. Sustained effort must be put in place to develop vaccines against recurring EIDs. With any virus that's constantly moving and changing, it's important to have effective testing and reporting mechanisms in place to monitor them. That means that if an outbreak occurs or a new variant emerges, it can be flagged quickly to a central health authority. By raising the alarm quickly, effective measures can be quickly put in place to help limit virus transmission. This kind of surveillance is best when it's done at a community level so that individual member of the community be enable to prepare to tackle EIDs by becoming aware of the likelihood of occurrence, and understanding the strategies for prevention of the spread of infections so as to reduce the threat it poses on public health and global economy.

Anticipation of Possible Emerging Infectious Diseases

Anticipation of possible emerging or reemerging infectious diseases helps individuals, communities and countries to better prepare and live ready to overcome any EID. It will also enhance more research on EIDs and discourage unhealthy interference with ecosystem. An important factor in that content is that there must be transparency from government, and the government should stop politicizing issues of emerging diseases as this has created confusion among communities and prevent people from obeying rules related to the prevention and control of EIDS.

Training and Retraining of Health Workers

Good preparation prevents poor performance. Health workers who are usually at the forefront of warfare against EIDs must be regularly trained and retrained within and outside the country. The Government can sponsor health workers for specialized training in centers of excellence outside the country and necessary equipment and enabling environment created for them to regularly put their knowledge to work for the control and management of EID peculiar to their communities.

Involving the Community in Effective Control of Emerging Infectious Diseases

Community involvement and ownership of any program is pivotal to its success and sustainability. Policy makers and Public health workers must therefore ensure that community leaders are made to buy into the program and in turn get their community fully involved; involvement breeds commitment. EIDS is spread from person to person through direct and indirect contact, human behaviour within the community at the time of epidemics is an important factor in the spread of the disease and in the promotion of control strategies. More so, the culture, beliefs, religions, organizations and social groups within the community must be considered in the plan so as to prevent misinformation, discrimination, stigmatization, and ignorance which are pivotal to the spread of these diseases (Wu, Wang, Detels, Bulterys, & McGoogan, 2020).

Opportunity Window for Better Equipping of Health Facilities

Every time a community or country is affected by EIDs, it should be seen as an uncommon opportunity to strengthen and equip health facilities so they can be better placed to handle such emergencies. Every challenge is an opportunity to become wiser and stronger. During the recent COVID-19 pandemics, the importance of countries investing in healthcare workers who are frontline workers in any health care system was brought to limelight. They were to do testing, the diagnosing, the reporting of cases, the caring for the sick, and the vaccinating the vulnerable. They should therefore be equipped, trained and retrain from time to time to best prepared for emergencies.

Networking with International Health Agencies

The world is a global village. With ever increasing international travels, whatever affect a country could affect other countries within hours. It is therefore very important to collaborate with international health agencies for a joint effort against EIDs locally and globally in a turbulent world. For example, the Medical Research Institute was established in Lagos, Nigeria since 1907 and metamorphosed into the international Rockefeller Foundation; the yellow fever research institute in 1920s and became an important research laboratory for West Africa through the effective collaborations with the international communities. (Adetiba, 2021) and it has since been leading research in public health and infectious in the West African region. This kind of collaborating and networking effort can help to stem the surge of emerging and re-emerging infectious diseases. Global peace must be maintained at all cost to enjoy a healthy society.

Conclusion

It is concluded that there is need for preparedness for emerging and re-emerging infectious disease based on evidence of increasing frequency of cases and that it is not likely that emerging diseases will be eradicated soon. Therefore, it is recommended that the nations around the world especially developing nation can used the preparation approach to ensure adequate preparation.

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