EDITORIAL

Public Health Emergencies in the New Millennium: A Rising International Concern

Bratati Banerjee
Director Professor, Department of Community Medicine, Maulana Azad Medical College, New Delhi

ABSTRACT

Pandemics have been reported throughout human history, but recently there appears to be an alarming rise in the frequency and diversity of health threats that is of grave international concern. In addition to natural pandemics of infectious diseases, there is a host of other problems like antimicrobial resistance, bio-warfare, climate change, and even flaring up of non-communicable diseases to name a few, that are having devastating effects on public health as well as on global and national economy.

It is time we introspect into our role in their causation and also find ways to alleviate such an alarming problem. World Health Organization has designed the World Health Day Theme for the year 2022 as "*Our Planet, Our Health*". The earlier we realize and internalize this concept, the better it is for us.

INTRODUCTION

"Our Planet, Our Health"
World Health Day Theme 2022

Pandemics have been reported throughout human history, but recently there appears to be an alarming rise in the frequency and diversity of health threats that is of grave international concern. In addition to natural pandemics of infectious diseases, there is a host of other problems like antimicrobial resistance, bio-warfare, climate change, natural disasters and even flaring up of non-communicable diseases to name a few, that are having devastating effects on public health as well as on global and national economy. Along with threat to human health, the flora and fauna are also compromised that in turn have serious impact on human health and are also the root cause of many problems.

It is time we introspect into our role in their causation and also find ways to alleviate such an alarming problem. *"Our Planet, Our Health"*, the World Health Day theme for the year 2022, rightly focuses on the critical situation in our planet.[1] The earlier we realize and internalize this concept, the better it is for us.

International Health Regulations (IHR)

Health and disease are dynamic conditions and are constantly evolving. Unequal development in different countries and implementation of health promotion and disease prevention and control measures, especially for communicable diseases, is a common danger. Hence, Governments of all countries have a responsibility for the health of their people in global interest too. In addition, an overarching legal framework requires all countries to be committed and legally bound to contribute to maintenance of international health also, to prevent occurrence of pandemics or public health emergencies across the globe.

To maintain good health in all countries across the world, some regulations have been drawn up by the World Health Organization (WHO). The International Health Regulations (IHR) was first adopted by the World Health Assembly (WHA) in 1969 and covered six diseases viz. cholera, plague, yellow fever, smallpox, relapsing fever, and typhus. The Regulations were amended in 1973, and subsequently in 1981, to focus on three diseases viz. cholera, plague and yellow fever. With the increase in international travel and trade, and the emergence, re-emergence and worldwide spread of diseases and other threats, the WHA called for a substantial revision in 1995. The revision extended the scope of diseases and related health events covered by the IHR to take

CORRESPONDING AUTHOR: Bratati Banerjee, Director Professor, Department of Community Medicine, Maulana Azad Medical College, New Delhi
E Mail ID: bratati1@hotmail.com
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into account almost all public health risks viz. biological, chemical, radiological or nuclear in origin, which might affect human health, irrespective of the cause or source. The third revised Regulations (2005) were adopted at the Fifty-eighth WHA, on 23rd May 2005, which entered into force on 15th June 2007, with 196 countries across the globe agreeing to implement the IHR 2005. The Regulations require States Parties to notify a potentially wide range of events to the WHO.[2]

Currently, the IHR are not limited to specific diseases, but are applicable to health risks, irrespective of their origin or source. Hence, they will follow the evolution of diseases and the factors affecting their emergence and transmission. The IHR also require States to strengthen core surveillance and response capacities at the primary, intermediate and national level, as well as at designated international ports, airports and ground crossings. They further introduce a series of health documents, including ship sanitation certificates and an international certificate of vaccination or prophylaxis for travelers.[3]

The IHR also define countries' rights and obligations in handling public health events and emergencies that have the potential to cross borders, including the requirement to identify and report public health events. For this purpose, the Regulations contain a decision instrument that outlines the criteria to determine whether or not a particular event constitutes a "public health emergency of international concern".[4]

A public health emergency of international concern (PHEIC) is defined in the IHR (2005) as, "an extraordinary event which is determined to constitute a public health risk to other States through the international spread of disease and to potentially require a coordinated international response". This definition implies a situation that is:[4]

- serious, sudden, unusual or unexpected;
- carries implications for public health beyond the affected State's national border; and
- may require immediate international action.

Increasing infectious diseases

Plague and cholera pandemics were disseminated in the earlier times along trade and military routes. Later, movement of human population for other reasons through rail, ship and air travel led to geographical spread of pathogens.[5] In addition to increased trade- and tourism-related international travel, the current rapid and alarming increase in spread of infectious diseases is due possibly to various other factors like exponential growth in human and livestock populations; forest encroachment; closer interaction between livestock and wildlife; globalisation of trade in animals and animal products; increased contacts between humans and animals through breeding, hunting, wet markets and trade of exotic pets; changing farming systems and land use; rapid urbanisation; changes in ecosystems; and climate change, to name a few.[6,7] As a result of interaction of all these factors, the habitats of pathogens, hosts and disease vectors are modified, which affects the transmission dynamics of infections to humans.

To add to the problem, antimicrobial resistance (AMR) is rapidly emerging. Antimicrobials, as described by the WHO, are "medicines used to prevent and treat infections in humans, animals and plants, which include antibiotics, antivirals, antifungals and antiparasitics". AMR occurs when bacteria, viruses, fungi and parasites change over time and no longer respond to medicines, making infections more difficult to treat, thus increasing the risk of disease spread, severe illness and death. AMR is a global health and development threat. Especially alarming is the rapid global spread of multi- and pan-resistant bacteria, which are also known as "superbugs" that cause infections that are not treatable with existing antimicrobial medicines such as antibiotics.[8]

AMR occurs naturally over time, usually through genetic changes. However, currently the main drivers of antimicrobial resistance that are rapidly emerging across the globe are misuse and overuse of antimicrobials; lack of access to clean water, sanitation and hygiene (WASH) for both humans and animals; poor infection and disease prevention and control in health-care facilities and farms; poor access to quality, affordable medicines, vaccines and diagnostics; lack of awareness and knowledge; and lack of enforcement of legislation. For common bacterial infections, high rates of resistance against antibiotics frequently used to treat these infections have been observed world-wide, indicating that we are running out of effective antibiotics.[8]

Other public health threats

Another issue of health threat, which is emerging as a global alarm, is climate change that is already impacting health in a variety of ways,

which may be directly by deaths and illnesses occurring due to extreme weather events, such as heat waves, storms and floods, as well as indirectly due to disruption of food systems, increases in zoonoses and food-, water- and vector-borne disease, with resultant increase in non-communicable diseases such as mental health issues, injuries, malnutrition, and increased mortality due to complications in chronically ill patients.[9,10] Climate changes also affect the geographic distribution of disease vectors and hosts as well as the living habitats of microorganisms which could potentially increase the spread of pathogens.[5]

The impact of human activities on the Earth's complex ecosystem has started since the beginning of farming, and with the industrial revolution in the 18th century the situation has rapidly deteriorated.[9] The problem is expected to rise even further and between 2030 and 2050, climate change is expected to cause approximately 250,000 additional deaths per year, from malnutrition, malaria, diarrhoea and heat stress.[10] Such a glaring problem raises the question, is it time for the WHO to declare climate breakdown a public health emergency?[11]

Use of unconventional weapons or weapons of mass destruction, which include biological, chemical, nuclear and radiological weapons, of which bio-warfare or bio-terrorism is a serious concern, has risen globally. The risk of using biological agents in a terrorist attack is thought to be increasing. Biological and toxin weapons are either microorganisms like virus, bacteria or fungi, or toxic substances from living organisms that are produced and released deliberately to cause disease and death in humans, animals or plants.[12]

Biological agents like anthrax, botulinum toxin and plague can pose a difficult public health challenge causing large numbers of deaths in a short duration of time. Biological agents, which are capable of secondary transmission, can lead to epidemics and pandemics. An attack involving a biological agent may simulate a natural event, due to which public health assessment and response may become difficult. In case of war and conflict, laboratories having high-threat pathogens can be targeted, which might lead to serious public health consequences.[12]

Rising Public Health Emergencies

Humankind has experienced major pandemics throughout history. However, recently the frequency of such conditions has been seen to be alarmingly higher. While there have been around fourteen pandemics caused by three main groups of pathogens viz. cholera, plague and influenza over the first two millennia of the Common Era,[5] in the third and present millennium already seven public health emergencies of international concern, caused by a variety of pathogens, have been declared by the WHO in just a little over two decades.[13,14] Of these, the most severe pan-global pandemic affecting all segments of population in all countries was the COVID-19 pandemic, which also had major social and economic impact from which the world has not yet recovered.

In the first 2000 years of the Common Era, there have been about twelve events of biological and chemical warfare.[15] In the current millennium, the case of the 'anthrax letters' following the attack of the World Trade Center on 9th September 2001 in New York, is an event of bioterrorism, with a huge impact at a psychological and political level though the number of effective infections was small. The particular strain used was traced to the US army's laboratory at Fort Detrick, but the perpetrators of the attacks could not be identified.[16] More recently, the pandemic of COVID-19 that created havoc across the world in terms of heath, economic and social devastation, was initially suspected to be an act of bio-terrorism,[17] linking it to the country of origin of the virus,[18] though extensive investigation has not been able to prove it conclusively.

Along with communicable diseases, non-communicable diseases (NCD) are also on the rise, with an increasing number of countries facing a double burden of diseases as the prevalence of risk factors for chronic diseases are increasing while many countries are still struggling to reduce morbidity and mortality due to infectious diseases.[19] NCDs, such as heart disease, stroke, cancer, chronic respiratory diseases and diabetes, are the leading causes of mortality in the world, and is causing an invisible slow epidemic.[20] This chronic epidemic of NCDs has made the recent COVID-19 pandemic worse, both conditions acting synergistically to increase morbidity and mortality.[21]

To make matters worse, climate change is creating havoc in the lives of the people across the world. The number of disasters has increased by a factor of five over the past 50 years, driven by climate change, extreme weather conditions and improved reporting.

According to the World Meteorological Organization (WMO) Atlas of Mortality and Economic Losses from Weather, Climate and Water Extremes (1970-2019), there were more than 11,000 reported disasters attributed to these hazards globally, with over two million deaths and over three trillion US$ economic losses. A disaster related to weather, climate or water hazard occurred every day on an average over the past 50 years, killing 115 people and causing more than 200 million US$ in losses daily.[22]

In Asia, during the same period i.e. 1970-2019, more than three thousand disasters were recorded, with nearly a million lives lost and two trillion US$ of economic damages. Almost half of these disasters were associated with floods and a little over one-third with storms. Asia accounts for nearly one-third of weather, climate, and water-related disasters globally, nearly half of all deaths and one-third of associated economic losses.[23]

In addition to health effects and loss of human lives and economy, there is population displacement due to climate change and disaster, of a magnitude three to ten times higher than that caused by war or conflicts. On average, 26 million people are displaced by disasters such as floods and storms every year (as of 2016), that amounts to one person being forced to flee every second. Climate change also causes poverty and food shortages, forcing even higher numbers of people to flee their homes. Situation will get worse as climate change continues, with heavy impact on humanity.[24]

Thus, owing to multiple factors, public health emergencies are expected to increase even further due to unscrupulous human activities as well as their effects on the environment. Epidemics and pandemics are also likely to occur more frequently, along with climate-related hazards with resultant increasing morbidity and mortality, thus presenting new challenges for public health.

Salvaging from the abyss

It is time we realize our mistake and start taking action for rectification of the same. Measures for prevention of public health emergencies need to be implemented through multi-pronged approach at all levels from international to national, community and individual levels. One such approach is the *'One Health Approach'* that seeks to achieve optimal health outcomes while recognizing the interconnection between people, animals, plants, and their shared environment, through coordination between multiple sectors to achieve better public health outcomes.[6]

The ongoing COVID-19 pandemic has highlighted the need to create sustainable wellbeing societies committed to achieving equitable health now and for future generations without breaching ecological limits, as our health and our planet are closely interlinked. Focusing on the need of the hour, the World Health Day Theme for the year 2022 is *'Our Planet, Our Health',* drawing attention to the urgent need to keep humans and the planet healthy and foster a movement to create societies focused on wellbeing. Global commitment should be to build a world where clean air, water and food are available to all, where economies are focused on health and wellbeing and where cities are liveable, with people having control over their own health as well as on the health of the planet.[1]

The WHO has outlined what we at all levels can do to protect our planet and our health.[25] So let us join hands to enhance our commitment, pool our resources, and fight together, to protect our health by protecting our planet and all its inhabitants, as it is the only home we have that is a fine one too.

"We are all in this together"

António Guterres, the ninth Secretary-General of the United Nations

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