

Pandemics in the past and future

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Paradox of hope and despair

A distinguished epidemiologist at Johns Hopkins and WHO advisor, Aidan Cockburn, popularized the idea of “eradication of infectious diseases”. He emphasized that “eradication” of infectious disease as a concept in public health was replacing the concept of “control” since the early 1940s. He gave a very attractive slogan, “Control is an unending operation. After eradication no further effort is required”⁽¹⁾. There are many impactful stories of conquering infectious diseases since 1950s. We have insecticides to handle the problem of vector-borne diseases; we have BCG and several different vaccines to prevent major pediatric diseases. Smallpox is eradicated. Abdel Omran's paper of 1971 on epidemiological transition was a landmark publication⁽²⁾. His theory of epidemiological transition was most appropriate for the developed world and it generated tremendous euphoria. He talked of degenerative and man-made diseases displacing the pandemic infectious diseases for the first time. The theory of epidemiological transition enunciated by Omran and expanded by Murray and Lopez in 1996⁽³⁾ and beyond, essentially describes and explains the trend of changes in disease morbidity and mortality. Application of this knowledge was perhaps overenthusiastic and even damaging. Around this time the International Health Regulations-1969 asserted that we now should consider only three diseases from the past as notifiable- plague, yellow fever and cholera. This was the belief of “microbial fixity” that pinned the hope on “the diseases we have are the only ones we will face”. Periodic attacks by emerging infections have been a perpetual threat. However, Omran's theory of receding pandemics was blindly accepted. Historically malaria, leprosy, smallpox, bubonic plague of 1347, syphilis in the 1490s, cholera in 1830, and Spanish flu in

1918–1919 are some of the examples from the past. Recent ones like HIV-AIDS, swine flu, SARS, MERS, Ebola and the latest SARS-CoV-2 are constant reminders. The World Health Organization (WHO) and the government of Democratic Republic of Congo (DRC) announced the end of a severe Ebola outbreak in the northeast DRC on 25 June 2020, while a fresh Ebola outbreak was spreading in the country's northwest. In fact, the Age of Pestilence and Famine, described by Omran continues as background for the next epidemiological transitions. This historical amnesia blinded the policy makers to the need of preparedness for new and emerging infectious diseases. Surveillance became an empty slogan without the rigor and action. Ignoring and hiding of these diseases and their magnitude is the practice since historical times and continues in the present days as well.

I am giving below two very telling pandemics, which affected India and are relevant in today's context. I will also consider the recent pandemic of Ebola that has immediate impact on the global health policy.

Plague Pandemic of 1855

Origin of the third pandemic of bubonic plague was a Central Asian focus, in China in 1855. The third pandemic followed the international fault lines of inequality, poverty, and neglect. This third round of plague rapidly engulfed India, resulting in 13 to 15 million deaths between 1898 and 1910. Before finally receding, it ultimately killed approximately 20 million people and the Case Fatality Ratio approached 80 %⁽⁴⁾. Plague existed in India at least 3 centuries before 1896 and India faced periodic epidemics mostly in North India. In 1896 a ship from Hong Kong introduced plague in India⁽⁵⁾. The disease struck Bombay and its more than eight hundred thousand inhabitants in

September 1896. By December in the same year, more than half the population fled away from the city. People ran away from the city not so much due to the fear of the plague but because of the fear of the atrocious measures deployed to repel it. Bombay City Council believed that the plague regulations helped Bombay to survive the plague. In reality, the fleeing residents carried the disease with them spreading the infection to the rest of the subcontinent in the era of rapid travel by roads, rail and steamships, to everywhere.

Spanish Flu of 1918-19

It was single deadliest event in human history. About 50 to 100 million people died on account of this epidemic world over. Also referred to as the Bombay Influenza or the Bombay Fever in India, the pandemic is believed to have killed up to 14 -17 million people in the country, the most among all countries. The 1918 influenza pandemic, commonly known as the Spanish Flu, began in Europe towards the end of World War 1. Like Covid-19, it was also a respiratory disease and spread in similar manner as the SARS-CoV-2 virus. It lasted for two years, and infected over 500 million people. This was one-third of the world's population at that time.

A ship carrying Indian troops reached the shores of Bombay on the 29th day of May in 1918. It remained anchored to the city's docks for about 48 hours. The world was on its last leg of the First World War. The Bombay ports were busy with the movement of troops and goods back and forth from England. The ship, thus, remained an inconspicuous visitor on its waters. However, the city was not prepared to receive the unusual cargo that had come on the ship: lethal strains of the H1N1 influenza virus right from the trenches on the Western front. On June 10, seven police sepoy were hospitalized with what appeared to be influenza. They were India's first cases of the highly infectious Spanish flu that rapidly swept across the world at the time. Bombay was soon crippled by the virus and railway lines carried it to different corners of the country. In Bombay, 768 people died in a single day on the 6th of October in 1918. The Hindi poet, Suryakant Tripathi, popularly known as Nirala, wrote in his memoirs that

“Ganga was swollen with dead bodies.” He lost his wife and many members of his family to the flu but could not find enough wood to perform their last rites. A report released by the sanitary commissioner in 1918 later documented that it was not just Ganga that was clogged up with bodies, but all rivers across India. By the end of 1920, the pandemic claimed somewhere between 50 to 100 million lives globally – possibly more than both the world wars combined. India was the country that bore the greatest burden suffering an estimated 18 million casualties, which accounted for about 6 per cent of the country's population at the time.

Flu pandemics usually continue in waves. The first wave of the Spanish Flu was mild and resembled the seasonal flu. This wave lasted till July. Then, a second more lethal wave took over from September and lasted until the end of the year in 1918. A final wave of the Spanish flu was witnessed in the early months of 1919 and the disease finally vanished by March 1920.

Lessons from 1918 Flu

1. H1N1 virus is similar to present day waterfowl virus, with extreme potentials for pandemic fatality
2. There is a distinct need to develop treatment and prevention strategies
3. It is necessary to have rapid diagnosis for high-risk patients
4. It is critical to build infrastructure to meet such massive demands⁽⁶⁾

Ebola epidemic in West Africa

In the recent past the world has witnessed the worst outbreak of Ebola that occurred in West Africa covering Guinea, Liberia, Sierra Leone, Nigeria and Mali, from 2014 spreading over 4 long years affecting more than 28,000 people and killing over 11,000 of them⁽⁷⁾. More than 500 health workers succumbed after providing health care to Ebola affected persons, resulting in depletion of already fragmented health care work force in the region. Economic loss to the region was over \$2.2 billion and the cost for the international response

amounted to over \$3.9 billion⁽⁸⁾. Suspected first case, a 2-year-old child, occurred in Meliandou village of Gueckedou prefecture in Guinea. The child died on 6th December 2013. There was a history of contact with fruit bats. Mother, sister and grandmother of the child also succumbed to the illness within a short period. By the end of March 2014, 111 individuals suffered from suspected Ebola and 79 of them died a case fatality ratio of 71%. There is some tail tell evidence that Ebola transmission was going on in the prefecture for a few months even before the first Ebola case report and this must have resulted in many transmission chains⁽⁹⁾.

On August 8, 2014, WHO declared the West African Ebola Epidemic as a Public Health Emergency of International Concern (PHEIC) after the Ebola virus reached Lagos, a 24 million population city, the Nigerian Capital. As a consequence, very stiff actions had to be taken by the affected countries to contain the epidemic.

- Declaration of national emergency
- Activation of national disaster management system
- Establishing emergency operations centers
- Ban on international travel for infected persons and their contacts
- Funerals and burials to be conducted in presence of trained personnel to reduce transmission risks and
- Quarantine when needed

This epidemic restated some extremely important messages of epidemiological significance:

- Extreme poverty. Resource poor countries on way to development
- Vulnerable, rather thin dysfunctional local health care infrastructure
- Initial foci of Ebola episodes lingered over a few months in the remote areas in populations coming in contact with wild life before the Ebola epidemic broke out, mainly through person-to-person contact, driven by local customs and culture, into cities

- Deep-rooted cultural practices about burial of highly infectious corpses
- Population connectivity was extensive with network of roads and through electronic mode connecting to large urban population
- Spread by air travel (Lagos, Nigeria, Europe and USA)
- PHEIC related steps would lead to coercion and subsequent hiding tendency unless humane approach is adopted

These are the key factors with respect to several emerging and resurging infectious disease outbreaks. On 14th Jan 2016, WHO officially declared that the Ebola epidemic was contained. It is not certain that the epidemic is really over. Infectious disease epidemics affect the entire social fabric of a country. The effects of pandemics would extend far beyond a single nation. The cost goes much beyond direct morbidity and mortality. Epidemic and endemic situations affect abilities of countries in cyclical form and affect their capacity to pull themselves out of poverty.

International Health Regulations, 2005

WHO in 2005 established a new set of International Health Regulations (IHR 2005) to replace the outdated IHR-1969. The old framework required notification only in the event of plague, yellow fever, and cholera, the new rules required notification for any public health emergency of international concern (PHEIC), including unknown pathogens and emerging infections. The 2005 regulations specified the nature of the events that should trigger international concern and committed all of the 193 WHO member states to improve their capacity for surveillance and response. In addition, recognizing that microbes do not acknowledge political frontiers, IHR 2005 called for effective responses wherever necessary to contain an outbreak on the basis of real-time epidemiological evidence instead of concentrating on taking defensive measures at international borders. The IHR (2005) were adopted by the Fifty-eighth World Health Assembly on 23 May 2005. They entered into force on 15 June 2007. The purpose and scope of the

IHR (2005) are “to prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade.”

WHO, in the year 2000, organized a rapid response capacity. This was the Global Outbreak Alert and Response Network (GOARN) with the goal of ensuring that even the most resource-poor countries would have access to the experts and means needed to respond to an epidemic emergency⁽¹⁰⁾.

Covid-19

The present pandemic of Covid-19, a zoonotic disease, started since possibly September 2019 in China emerging from horseshoe bats. The first reported case of Covid-19 was on December 10, 2019 in Wuhan. As of July 5, 2020, there were 11.4 million reported cases at global level. India now stands 3rd in the list of most affected countries with almost 690,000 cases. In the city of Pune since the last one week, almost 1000 new cases are being reported every day. This figure for July 5 is 1,500. Global graph of new cases is showing an exponential pattern of rise. Hope we would be entering a post Covid-19 era soon but the challenges will continue with possible fresh waves of the pandemic and even the newer emerging infections from some corners of the globe.

One World One Health


Seventy-five per cent of all Emerging Infectious Diseases are Zoonoses affecting Humans⁽¹¹⁾. I will like to conclude by referring to the summary statement from an important conference on One World- One Health in 2004. Health experts from around the world met on September 29, 2004 for a symposium focused on the current and potential movements of diseases among human, domestic animal, and wildlife populations organized by the Wildlife Conservation Society and hosted by the Rockefeller University using case studies on Ebola, Avian Influenza, and Chronic Wasting

Disease as examples. The assembled expert panelists delineated priorities for an international, interdisciplinary approach for combating threats to the health of life on Earth. The product—called the “Manhattan Principles” by the organizers of the “One World, One Health” event, lists 12 recommendations for establishing a more holistic approach to preventing epidemic / epizootic disease and for maintaining ecosystem integrity for the benefit of humans, their domesticated animals, and the foundational biodiversity that supports us all⁽¹²⁾.

One Health concept is a worldwide strategy for expanding interdisciplinary collaboration and communication in all aspects of health care for humans, animals and the environment. There is an urgent need to recognize and act on these principles to face the continuum of the emerging and resurging infectious diseases.

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