Kaleidoscope

A Brief Overview of Pandemics

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Summary

This is a brief overview of major pandemics across the world.

s per World Health Organisation (WHO) 2010, a pandemic is the worldwide spread of a new disease. David M. Morens, Gregory K. Folkers, and Anthony S. Fauci (2009) define pandemic as a disease of very different etiologies that exhibit a variety of epidemiologic features. Any pandemic will sure to possess one invariable common denominator: widespread geographic extension. In A Dictionary of Epidemiology (2008) Pandemic is defined as an epidemic occurring worldwide or over a very wide area, crossing international boundaries, and usually affecting a large number of people.

Plague: "Plague of Justinian", "Black Death" and Plague in India

In the last two millennia, the plague has created several incidents of a pandemic. The first certain pandemic is known as Justinian's plague in the sixth century AD, between 542 and 546 AD. It spread across Asia, Africa and Europe and claimed nearly 100, 000, 000 victims. The second plague pandemic is known as the "Black Death" which took place in the fourteenth century from 1347 to 1350. It caused the death of approximately 50, 000,000 half of which was in Asia and Africa and the other half in Europe. One-fourth of the European population succumbed to this disease. The third phase of the pandemic began in Canton and Hong Kong in 1894 and spread by rats to 77 ports on five continents within 10 years from 1894 to 1903. Plague entered India in the third phase when it caused nearly 13,000,000 deaths. The cause of this disease was only understood in the late 19 century that is a Yersinia Pestis pandemic. This strain of Yersinia infects the oriental rat fleas or Xenopsylla cheopis forcing them to regurgitate concentrated bacteria into the host. Such infected hosts then transmit the disease to humans.

Humans can transmit the disease by droplets, leading to pneumonic plague¹.

The spread, source and severity of the first plague pandemic is disputed due to lack of documentation. Plague of Justinian, the first of three human plague pandemics, either spread from central Asia or Africa across the Mediterranean basin into Europe through the ships loaded with grain which also carried rats. This plague killed an estimated 100 million people according to the contemporary scholar Procopius, approximately 50 to 60 percent of the population of these regions contributing to the end of the Roman Empire.²

In the 14 Century with an absence of medicinal progress people turned to religion, Catholic Europe sought to identify sinners against God and in the process frequently singling out minorities, women, Jews or Non-Catholic Christians. During this phase, young doctors from any ranks were contracted to perform the duty of the plague doctor and address the shortage of specialized physicians. Venice was among the first citystates to establish such practice during 1348. Their principal task was to take care of people with plague and to put in public records the cases of deaths. In cities such as Florence and Perugia, plague doctors were the only ones allowed to perform autopsies to help determine the cause of death. This period also understood the significance of quarantine or isolating the infected population. They noted that, after a period of isolation, individuals who had not developed symptoms of illness would likely not spread the disease any longer. Thus, the rule of mandatory isolation was initiated. The first known instance of quarantine was implemented in 1377 in Ragusa, the Citystate of Dubrovnik for 30 days to all new arrivals before entering the city.³

The third wave of plague began in China's Yunnan province in 1894 and then spread through the shipping routes to the United States (US). A ship with infected rodents from Hong Kong came to Hawaii in December 1899, and then San Francisco, where the pandemic began in March 1900.4 However, except for China and India, its spread was limited.⁵ In India as well the spread was contained to selected zones. It arrived in India in 1896. During the first three years, almost fifteen percent of the total number of deaths in India was from Bombay. In the year 1903 Bombay witnessed 20,788 plague deaths, and in 1907 total death toll of India was 1,315,892. Till 1921, an estimated twelve million Indians lost their lives, in comparison with three million in the rest of the world. Punjab had the second largest numbers in plague mortality.6

Influenza Virus: "Spanish Flu" or H1N1, and "Swine Flu" or H1N1/09

There are two bouts of influenza virus that had reached a level of the pandemic. One took place from 1918 to 1919 and another in 2009. Both influenza viruses have similar flulike symptoms such as fever or feeling feverish/chills, cough, sore throat, runny nose, muscle or body aches, headaches, fatigue, and diarrhea.⁷ However, one distinctive trait of both these viruses was their ability to affect the younger healthier population whereas common flu tends to impact children and elder generation more.

An estimated one-third of the world's population was infected during the 1918– 1919 influenza pandemic. The fatality rate was more than 2.5 percent, compared to other influenza viruses with less than 0.1 percent fatality rate. The first wave of influenza pandemic appeared in March 1918, followed by two much more fatal second and third waves in September to October of 1918 and January of 1919 respectively.⁸

Despite advances in epidemiology and public health, the true origin of Spanish flu remains unknown. The pandemic took place in the middle of World War I in a time of uncertainty, press censorship and advanced modes of transportation, including intercontinental travel. Within months, it spread from Europe, where military movements contributed to larger spread, to the United States (US), Asia, Africa, and the Pacific Islands. The mortality rate of Spanish flu ranged from 10 percent to 20 percent. This influenza virus had the highest fatality rate among the H1N1 strains, approximately 100 million. This virus affected mostly younger and healthier populations. By August 1918, the virus had mutated to another form which was supposedly even deadlier than the first wave.9

Spanish flu to some extent also determined the outcome of the First World War because it affected armies of Germany and the Austrian–Hungarian Empire more virulently than their Allied opponents (Price-Smith 2008:58). Many notable politicians, artists, and scientists were either affected by the flu or succumbed to it. Its distinguished survivors include Walt Disney, Greta Garbo, Raymond Chandler, Franz Kafka, Edward Munch, Franklin Delano Roosevelt, and Woodrow Wilson; whereas painters such as Gustav Klimt and Egon Schiele, and poets like Guillaume Apollinaire were among the fatalities of this virus.¹⁰

The 2009 H1N1 pandemic started in Mexico in April 2009. By the end of April, cases were reported in several states in the United States (US), and in countries such as Canada, Spain, United Kingdom (UK), New Zealand, Israel, and Germany. On 25 April 2009, the WHO declared the situation a public health emergency of international concern.¹¹ It continued to spread for over a year and on 10 August 2010, the Director-General of

WHO, Dr Margaret Chan declared the end of this pandemic. The first doses of the H1N1 pandemic vaccine were administered on 5 October 2009. The virus infected over 10% of the global population and had a death toll approximately from 20,000 to over 500,000. The largest of these fatalities may have occurred in countries in the African and Southeast Asian regions as per a report published in the Centers for Disease Control and Prevention (2012), where more than half of all 2009 H1N1-related deaths occurred. This study estimated that 80 percent of H1N1 fatalities were younger than 65 years of age. It is different from seasonal influenza epidemics which usually kills 80 to 90 percent of the population that is 65 years of age and older. It was estimated that 0.001-0.007% of the world's population died of respiratory complications caused by the 2009 H1N1 virus infection during the first 12 months.¹² Although its death rate was lower than the regular influenza death rates, at its peak it was perceived as threatening because it primarily affected healthy young adults. This pandemic was the first disease where mental health was considered an important aspect of preparedness and mitigation policy efforts.¹³

HIV Virus

The first cases of Acquired Immuno-Deficiency Syndrome (AIDS) were reported in 1981, and very quickly infection with the virus (HIV) has grown to pandemic proportions. At present treatment of HIV infection with antiretroviral therapy (ART) are available.

From 1981 till the end of 2018, 74.9 million people have become infected with HIV and 32.0 million died.¹⁴ It causes about one million deaths a year worldwide. This virus's spread is especially alarming in some Sub-Saharan African countries such as Botswana, Lesotho, and Swaziland, where it has infected more than 25 percent of the population. As per the WHO report of 2018, 67.99 percent of the total HIV positive patients are from Africa, 10.5 percent from South East Asia, 9.26 percent from both the continents of America, 6.61 percent from Europe and 5.03 percent from Western Pacific.¹⁵ In the US, approximately 1.2 million people are HIV positive and the death toll is 12,000 per year. It used to be over 40,000 per year in the late 1990s. In the US, HIV also has disproportionately affected the gay population, transgender women, and African-Americans both in terms of the of number infected and social discrimination.16

Despite spreading slowly than any other pandemic, HIV has received significant public health attention from national and international administrations and pharmaceuticals. It is also a disease that has managed to focus on the mental health of the patients so as to make others comprehend some of the challenges generally associated with infectious diseases.¹⁷

Corona Virus: SARS

Severe Acute Respiratory Syndrome (SARS) was caused by the SARS Coronavirus (SARS-CoV) and first appeared in China in 2002 where it had infected almost 10,000 individuals, mainly in China and Hong Kong¹⁸. By the end of 2002, the disease spread to 26 other countries, such as Canada with 251 cases. The outbreak was contained by mid-2003. Although there are disputed theories regarding its inception, SARS-CoV is thought to come from an animal probably bats, which spreads to other animals (civet cats).¹⁹

Symptoms of SARS-CoV are primarily similar to influenza and include fever, malaise, myalgia, headache, diarrhoea, and shivering. However, the disease has no proven specific symptoms so far. For example, fever, one of the most frequently reported symptoms, is sometimes absent at the beginning of the infection, especially in elderly and immunosuppressed patients. From the perspective of severity and mortality rate of about 10%, SARS-CoV created a global health concern. The outbreak of SARS also witnessed an increase in the study of patient's mental health both among the active patients and survivors of the disease.²⁰

Ebola Virus Disease

Ebola Virus Disease (EVD) first appeared in 1976 in two simultaneous outbreaks, one in the present Nzara in South Sudan, and the other a village near the Ebola River in Yambuku, Democratic Republic of Congo.²¹ The 2014 to 2016 outbreak in West Africa was the largest EVD outbreak since the virus was first discovered in 1976. Most likely it was first spread through fruit bats in a village in Guinea in December 2013. From Guinea, it reached Sierra Leone and Liberia, where it infected over 28,000 and the fatality rate was approximately 11,000. Cases were registered in Nigeria and Mali as well, albeit small in number and quickly contained. In September 2014, a passenger from Liberia died in Texas simultaneously infecting two nurses caring for him which led to a significant public concern over possible Ebola outbreak in the US.22 This again led to the US Department of Defense deploying military personnel for training Liberians to manage the disease and build hospitals. This mission was called Operation United Assistance²³.

As per WHO guidelines 2020, EVD is introduced into the human body through contact with the blood, secretions, organs or other bodily fluids of infected animals such as fruit bats, chimpanzees, gorillas, monkeys, forest antelope or porcupines. After it enters a human-body, EVD spreads through human-to-human transmission via direct contact through blood or body fluids or objects that have been contaminated with body fluids from a sick person. The symptoms of EVD include fever, fatigue, muscle pain, headache, sore throat vomiting, diarrhea, rash, impaired kidney and liver function, internal and external bleeding.²⁴

Zika Virus

Zika virus is found in rhesus monkeys in Uganda in 1947.25 The only known outbreaks of this virus were recorded in Micronesia in 2007 and South America and the US from 2015 to 2016. It was identified in Brazil in 2015. Symptoms of the Zika virus are flat pink rashes, bloodshot eyes, joint pains, fever, and headaches. It is a mosquito-borne disease, typically borne by the species Aedes Aegypti but it also can be sexually transmitted. Initially, its mild symptoms made it rather insignificant form the public health perspective. However, as later infections showed that Zika can cause Guillain-Barre syndrome in adults and cause microcephalia (a condition in which the brain does not develop or has stopped growing thus making the circumference of the head smaller than normal²⁶) in unborn children of infected mothers (a risk of about 1%).27 Guillain-Barre syndrome is a neurological disorder for which the body's immune system attacks part of its nervous system located outside of the brain and spinal cord. GBS can cause mild weakness to paralysis.²⁸

For example, in the year 2015 Brazil witnessed 2400 birth defects and 29 infant deaths due to suspected Zika infection. Zika transferred from Micronesia, across the Pacific, to Brazil, where it continued to spread. Since 2016, Zika has spread throughout South America, Central America, the Caribbean, and several states within the USA. It remains a significant public health concern, as there is no vaccine available so far. $^{\scriptscriptstyle 29}$

Endnotes:

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