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Review

Pandemics and Epidemics Throughout History

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Abstract

Despite the advancements in medicine and community health, epidemics and pandemics continue to pose a significant challenge to modern society. Population growth, urbanization, climate change, and globalization contribute to their spread, while transportation facilitates rapid transmission. Throughout history, epidemics and pandemics have significantly affected human civilizations, wiping out entire populations, causing economic collapse and political unrest, and changing the course of history. This article provides a summary of some of the most significant epidemics and pandemics throughout history, including the oldest known pandemic in China, the Plague of Athens, the Antonine Plague, the Black Plague, and the Spanish Flu, as well as the history of epidemics in the Arabian Gulf region. While the impact of these epidemics and pandemics has been devastating, they have also led to advancements in medicine and public health, helping us better prepare for future outbreaks. Continuous research and vigilance are essential in addressing the threat of epidemics and pandemics in our modern age.

Keywords: *epidemics, pandemics, history, medicine, public health, global challenges, outbreaks.*

Introduction

An epidemic is a term that describes the increased incidence of a disease that can spread rapidly amongst a population in a local region in which it is uncommon (1). The etymology is derived from the Greek epi-, meaning on or upon, and -demos, meaning the people (2).

Despite the incredible technological developments and multiple scientific research in the fields of medicine and community health, the possibility of the spread of epidemics and pandemics is still the most difficult and dangerous challenge in our modern age. Population growth, an increase in densely populated urban areas, climate change, and globalization are causes for the occurrence of pandemics and epidemics. Moreover, the evolution of pathogens also requires continuous research to develop effective treatments and vaccines to stop their spread. In addition, the tremendous and rapid progress in transportation also leads to the rapid spread of epidemics and pandemics if they occur.

Throughout history, human societies have faced many epidemics and pandemics that affected the building of human civilizations. These epidemics and pandemics had multiple effects, during which they wiped out entire civilizations, claimed the lives of millions of people, stopped economic development, drained enormous wealth to confront them, and posed a significant challenge to the capabilities of and the potential of scientific and human civilizations. These epidemics had established major changes in the world, including demographic bleeding, economic collapse, political and social unrest, along with victories and defeats leading to the rise and decline of civilizations. After that, these epidemics changed the course of history and the map of the world (3).

Since ancient times, mankind has known the emergence of many epidemics and pandemics, which spread due to movement, commercial movements, and military campaigns, where individuals infected with these diseases transmit the infection to healthy others, causing an exacerbation of the crisis. The ancients often called these epidemics metaphorically the plague because of the rapid spread of diseases and the death of many human beings (4).

This article will summarize the most important pandemics and epidemics throughout history.

The Oldest Pandemic in History

The oldest pandemic known in history was mentioned in a translated report in the Chinese Journal of Archaeological Sciences. Scientists discovered a 5,000-year-old prehistoric site called Hamin Mangha archaeological site located in northeastern China, in which archaeologists discovered the remains of 97 human bodies of young and middle-aged adults pressed into a small house of 20 square meters. Archaeologists believe that a disaster that occurred at that time might have been responsible for the cramming of these corpses in one place inside the house, and thus it was not possible to bury them (5).

The Plagues of Egypt

The three Abrahamic religions mentioned examples of the spread of epidemics in Egypt at different times. It was mentioned in the Old Testament book in the Book of Exodus that ten series of epidemics, which were described as plagues, had occurred before the period of Pharaoh's imprisonment of the Children of Israel in Egypt, including lice, boils, parasites, and livestock disease (6). The Holy Qur'an in Surat Al-A'raf (7) also mentioned the same story.

The Plague of Athens

It was called by this name because it appeared in Athens and killed a quarter of its population and a quarter of the Athenian army during four years during the period between 426 to 430 BC, according to the date recorded during the Peloponnesian War. The disease spread very quickly and claimed the lives of five million people (8). It is believed that the disease began in Ethiopia and then spread to Egypt and then to Greece, and the symptoms of the disease were described as headache, conjunctivitis, skin rash, fever, coughing up blood, and abdominal pain with vomiting (9). In 2006, Manolis Papagrigorakis and her research team at the University of Athena were able to determine the type of disease by studying and analyzing three intact teeth found in

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three bodies in a mass grave discovered there in 1994, and scientists discovered that the disease was, in fact, the bacteria that caused typhoid fever (10).

The Antonine Plague

It was called this name due to its occurrence during the reign of the Antonine dynasty in the Roman era. The disease appeared between the years 165 and 190 AD. Scientists believe that the pandemic might have been either smallpox (11) or measles (12). This disease destroyed the Roman army, and historical sources indicate that it was transmitted to the Roman army during their conquest of Iraq and Egypt, causing the death of five million people and the outbreak of the disease again in 215 and 266 AD (13).

The Plague of Cyprian

It was named after a Cypriot, Bishop of Carthage in Tunisia, who believed that this epidemic was the end of the world and appeared in the period between 249-262 AD and killed about 5000 people in Rome alone (14) (15).

The Plague of Emmaus

This plague spread in the areas of the Islamic conquests during the reign of the second Caliph, Omar ibn Al-Khattab- may Allah be pleased with him- in the year 639 AD. This plague appeared in the town of Emmaus, near Jerusalem, and was named after it. From there, it moved to various regions of the Levant. Thirty thousand died during this epidemic, including a large number of companions of the Messenger of God, peace be upon him, including Abu Ubaidah Amer bin Al-Jarrah, Muadh bin Jabal, his son Abdul Rahman, Sharhabil bin Hasna and Al-Fadl Ibn al-Abbas Ibn Abd al-Mutab and Yazid Ibn Muawiyah (16). The history books mentioned that the rightly guided Caliph Omar Ibn al-Khattab, may God be pleased with him, dealt with this epidemic with the utmost caution, so he did not enter the Levant, and from it, the jurists deduced not to enter and leave the inhabited land (17).

The Justinianic Plague

This epidemic appeared between 541-750 and was called the bubonic plague. It is believed that it resulted from the breeding of mice and fleas on merchant ships and appeared first in Ethiopia and Egypt, then moved to the cities of the Mediterranean coast. Others believe that it began in the plains of Central Asia and then moved through the lines of trade convoys to Europe. The soldiers returning from the Byzantine military campaigns also carried the disease to Rome and, from there, to the rest of the cities of Western Europe (18). Symptoms of the disease begin with fever and fatigue. After a short period, a boil appears in the areas of the thigh, armpits, or next to the ears, from which the disease spreads in the body very quickly, which leads to death. Approximately 50% of the population died from the plague (19).

The Black Plague

The bacterial bubonic plague of the type of Yersinia pestis was a global epidemic that appeared in China in 1334 and reached Europe in 1347-1351 by trade caravans that came via the Silk Road (20). This epidemic killed about 60% of the population of Europe and about 150 million people in the world (21). The waves of the Black Plague struck the European continent in places that lasted until the eighteenth-century AD (22).

The Third Great Bubonic Plague

This epidemic appeared again by wild mice in a remote area of China in Yunnan Province in 1855, and from there, the disease spread on the tin and opium road and reached the provincial capital Kunming in 1866 (23). From there, the disease continued to spread In China and Hong Kong, where the scientist Alexandre Yersin, as well as the scientist Kitasato Shibasaburo, each separately discovered the bacteria that caused the plague in the year of 1894. The bacterium was thus named after the scientist Yersinia (24). The epidemic moved to Bombay in India in 1896, and the disease moved to Karachi in 1898. The scientist Paul-Louis Simond discovered that brown rats were the primary incubators for the disease and that the rat flea is the vector that causes the disease (25).

http://dx.doi.org/10.52533/JOHS.2023.31003

Smallpox

One of the most widespread epidemics in the world, it is believed that smallpox appeared during the era of the Egyptian Empire three thousand years ago. Traces of a skin rash like that of smallpox were found in three Egyptian mummies. The oldest description of the disease was found in the literature of China in the fourth century AD (26). After this time, smallpox appeared as a global epidemic in various eras and places, during which millions of people were killed throughout history where the disease killed three people out of ten contracted. The disease continued to claim human lives until the end of the seventeenth century when smallpox vaccination experiments began at the hands of the English doctor Edward Jenner, when he noticed that the milkmaids who contracted cowpox did not show symptoms of smallpox, and this was proven by experience when he vaccinated the hand of nine-year-old boy James Phelps from an ulcer of one of the milkmaids infected with cowpox. After exposing the child several times to people with smallpox, the child did not show any symptoms. The experiment was the key to vaccinations against smallpox, culminating in its final eradication (27).

Cholera

The first to describe the symptoms of the disease was the Portuguese historian Gaspar Correa in India in 1543. The cholera epidemic has spread widely in the world since the beginning of the nineteenth century in the form of six waves between 1817 and 1860 after it was confined to the Indian subcontinent, and the first epidemic appeared between 1817 and 1824 in the Indian subcontinent and then moved to neighboring countries. The number of deaths in India exceeded 15 million people and then spread to many parts of the world. This led to the death of nearly 23 million people around the world (28) (29). An epidemic re-emerged in its seventh wave in 1961 in Indonesia and then spread in Southeast Asia. At the beginning of the seventies, the disease spread to the countries of the Middle East and the Arab Gulf and then appeared in many African countries. It infected more than 140,000 people. Outbreaks continued to appear in many countries, including Peru, in 1991, leading to the death of 3000 people. Cholera later spread to many Latin and Central American countries (28) (29).

The Spanish Flu

Also known as the H1N1 virus, the Spanish Flu acquired its name because the Spanish media had shed light on this pandemic, despite the fact that Spain was not the source of the virus (30). This pandemic began at the end of World War I, coinciding with the beginning of modern medicine specialties. Like the specialization of infectious diseases and modern epidemiology studies, the first cases appeared in a US Army camp in the Fort Riley area in the state of Kansas in March 1918, when more than a hundred soldiers complained of symptoms of cold in one day, and the number doubled very quickly. After that, it began spreading in The United States, Europe, and Asia (31). The spread of the virus was attributed to the First World War that was going on at that time as the epidemic spread among soldiers, especially in crowded, polluted, and humid places. This pandemic continued in successive waves until the fourth wave, which subsided in March 1920, when the last case of the disease appeared (30). The disease is estimated to have infected more than five hundred million people worldwide. The number of victims of this virus is estimated to be between seventeen million and fifty million people, meaning that it killed nearly 10% of the infected individuals, making the Spanish flu one of the deadliest pandemics in human history (32). It was also known that this virus killed many children and the elderly, in addition to a large proportion of healthy young people (33). It is worth noting that a theory was put forward about the cause of the Spanish flu outbreak and linking the emergence of the disease with the migration of 9600 Chinese farmers to Canada in 1917 and 1918. They had come from some remote areas in China, coinciding with the spread of pneumonia in the areas from which they came, and then the disease spread to the rest of the cities in Canada and North America (34).

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Epidemics in the Kingdom and the Arabian Gulf Region

Historical sources mention that many epidemics have spread in the Arabian Peninsula during the past 150 years, including:

Jaundice

It occurred in 1904 and was called the Year of the Death of the Elderlies, and it spread in Najd and the Arabian Gulf. The exact cause of the disease is not known, but it could be malaria or hepatitis A (35).

Plague

It spread widely at the beginning of the twentieth century in Bahrain, other Arabian Gulf states, and the eastern coast of the Kingdom of Saudi Arabia in 1903, 1907, and 1925. The high number of deaths during those years prompted residents of those regions to call them "The years of mercy," owing to how often people said, "May God have mercy on the souls of the deceased." The American Mission Hospital in Bahrain published one document indicating that the plague killed nearly 9,690 people in Bahrain alone (36).

Measles

It started in 1912, continued for several years, and was called "The Years of Measles." It spread to the eastern coast of the Arabian Peninsula, Najd, and Hijaz. The outbreak mainly affected children; reports indicated several thousand died from the disease (35).

The Spanish Flu

It appeared in the Arabian Peninsula in 1918 and invaded various regions of the Arabian Peninsula, including Najd and Hijaz. It was called "The Years of Fever" because of the high fever in infected patients. These, too, were known as "Years of mercy," owing to how often people said, "May God have mercy on the souls of the deceased." Historical sources indicated that the founder of the Kingdom of Saudi Arabia, King Abdulaziz Al Saud lost his eldest son Turki and wife Jawhara bint Musaed due to the Spanish flu (37). Also, thousands of deaths were reported in the cities of Buraidah and Unaizah (38).

Smallpox

It broke out in the 18th and 19th centuries, with the last outbreak occurring in 1939. The outbreaks were called "The Years of Smallpox." These epidemics swept all the cities of the Kingdom, starting from the eastern coast and passing through Najd and Hijaz in the west (39).

Malaria

Malaria had spread in several regions of the Kingdom, including the eastern coast. At that time, Arabian American Oil Company "Aramco" played a leading role in the fight against malaria since the forties of the last century in the Eastern Province. Preventive medicine in Aramco, led by Dr. T. C. Alexander, was pivotal in eliminating malaria in the Eastern Province and Al-Ahsa. The campaign included field and educational visits to the people to confront endemic malaria by spraying pesticides to kill mosquitoes and transferring the Mosquito fish (Gambusia affinis), which feeds on mosquito larvae, to the stagnant waters of ponds in the area until it was completely eradicated in 1956 (39).

Cholera

Cholera spread in the Arabian Peninsula in the early 1970s on the east coast of Saudi Arabia, and this led to the isolation of Qatif city and its villages from the rest of the cities of the eastern province. During that time, Saudi Arabian Oil Company employees were forced to stay outside Qatif until the end of the isolation period, which lasted for several months (40).

Conclusion

The emergence and spread of epidemics and pandemics are still the most dangerous and difficult challenges in our modern age. Continuous research and development of effective treatments and vaccines are essential to combat these global health challenges. Understanding the history of epidemics and pandemics can help us better prepare for and prevent their spread in the future.

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Author contribution

All authors contributed to conceptualizing, data drafting, collection and final writing of the manuscript.

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