History of Cholera Outbreaks in Iran during the 19th and 20th Centuries

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ABSTRACT

Cholera is an acute infectious disease with high mortality if left untreated. Historically, between the 19th and 20th centuries seven great pandemics of *cholera* occurred and worldwide, thousands of people died. Based on an old theory, cholera was considered an air-born disease and the emergence of its outbreaks were attributed to bad weather or miasma. However later in the 18th century, British physician John Snow (1813-1858) explained the association of a terrible *cholera* outbreak in London in 1849 to contamination of the drinking water supply with human excreta. Despite his finding, the causative agent of this dreaded illness was unidentified until later in the 19th century.

In 1854, Filippo Pacini (1812-1883) an anatomist from Italy and then in 1883, Robert Koch (1843-1910) the German bacteriologist, discovered '*vibrio cholerae*' as the etiologic agent. During the major pandemics of cholera in 19th and 20th centuries this illness reached Iran and led to vast depopulation and a crucial impact on the country's socioeconomic status.

Poor public health conditions, lack of a well-organized public health authority for implementing preventive and quarantine measures as well as Iran's specific geographic location were the main facilitating factors of the emergence of various epidemics, including *cholera* in Iran. The present paper briefly reviews the *cholera* outbreaks in Iran during the 19th and 20th centuries.

KEYWORDS

Cholera; Pandemic; Epidemic; Iran

INTRODUCTION

The word *cholera* means a bilious disease and is derived from the Greek term 'chole' or bile which is a nonspecific word that has been used in past centuries for various gastrointestinal diseases.[1]

The exact history of *cholera* outbreaks in ancient times is unknown except for the evidence of its endemicity in India.[2]

In the 17th century, *cholera* was known as severe summer diarrhea[3] and prior to the discovery of the *cholera* etiologic agent in the 19th century, physicians incorrectly believed in the miasmatic theory of causation of *cholera*. Miasma is defined as bad air and the *cholera* outbreaks were attributed to bad weather.[4]

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However in 1849, the British physician John Snow (1813-1858) explained the association of a *cholera* outbreak in London with contamination of the drinking water supply by human excreta.[5] Later in 1854, Filippo Pacini (1812-1883) an anatomist from Italy[6] and then in 1883, Robert Koch (1843-1910) the German bacteriologist, discovered '*vibrio cholerae*' the responsible microbial agent of cholera.[7]

Major pandemics of cholera in the world

According to Hardy, historically "*cholera* has been remembered as the disease which made the 19th century its own"[8] and continued into the 20th century, until the present time. The brief historical features of seven major pandemics of *cholera* that took place during the 19th and 20th centuries (which mostly originated from India) were as follows:

- The first pandemic (1817 - 1821) known as 'Asiatic cholera' began in Jessore near Calcutta and then appeared throughout India before spreading into the Far East and other regions of the world, including Muscat, Tehran and Baghdad.[3,9]
- The second pandemic (1829-1851) again started in India and then spread into China, Europe and America.[9]
- The third pandemic (1852-1860) mainly occurred in Russia with a high mortality rate.[9]
- The fourth pandemic (1863-1875) began in the Bengal region. Indian Muslim pilgrims visiting Mecca spread this pandemic throughout the Middle East.[9]
- The fifth pandemic (1881-1896) began in India and reached Europe. Germany, however, was among the countries which were hardly affected.[9]
- The sixth pandemic (1899-1923) took place at the turn of the 20th century and killed over 800,000 people in India alone and subsequently spread into the Middle East, Eastern Europe and northern Africa.[9]
- The seventh pandemic (1961-1970s) started in Indonesia and extended to India, Russia and North Africa. In this pandemic the responsible organism was an El Tor biotype of cholera.[9]

In 1991, during an outbreak of cholera 3488 and 2618 people were killed, respectively, in Africa and Latin America.[10] Outbreaks of cholera have continued to the present time although its severity is diminished,[11] it is still an important disease in developing countries and the application of antibiotics and fluid therapy have saved the lives of many cholera patients.

Major cholera epidemics in Iran during the 19th and 20th centuries

In the traditional Persian medical literature the term 'waba' (cholera) has been used for any epidemic, whereas for sporadic cases of cholera, the word 'waba-ye paiza' or autumn cholera, and for infantile cholera, 'seql-e sard' have been used.[10]

Because of the high fatality rate attributed to cholera, the term 'margamargi' (death and dying) or similarly 'maraz-e mout' (the illness of dying) were also used in Iran.[12] The public health status in Iran during the Qajar period (1796-1925) was poor. For instance, in the 19th century, the infant mortality rate in Iran was greater than 50%[13] while at the same time it was around 20% in France and Germany.[14]

Between 1820 and 1903, seven major cholera epidemics with high mortality rates, particularly among children, occurred in Iran as part of the worldwide cholera pandemics. In Iran, this was mostly due to the lack of an effective health authority prior to 1904 to control the spread of fatal epidemics and therefore no effective preventive and quarantine measures were employed. In addition, the special geographic position of Iran and its close relations with Afghanistan, Mesopotamia (Iraq), the trans-marine trade of ports on the Persian Gulf with India and the economic relation of northern Iranian cities with Russia were the main facilitating factors for the spread of epidemic diseases, including cholera. Thus Iran was potentially at risk of acquiring cholera epidemics from neighboring countries.[15]

Pilgrimage to Mecca and Iraq's holy cities had a significant role in dissemination of the illness among the Iranian pilgrims during epidemics (Figures 1 and 2).[16]

Unsanitary public conditions, serious shortage of safe water supply, ignorance and poverty all had

major roles on the emergence and spread of the infectious epidemics in Iran during the 19th and the first decades of the 20th century. The first cholera outbreak began in 1821 in Bushehr through the Persian Gulf and in due course appeared in Kazeroun, Shiraz, Abadeh (Fars Province), Isfahan and central parts of Iran, and after two years spread into Russia via the Caspian littoral.[13,15,17]

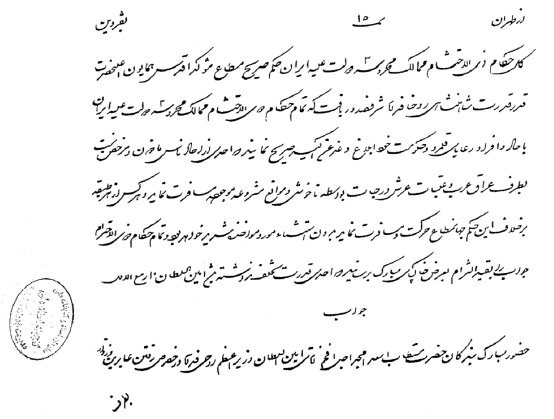

Figure 1: **The order of Naser ad-Din Shah Qajar sent as a telegram to the governors to ban pilgrimage to Iraq's holy cities because of the 1889 cholera epidemic. (Source: National Library and Archives of the I.R. of Iran, Courtesy of Mr.Farid Ghasmlou and Mr.Ali Akbar Vatanparast, Iranian Academy of Medical Sciences).**

Figure 1: **The public announcement by the Minister of Interior stating that cholera was rife in Basra, Iraq, thus forbidding travel to Iraq, 1927. (Source: National Library and Archives of the I.R. of Iran).**

The second epidemic began in India and extended to Afghanistan at the eastern border of Iran and spread to Iran in 1829. Then, from the Caspian Sea, cholera reached St. Petersburg (Russia), and appeared in Germany, England and France in 1832. The third epidemic occurred in 1846. The original focus was India and it spread by way of Afghanistan into Mashhad (Khorasan Province, northeastern Iran), subsequently reached Isfahan and finally extended further to Constantinople (Turkey), Russia and other parts of Europe. According to Dr. Ernest Cloquet, the special French physician to Naser ad-Din Shah (reigned 1848-1896) during that cholera epidemic, around 10% of the population of Tehran (e.g., 12000) died and the daily mortality in Tabriz, Azarbaijan Province was around 120. The fourth cholera outbreak started in 1851and a severe epidemic occurred in Tehran between 1851 and 1852 during Naser ad-Din Shah Qajar's reign. The epidemic of cholera in Tehran continued for 46 days and it was estimated that the daily mortality was around 60 to 70. The fifth cholera epidemic occurred in Iran in 1869. It had originally spread into Mecca by the Indian pilgrims, and then extended into Iraq. Subsequently Iranian pilgrims to the holy cities of Iraq brought cholera to Iran. During this outbreak, cholera invaded Tehran, Ghom, Kashan, Bushehr, Kazeroun and Shiraz. Concurrently famine also appeared with many deaths. This famine continued until 1871.The daily deaths in Tehran were around 50, and it was estimated that approximately 5000 people died in Shiraz. The sixth epidemic took place in 1891 and cholera reached Rasht in Gilan Province, northern Iran from Russia. Then the illness became prevalent in Semnan, Damghan (Semnan Province) and reached Tehran in 1892. In Shushtar, a small city located in Khuzestan Province, around 2000 people died during that cholera epidemic. The seventh cholera epidemic broke out in 1903 and it spread from Basra (Iraq) into the Persian Gulf and reached Shiraz, Isfahan and Tehran.[13,15,17]

Kermanshah in western Iran was also involved through Ghaser-e Shirin located near the Iran-Iraq border. Then, other cities including Mashhad and Tabriz were involved and in due course, the outbreak

extended further to Russia, and eventually reached Germany and Austria in 1905. It is estimated that around 20000 people, mostly poor and weak, died of cholera in Tehran.[13,15,17] The Majles Hefz-o-Sehheh (Council for Preservation of Health) had been previously established in 1881 but it was not active.[18]

The council was re-established in 1904 and its activities continued until 1920. The main objective of the Council for Preservation of Health after its re-establishment was a national campaign against the fatal infectious disease outbreaks, including cholera and the plague in Iran (Figure 3).[13]

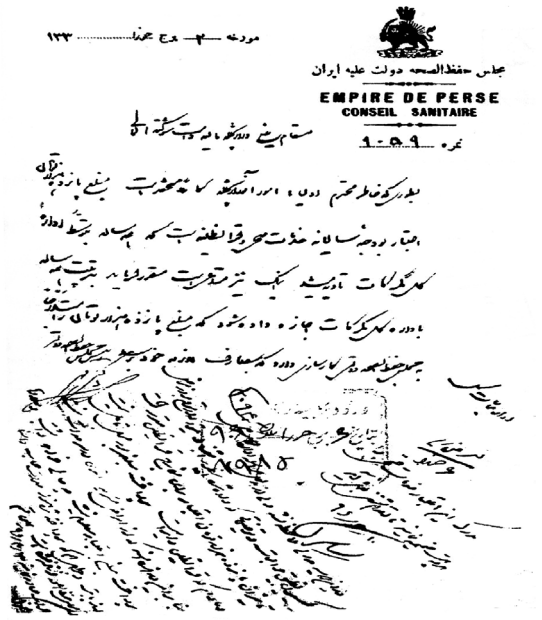

Figure 3: **A letter from the Majles Hefz-o-Sehheh (Council for Preservation of Health) to the Ministry of Finance to allocate an annual budget of 15000 tomans for public health affairs and quarantine measures, 1916. (Source: National Library and Archives of the I.R. of Iran)**

Other outbreaks of cholera in Iran during the 20th century

During the 20th century, cholera outbreaks still continued in Iran and in 1917, during the First World War, an outbreak appeared in Mazandaran and Khorasan Provinces. Out of 344 patients in Mazandaran, 188 died; and in Khorasan, of 311 infected people, 308 patients expired. Again in 1923, cholera appeared in Iraq but it was stopped because preventive measures were applied at the Ghasr-e Shirin Quarantine Station and pilgrimage to holy cities in Iraq was banned by the Council for Preservation of Health. During this outbreak, the illness invaded Abadan, Khuzestan Province in southern Iran and out of 961 patients, 911 died. In addition, in a small village near Ghasr-e Shirin located at the western Iran-Iraq border, six patients died of cholera.[17] A cholera outbreak occurred in Afghanistan in 1941 and quarantine measures were implemented by the Ministry of Health to prevent its further spread into Iran (Figure 4).[19]

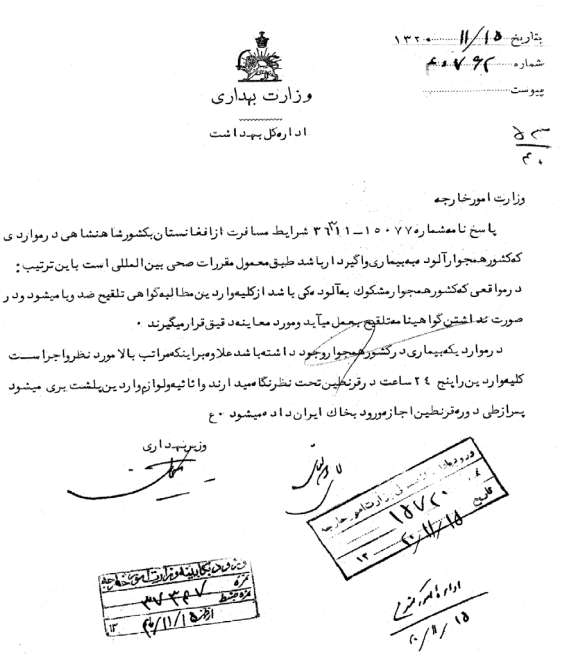

Figure 4: **The cholera outbreak occurred in Afghanistan in 1941 and preventive measures, including quarantine, were implemented by the Ministry of Health to prevent its spread into Iran.[19]**

Again in 1960, an outbreak of cholera occurred in Pakistan and Afghanistan. At that time, the Pasteur Institute of Iran (founded in 1921 at the end of the Qajar period) produced 9.5 million cholera vaccines to protect the population of the eastern regions of Iran.[20] At the beginning of the 21st century, a limited cholera outbreak occurred in Iran in the summer of 2005 and out of 1150 patients, 11 people died.[21]

Persian books published on cholera in Iran

In traditional medicine, cholera was considered as an air-born disease attributed to bad weather (Figure 5).[22]

Several Persian books were written on cholera by Iranian and European physicians in Iran during the 19th and 20th centuries. The oldest book was entitled 'Wabbayeh' (Cholera) written by an Iranian author named Mirza Mohammad Tabib Tehrani which dated back to 1858.[23] Among European physicians, Dr. Jacob Eduard Polak (1818-1891) from Austria who was the first medical teacher of Dar al-Fonun School (founded in 1851) wrote a treatise on cholera (Resaly-e Wabbayeh) which was published by Dar al-Fonun Press in 1852.[13]

Figure 5: A page of the Persian medical manuscript entitled 'Dafa –al-Waba' (Cholera Curing) which was written in 1866 by an Indian traditional physician, named Molavi Hakim Ahmad. He pointed out that based upon the Galen and Avicenna views, cholera was caused by bad weather.[22] (Courtesy of Ms.Javadi, Iranian Academy of Medical Sciences).

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CONFLICT OF INTEREST

None declared.

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