

Epidemics and Pandemics in India Since 20th Century - A Brief Review

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ABSTRACT

The outbreak of an infectious disease and its spread beyond geographic boundaries which leads to a high mortality is declared as pandemic. The factors responsible for pandemic are globalization and travel of people across the world for education, employment, business etc. On March 11, 2020 the corona virus outbreak was declared as pandemic by the World Health Organization. Nevertheless, India was one of the countries affected by the coronavirus outbreak. This article describes the epidemics and pandemics in India since 20th century. But, India was a sufferer of few serious pandemics even before that which are mentioned in brief in this article. Every pandemic has some similar and some dissimilar set of characteristics. All the possible precautionary measures should be taken to avoid transmission within the country and to other countries. In this article, the sincere efforts have been put into compilation of all these natural disasters to alert the dental and medical professionals about the mistakes they might have committed in dealing with an outbreak in the past or how they would overcome or face the current issues. Fortunately India has fought against all these calamities bravely and successfully. Nevertheless during COVID-19 also, India is maintaining better control over the disease spread irrespective of its limited resources and dense population. Though overall incidence of new cases is reducing day by day, COVID-19 still exists in India and all over the world.

A widespread occurrence of an infectious disease in a community at a particular time is termed as "endemic". However, if the outbreak of a disease occurs due to its high infectious potential it can lead to a high mortality rate, and so is declared as a pandemic. The globalization and travel of people across the world is usually responsible for pandemic. India has handled many epidemics and pandemics as revealed by history. The World Health Organization declared the coronavirus outbreak as pandemic on March 11, 2020. Basically the disease originated in China, as the first case of COVID-19 infection was diagnosed in Wuhan city of China. Large number of cases were detected to be suffering from the same disease in China as it was a highly contagious disease. Presently, the disease has spread all over the world like a storm, affecting most of the countries, with the highest number of infected cases in U.S., Italy and Spain. India is also one of the victim countries. Taking into account the rapid spread of disease COVID 19 is the topic of great worry in India due to its high population density.

This article describes the epidemics and pandemics since 20th century. But, India was a sufferer of few serious pandemics even before that such as Cholera Pandemic in 5 phases, Bombay Plague Epidemic and VIth Cholera Pandemic in 19th century.¹

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BACKGROUND

A number of epidemics and pandemics in India since 20th century are influenza, cholera, dengue, smallpox and many more. This article is compilation of all these natural disasters with a hope that it may be beneficial in understanding the mistakes performed while dealing with pandemics in the past as well the steps taken to overcome the conditions.

VARIOUS PANDEMICS AND EPIDEMICS

Influenza Pandemic or Spanish Flu in the Year 1918-19

H1N1 strain of Influenza is causative agent for the same. The first episode of the disease began in early 1918 and was observed in Europe, US and some Asian countries. In India, it began in Bombay and then spread to northern India. Then it spread worldwide.² It was spread due to "World War I" as the soldiers were the carriers of this disease. It infected around 500 million people worldwide and killed 20 - 50 million of them. The transmission of this disease was same as flu through droplets and contaminated surfaces, but the infected person could transmit this disease only when that person got very sick. Hence the spread rate was comparatively low if we compare it with novel corona virus infection.

Like other viruses, increase in the virulence and velocity of the virus strain and the humid climate during monsoon were believed to be the factors responsible for the severity and spread of the Spanish Flu disease.³ Similar conceptions such as suitability of cold and humid climate for the growth and spread of COVID 19 had become popular in the earlier days of pandemic. Myth was, COVID 19 was less likely to affect Indians, due to hot summer in India. But, the researchers concluded that human body temperature was suitable for the vitality of corona virus.

1961 - 1975 Cholera Pandemic

Also called as 7th cholera pandemic, which was noticed in Indonesia followed by Bangladesh and then it spread to India. The spread of virus took place in a duration of five years, affecting the population of some parts of Asia, Bangladesh and India. In India, Kolkata was the main city affected and responsible for the spread of the virus. The poor water sanitization practices were blamed for the same in Kolkata.

Previously, six cholera pandemics have been known. The 7th pandemic was reported to have started in 1961 and still continuing in 2020. Although the previous 6 pandemics were caused by the classical biotype of cholera, *Vibrio cholerae*, and it should be mentioned that in the seventh pandemic the El Tor lineage was the dominant strain. Contaminated food and drinking water with the bacteria *V. cholerae* is known to cause cholera affecting younger as well as adult population. Its manifestations are diarrhoea and thus dehydration. Therefore, treatment for mild cases include ORS solution while in moderate to severe cases, administration of I.V fluids along with antibiotics to cope up with dehydration. This has to be done to prevent possible complications like shock.⁴

Small Pox Epidemic in 1974

Small Pox Epidemic was one of the most awful epidemics of the 20th century in which overall contribution of India was approximately 85 % of this epidemic worldwide. Viruses named "Variola major or Variola minor" caused this disease. This epidemic mainly affected the villages of West Bengal, Bihar and Odisha. To eliminate the disease from the country, India launched an eradication program. India took assistance from WHO. Nevertheless to assist India in handling the epidemic, WHO along with the Soviet Union provided medical aiding to India. As a result of the eradication program and contribution by other agencies, India became free from smallpox in March 1977. Small pox was the first disease to be battled globally and was declared eradicated by WHO in 1980.⁵

Polio Epidemic from 1970 to 1990

Polio was one the epidemics which badly affected India mainly Uttar Pradesh. The disease affected the population widely and involved both urban and rural population that resulted in a worrisome consequence of post-polio paralysis.⁶ Later on polio was considered under immunization programme and each and every child in India was immunized by oral polio drops. Success of the story was, polio-free India in January 2011.

Surat Plague Epidemic in 1994 and in 2003

In September 1994, initial plague patients were reported in Surat. The disease then spread to other cities of India. The unhygienic conditions like open drains, poor sewage system etc were the predisposing factors responsible for precipitation of the epidemic. Disease was dangerous with high mortality. Initially the health care providers faced difficulty in diagnosing the condition, but later on they became successful in controlling the situation when they succeeded in diagnosis. In 2002, the Plague cases were detected in Northern India, Shimla district of Himachal Pradesh. By that time, all the preventive measures were taken at an early stage of the epidemic, before it spread widely so that it could be controlled beforehand.

SARS: Severe Acute Respiratory Syndrome Epidemic in 2003

SARS is stated to be the first serious infectious disease of the 21st century. Like COVID 19, it began in China in 2003 and then spread to Asia, America and Europe within 7 to 8 months.⁸ The reason for SARS was same as that of COVID-19, named "SARS CoV" and was characterized by a severe acute respiratory distress. The route of transmission was reported to be through coughing and sneezing.

The disease originated from civet cat and then human to human transmission was observed. Symptoms such as fever, malaise, myalgia, headache, diarrhoea, rigors, shortness of breath were observed. No such potential carriers or asymptomatic patients were observed during this period. The infected person could infect other person only if he gets very sick and not when he had mild symptoms.

Dengue Epidemic in 2003 and in 2006

Dengue Epidemic was first reported in Delhi. It spread widely in India irrespective of the profound preventive measures. Dengue fever occurs due to virus that belongs to the family Flaviviridae and spreads by infected Aedes mosquito bite. The clinical manifestations include continuous high grade fever lasting for 2 - 7 days, thrombocytopenia, pleural effusion & ascites.⁹

Similar dengue outbreak was observed in 2006 again in Delhi which then spread to other states of India.¹⁰ However; Indian ministry of health took necessary precautions to prevent the progress of outbreak. Indian government became successful in efficient management of the situation. Health awareness strategies about dengue in the community were important to increase knowledge and sensitize the community to decrease the impact of this epidemic.

Chikungunya Outbreak in 2006

Chikungunya Outbreak was one of the epidemics reported in India affecting large number of population. The condition initially affected Ahmedabad city with approximately 2,944 deaths estimated. Second encounter of the similar epidemic was observed in India in the month of December of the same year. But, during this episode, states from south India were also involved. The volatile nature of this epidemic was attributed to the herd immunity of the isolated genotype. The activities were undertaken to control mosquitoes. Through various communication, media awareness programmes were carried out so as to control further spread of the epidemic.¹⁰

For Dengue and Chikungunya outbreak, the vector responsible was mosquito. Basically poor sanitization, improper drainage systems, stagnation of water at number of places were the favorable places for breeding of mosquitos. Delhi was the worst hit in India with highest number of patients by this epidemic.

H1N1 Flu Pandemic in 2009 and in 2015

The H1N1 Flu pandemic was first noted in May which then spread worldwide by July 2009. Then spread of the disease continued to involve larger number of population and was declared as "Pandemic" approximately after one year; that was in August 2010. Nearly 18,500 deaths were reported globally due to this condition.¹¹ Three strains of influenza viruses were said to be responsible including Inf A, H1N1 and Inf A, H3N2 and pdm H1N1 strain.¹² The reappearance of H1N1 flu was again noted in 2015 which was then labeled as the "Indian Swine Flu". The basic reason for the reappearance of the condition was the favorable climate such as low temperature. Another reason for the same was relevant to the people which included compromised host immunity. Also the disappointment in regard to vaccination campaign after 2010 was the reason for persistence of the situation. According to the NCDC data, Rajasthan, Maharastra, and Gujarat were the badly affected states during this pandemic.¹³ Irrespective of the public awareness campaigns on large scales, condition persisted. In March 2015, large numbers of cases were reported to be suffering from the disease and nearly 2000 deaths were noted.

Apart from this Jaundice epidemic was also reported in India which was due to Hepatitis E Virus. It affected primarily

Gujrat district followed by Odisha. It was one of the epidemics that lasted for a longer duration. Indian Government succeeded in establishing control over the situation by conducting mass public awareness and making the people aware about the route of transmission of the disease which was feco-oral route. The population belonging to the lower socio economic category was the worst suffered. The control measures included provision for clean water and sanitation.¹⁴

Nipah Virus Outbreak in 2018

This condition was first noticed in Kerala and reported to be caused by fruit bats. The condition began in May 2018. The Kerala Government put into action several precautionary measures without delay which brought the condition to control with minimal spread of the virus. As a result of the precautionary measures in time, the outbreak could be curbed approximately within the month of June in Kerala.¹⁵

2019- Coronavirus

As most of the researchers have reported Coronavirus disease, COVID-19, as a new strain which hasn't been formerly recognized in human beings. It was detected that it occurs due to a specific strain of corona virus which was meanwhile named 2019-nCoV by the WHO and was later relabelled as SARS-CoV-2 by the International Committee on Taxonomy of Viruses.

Coronaviruses are enveloped, positive strand RNA viruses which belongs to the family coronaviridae.¹⁶

Like human, it may be transmitted between animals. It can spread directly through cough or sneezes of infected person or indirectly by touching contaminated objects. It is highly communicable during the first 3 - 4 days after outbreak of the symptoms, although few cases of spread have been noticed in early asymptomatic cases and in later stages of the disease. The time period from exposure to the outbreak of symptoms generally is between 2 - 14 days, with an average of 5 days. The standard method of diagnosis remains reverse transcription polymerase chain reaction through nasopharyngeal swab.¹⁷

Common signs and symptoms of the infection are coughing and cold with or without fever, respiratory distress. However, if not diagnosed and treated in initial stages, the condition may progress to severe acute respiratory syndrome, pneumonia, kidney failure and ultimately can be lethal. The older age group, children and individuals with comorbidities especially chronic kidney disease, congestive heart failure, diabetes, chronic obstructive pulmonary disease are more prone for this infection which may be due to low immune status of such individuals.¹⁸

COVID-19 can be considered as a serious matter as compared to previous pandemics due to its wide spread impact. Absence of symptoms for few days, though the person has contracted infection, or is positive, is a root cause behind this. Everybody is experiencing new situations as the nation went into lockdown for few days, employees have been advised to work from home, everybody is wearing mask while visiting the public places, keeping sanitizers in their pockets, restrictions in meeting their friends, relatives under the term social distancing. For checking the CoV-2 spread in the initial stage, the lockdown was executed in 4 phases from March to May 2020. Even during lockdown there was

increase in new cases which might have been due to improper screening of individuals as well as due to volunteers shortage, inaccessibility of screening units and inappropriate deliberate detailing of the patients.¹⁹ Considering the rapid spread of this viral infection, testing the susceptible population becomes necessary. For the said purpose, testing per million population will be the one of the significant indicators that aid in comparison of nations concerning Covid-19 pandemic.

A review with reference to the state-wise burden of covid-19 in India showed that approximately 1 / 3rd of the positive cases belonged to Maharashtra. In other words Maharashtra was leading with highest number of Covid-19 positive cases followed by Tamil Nadu, Delhi, Gujarat, Rajasthan, and Uttar Pradesh.²⁰

Though there is a need to take all the necessary precautions and be aware there are still some negative effects on individuals that may affect them psychologically. The media coverage has highlighted COVID19 as a warning which has added to panic, stress and the potential for mania in them.²¹

It is also observed that individuals with psychological illnesses are usually susceptible to the manifestations of widespread panic and threat.²² So, we should think not only about physical health but mental health as well.

It is reported that similar social distancing was followed during the 1918 influenza pandemic also. As there is no vaccine or no specific treatment protocol, COVID-19 is a subject of valid concern, and we hope for a day when this disease will be completely eradicated. Till then we must take all the necessary precautions such as hand hygiene, isolation, personal protective equipment, social distancing and measures to boost immunity.

CONCLUSIONS

Any pandemic is a global health problem and should be addressed viciously. Though there are few common features, every pandemic is manifested differently. All the possible precautionary measures should be taken to avoid transmission within the country as well as to other countries. Measures like isolation of positive as well as suspected individuals and community lockdown have greater impact on arresting the spread of the virus. Fortunately India has fought against all these calamities bravely and successfully.

Nevertheless during COVID-19 also, India is maintaining better control over the disease spread irrespective of its limited resources and dense population. Everybody has to keep in mind that. COVID-19 still prevails in India as well as in other parts of the world and precautionary measures are the only options to save us and all.

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