International Journal of Humanities & Social Science: Insights & Transformations
Vol. 6, Issue 1 – 2021
ISSN: 2581-3587

An Overview of History of Epidemics & Pandemics in India

Dr. Nisar Ahmad Dar[1]
[1]*Teaching History at GDC Doongi, Rajouri.*

Abstract

India has encountered several epidemics and pandemics throughout history. This article talks about such outbreaks known to have occurred in the 19th to 21st century and are arranged in accordance to chronology. For this review, a variety of sources were used like National Center for Biotechnology Information (NCBI) and several others. Different forms of prints such as books, websites, and journals were used as references in this article. The necessity to review this title is because the information is scattered and to source them and compile them into a single article could help the researchers and readers particularly healthcare workers to understand what this country has been through in the past and what reforms have to be made by them, the community and the government in preventing such outbreaks in the future.

Keywords: Epidemics, Pandemics, Influenza, Cholera, Dengue, Smallpox, Swine Flu, COVID-19.

Introduction

India, being a third-world country, has encountered a variety of epidemics and pandemics through time. Several accounts of influenza, cholera, dengue, smallpox and several others have been recorded throughout history; while we have been able to eradicate some; many diseases still continue to pose a threat to the community. It is not uncommon for sudden and rapid outbreaks to occur in India and many articles direct the cause for this in such developing countries being malnutrition, lack of sanitation and lack of a proper public health system[1]. According to Park, epidemics is an unusual occurrence in a community or region of disease, specific health related behavior or other health-related events clearly in excess of expected occurrence.[2] It is a sudden, severe widespread outbreak of a disease pre-existing in the community. A study by John T. Watson, et all analyses the relationship between epidemics and natural disasters and establishes that there is a rise in the occurrence of epidemics post-disaster though incidence in India has not been emphasized[3]. However, another article states that in recent years, cholera outbreaks in India have been due to the breakdown of sanitation during natural disasters[4]. A study by Moore, Cristopher, and Mark displays that the epidemic trends modify when the transmission exceeds the threshold station the infectious nature of it[5].

Pandemics, on the other hand, refer to the worldwide spread of diseases. These are the global health problems that need to be addressed and treated viciously along with proper measures to avoid transmission to other countries. There have been a significant number of pandemics throughout history and in many instances; their control had been difficult because of the lack of a proper, working global surveillance system[6]. These pandemics show trends of developing microbial resistance and as a result, the death toll is usually high in pandemics than epidemics as concluded by the study comparing the mortality rate of influenza pandemic and epidemic[7].

As far as India is concerned, there have been only two major, significant pandemics throughout history. While cholera had been predominant throughout the 19th century with increasing death tolls every year, the influenza pandemic came later on in the early 20th century[8]. The influenza pandemic was short but devastating and after a long time, quite recently, came yet another flu pandemic by the H1N1 strain[9].

Though, it is almost impossible to analyze all epidemics and Pandemics throughout Indian history, effort has been made to include most of the significant ones.

Epidemics in 19th Century

1. First Cholera Pandemic (1817)

This is considered to be the first major epidemic of the 19th century in British-colonized India and was described as probably the most terrifying of all[10]. The first case was reported on 23rd August 1817 by a civil surgeon of Jessore[11].The overall estimation of the mortality is not available as the data collection in India began much later, probably in the late 1860s. As for the geography, it is important to note that the year 1817 had brought a very heavy rainfall leading to flooding which could have been the cause for such a rapid spread[12]. While the Europeans living in India then and the elite were not seriously affected, the slum dwellers and people in rural poverty were hit the worst[13]. This was probably due to the differences in living conditions, personal hygiene and practices.

2. Second Cholera Pandemic (1829)

The second outbreak started around 1826 from Bengal and spread through the rivers to various parts of northern India. After affecting the United Provinces (UP), its impact was huge on areas around Punjab and Delhi but most significant is its pandemic spread to countries like China[14]. Cholera spread far and wide, all along the trade routes from China affecting several cities and villages alike. In each place, it lasted for a few weeks and killed hundreds of people every day[15].

3. Third Cholera Pandemic (1852)

This third cholera pandemic started around 1852 and lasted till the late 1860s. It is significant in history because of its spread to countries that were until then not affected. Though India was not its major area of impact, in the later phase of pandemic, small spurts of cases were noted in Bengal. It spread to several other countries like Persia, Arabia and then to Russia[16]. This was due to the worldwide spread of El Tor serotype of Vibrio which was initially endemic to India[17].

4. Fourth Cholera Pandemic (1863)

This began around 1863. While some suggest that the major cholera epidemic in 1865 was brought to Mecca by the Haj pilgrims from India, others disagree stating that it was a just a recrudescence[18]. However, it is agreed that it was from Mecca that the infection spread to several countries.[19] The Kumbh Mela at Hardwar in April 1867 has been considered to be responsible for the epidemic spread of cholera in northern India[20]. The Madras Presidency in 1877 was the worst hit and the cholera epidemic was responsible for about 10% of the annual mortality then[21].

5. Fifth Cholera Pandemic (1881)

The fifth cholera pandemic was considerably less fatal as compared to the previous four. It was during this pandemic (1881-1889) that Robert Koch proved that cholera was transmitted through the fecal-oral route, after studying the outbreaks in Calcutta and Egypt[22]. It spread to United Provinces and Punjab after which it spread to other countries like Afghanistan, Persia, parts of Russia and then to Europe[23].

6. Bombay Plague Epidemic (1896)

This plague began in September 1896 in colonial Bombay creating a lot of social and political frenzy. The rapid growth of commerce in Bombay led to an increase in population and thereby overcrowding. The anti-plague campaign was started to battle this epidemic and it was based on the belief that the focus of the infections was from the slums. The plague killed thousands and many people were forced out of the city[24].

7. Sixth Cholera Pandemic (1899)

The sixth cholera pandemic began around 1899 and major outbreaks were noted in Bombay, Calcutta, and Madras[25]. While the infection throughout the 20th century was caused by O1 serotype of Vibrio cholera and confined mostly through the Asian subcontinent, the sixth cholera pandemic brought about surprising challenges. This cholera infection was caused by an unknown, non-O1 serotype of V.cholera and spread to many distant countries including the United States[26]. The sixth cholera pandemic lasted for about 25 years (1899-1973)[27].

Epidemics in 20th Century

1. **Influenza Pandemic (1918)**

This is also known as the *Spanish Flu of 1918-19*. This has been known to have caused around 20- 50 million deaths worldwide and is considered most devastating[28]. This was caused by the H1N1 strain of Influenza and was severe. The first episode of the disease began in early 1918 and later in autumn, it began to spread all around the world, India considered to be the foci[29]. The second wave of the attack began in Bombay in 1918 and spread to other parts of northern India and Sri Lanka from where it spread worldwide[30]. Improvement in the virulence and velocity of the virus strain and the monsoon bringing humidity are considered to be the key factors in increasing the severity and spread[31].

2. Polio Epidemic (1970-1990)

India was the worst affected by polio among the developing countries until the late 1990s after which the EPI (Expanded Program on Immunization) was initiated. The incidence of polio in India was very high in both urban and rural states and the most affected was the state of Uttar Pradesh[32]. Its worst sequel was reported to be post-polio paralysis and in the district of Vellore, about 6/1000 preschool children were affected[33]. It was in 1964 in Bombay and 1965 in Vellore that the oral polio vaccine was introduced[34]. India had a choice between Salk's IPV and Sabin's OPV. Even after the introduction of the OPV in EPI there was no improvement to be noted for 10 years[35]. But with improvement in surveillance, the desired results were achieved and India was declared polio-free status in January 2011 and emphasis has been laid on maintaining the guard to prevent resurgence[36].

3. Small Pox Epidemic (1974)

It is known as one of the worst small pox epidemics of the 20th century. India contributed to about 85% of this epidemic worldwide. This epidemic broke out in three different villages of West Bengal, Bihar and Odissa but it was impossible to establish a connection between the men hence it was treated as three different epidemics. The disease was introduced into different areas by different sources. While over 15,000 people died in this epidemic, thousands of the survived but most of them but most ended up with disfigurement and blindness[37]. Small pox was eradicated in by the WHO small pox eradication program. It was the first disease to be combated globally and was declared eradicated by WHO in 1980[38].

4. Surat Plague Epidemic (1994)

Plague cases in Surat were first reported in Sept 1994 and which it spread to other cities in India. Fewer than 1,200 people were found positive and it lasted for less than two weeks but it is considered important due to its high fatality and created worldwide repercussions. It is said to have been initially difficult for doctors to diagnose it but when they did, all necessary precautions are taken to contain its spread [39].

Epidemics in 21st Century (2001-2020)

1. Plague of Northern India (2002)

The Plague of Northern India broke out in Shimla district of Himachal Pradesh in February 2002. It was a small and less serious epidemic. Also, as soon as the plague was detected, immediate measures were taken like fumigation, evacuation, and chemoprophylaxis that lead to further control of the epidemic[40].

2. Dengue Epidemic (2003)

In 2003 during September, there occurred an outbreak of DF/DHF dengue fever or dengue hemorrhagic fever in Delhi. It reached its peak around October-November and lasted until early December. The mortality rate was around 3%. It became a major outbreak in India in spite of the widespread preventive measures taken to control DF[41].

3. SARS Epidemic (2003)

SARS (severe acute respiratory syndrome), is considered as the first serious infectious disease out break of the twenty-first century. It initially started in the Guandong province of China in 2003 and spread quickly to about 30 countries across Asia, Americas and Europe and accounted for a total of 8,439 cases and 812 deaths, within 7 to 8 months[42].

4. Meningococcal Meningitis Epidemic (2005)

In early 2005, a sudden surge had been noted in meningococcemia and meningococcal meningitis cases in India. Cases were reported from Delhi and the surrounding states of Uttar Pradesh and Maharastra. Around 430 cases of meningococcal meningitis were reported as of June 2005[43]. Case management, early detection through surveillance was aimed at prevention of spread[44].

5. Chikungunya Outbreak (2006)

Around 3.4 million cases of Chikungunya were reported in Ahmedabad 2006 with 2,944 deaths estimated. The mortality rate in 2006 epidemic was substantially increased when compared with that in the previous four years[45]. In December, there occurred another epidemic in South India where the states of Andhra Pradesh, Karnataka and Tamil Nadu were affected. The volatile nature of this epidemic was attributed to the herd immunity to the then isolated genotype[46]. Major efforts were taken for mosquito control and several awareness campaigns were initiated by the television and print media[47].

6. Dengue Outbreak (2006)

The outbreak began in early September of 2006 and the first case was reported from Delhi. By the end of September, it began to spread to other states like Rajasthan, Kerala, Gujarat,

Chandigarh and Uttar Pradesh[48]. The ministry of health set up a control room to monitor the outbreak and provide technical assistance that led to the efficient management of the disease[49].

7. Gujarat Jaundice epidemic (2009)

Modasa town in Gujarat witnessed the outbreak of hepatitis B in 2009[50] This is of significance because almost all outbreaks of viral hepatitis in India were considered to be due to hepatitis E which is feco-orally transmitted[51]. It was a long-lasting epidemic and control was achieved by mass public awareness and health actions.

8. H1N1 Flu Pandemic (2009)

The H1N1 Flu pandemic began in May 2009 and spread globally by July 2009. By August 2010, it was declared pandemic and around 18,500 deaths were reported from all around the world[52]. Three strains of influenza viruses were circulating then of which the Inf A (H1N1) and Inf A (H3N2) viruses were largely replaced by the pdm H1N1 strain[53].

9. Odisha Jaundice Epidemic (2014)

The outbreak began in November 2014 in Kantalbai, a remote village in Odissa. This led to a district level investigation and it was confirmed to be jaundice caused by the Hepatitis E virus[54]. This 2014 Odisha Jaundice epidemic was one of the many outbreaks in Odisha and the most common cause being HEV. This is transmitted enterically and has affected several people, especially of the low socioeconomic category. Surveillance for clean water and sanitation was proposed as the control measure [55].

10. Indian Swine Flu Outbreak (2015)

It refers to the outbreak of the 2009 H1N1 flu pandemic in India which was still present as of March 2015. This outbreak in 2015 is considered as a resurgence of the infection and the most plausible reasons are considered to be low temperature, decreasing host immunity and failure of vaccination campaign after 2010[56]. According to the NCDC (National Centre for Disease Control) data in India, Rajasthan, Maharastra, and Gujarat were the worst affected states in India during this pandemic[57].

11. Nipah Outbreak (2018)

The virus was first noted in the late 1990s in Singapore and Malaysia. The natural host for this disease is the fruit bat and transmission is from direct person to person contact[58]. This Nipah virus outbreak began in May 2018 in Kozhikode District, Kerala. This is the first Nipah virus outbreak reported in Kerala and the third known to have occurred in India, with the most recent previous outbreak being in 2007[59]. Spread of awareness about this infection, isolation of the infected and post-outbreak surveillance led to the control of this outbreak[60].

12. Corona Virus/COVID-19

At the end of 2019 a novel virus, Severe Acute Respiratory Syndrome Corona virus 2 (SARS-CoV-2), causing severe acute respiratory syndrome expanded globally from Wuhan, Hubai province, China.[61] The COVID-19 epidemic expanded in early December from Wuhan, China. The first confirmed case of COVID-19 outside China was diagnosed on 13th January 2020 in Bangkok (Thailand)[62]. When significant community transmission occurring in several countries worldwide, including Iran and Italy and it was declared a global pandemic by the WHO on 11th of March 2020[63].

India reported its first case of COVID-19 in Thrissur, Kerala, on 27th January, 2020,[64] a 20 yr old female. In March, the transmissions grew after several people with travel history to affected countries, On 12 March, a 76-year-old man of Kalburgi, Karnataka with a travel history to Saudi Arabia, became the first COVID-19 fatality of India.[65] Today upto 31st of December 2020, based on the WHO reports, we have globally 10,286,023 confirmed cases and 148,968 deaths[66]. The total case count through the year stands at approximately 82 million. The virus also proved most fatal in December with the global death load of over 321,000 people. The total number of lives claimed by the virus so far is 1.8 million in total[67]. For those sending out hopeful wishes of a COVID-free New Year, the reality that the world is still grappling with the virus is more a shock than a check.

Conclusion

India has stood strong through several epidemics and pandemics. Good medical care and efficient researches have made it possible to fight every infection and luckily, we have been able to even eradicate a few. It can be established that throughout time, many infectious diseases have become widespread due to the mere lack of sanitation and crowded environment. The tropical climate and the seasonal rains in India is yet another important factor contributing to several vector-borne infections outbreaks in the past and many more to come. Though it has been difficult to compile all the epidemics and pandemics due to lack of sufficiently available data and errors in data preservation, sincere efforts have been put into including most of the important, notable ones. This is written with a hope that it may help researchers, students particularly medical professionals understand where they had gone wrong in controlling an outbreak in the *past* or how they succeeded to lead by example. It is also a sad truth that India will have to face several more such outbreaks in the days to come but preparedness has to be given immense importance and control of spread should be the number one priority of the doctors and other health care workers.

References

1. Rice AL, Sacco L, Hyder A, Black RE. *Malnutrition as an underlying cause of childhood deaths associated with infectious diseases in developing countries.* Bulletin of the World Health organization. 2000; 78:1207-21.

2. John TJ, Dandona L, Sharma VP, Kakkar M. Continuing challenge of infectious diseases in India. The Lancet. 201115; 377(9761):252-69.
3. Watson, John T., Michelle Gayer, and Maire A. Connolly. Epidemics after natural disasters. Emerging infectious diseases 13.1 (2007) p. 543.
4. Sen S, Srabani. *Indian cholera: A Myth*. Indian Journal of History of Science 47.3 (2012) p.345.
5. Moore, Cristopher, and Mark EJ Newman. *Epidemics and percolation in small-world networks*. Physical Review 61.5 (2000) p. 367.
6. Hughes JM, Wilson ME, Wolfe ND. *The origin and prevention of pandemics. Clinical Infectious Diseases.* 2010 Jun 15; 5(12) 636.
7. Simonsen L, Clarke MJ, Schonberger *Pandemic versus epidemic influenza mortality: a pattern of changing age distribution.* Journal of infectious diseases. 1981; 17 (1) p.53.
8. Ramamurthy T, Sharma NC. *Cholera outbreaks in India.* 2014 p. 49.
9. Mills, Ian D. "*The 1918-1919 influenza pandemic-the Indian experience*." The Indian Economic & Social History Review 23.1 (1986) p.40.
10. Arnold, David. *Cholera and colonialism in British India. Past & Present* 113 (1986) p. 118- 119.
11. Pollitzer, Robert. *Cholera studies: History of the disease*. Bulletin of the World Health Organization 10.3 (1954):421.
12. Collins, A. E. *The geography of cholera*. Cholera and the Ecology of Vibrio cholerae. Springer, Dordrecht, 1996. P.255-256.
13. Pollitzer R, Swaroop S, Burrows W. *History of the disease. Cholera*. World Health Organization, Geneva, Switzerland.1959 p.11.
14. Opcit, Collins, *History of cholera* Springer, Boston, MA, 1992. P.36
15. Macnamara, Nottidge Charles. *A history of Asiatic cholera*. MacMillan,1876 p. 430.
16. Opcit, Collins, A.E. P. 291 & Barua, Dhiman. *History of cholera* Cholera. Springer, Boston, 1992 p.37.
17. Blake, Paul A. *Historical perspectives on pandemic cholera.* American Society of Microbiology, 1994. P.293-94.
18. Omar W. *The Mecca Pilgrimage: Its Epidemiological Significance and Control.* Postgraduate medical journal. 1952; p.269. And Barua, Dhiman. *History of cholera.* Cholera. Springer, Boston, 1992. P. 36.
19. Bryceson, AD. *Cholera, the flickering flame.* (1977) p.363.
20. *Opcit.* Pollitzer R, Swaroop, P. 421.
21. Whit combe E, *Famine mortality.* Economic and Political Weekly (1993) p.1169.
22. Howard-Jones, Norman. *the cholera vibrio: a centenary*. British medical journal (Clinical research ed.)288 (1984) p.379.
23. Rogers L. *The Incidence and Spread of Cholera in India*; Forecasting and Control of Epidemics..1928 (9) p.890.
24. Ibid.
25. *Opcit*, Rammurty T, Sharma NC P.

26. Kidambi P. *An infection of locality:* plague, pythogenesis and the poor in Bombay, 1896–1905. Urban History. 2004; 31(2) p.249-67.
27. Kaper JB, Morris JG, Levine MM. *Cholera. Clinical microbiology reviews.* 1995 8(1) p.48.
28. Colwell, Rita R. *Global climate and infectious disease: the cholera paradigm.* Science (1996) p.2025.
29. Johnson NPAS, Mueller J. Updating the accounts: *global mortality of the 1918-1920 Spanish" influenza pandemic.* Bull Hist Med. 2002; 76:10 p.115.
30. Chandra S, Kassens-Noor E. *The evolution of pandemic influenza: evidence from India,* 1918-19. BMC infectious diseases. 2014; 14(1) p. 510.
31. *Opcit.* Johnson, & Mueller.
32. John, T. Jacob, and Vipin M. Vashishtha. *Eradicating poliomyelitis: India's journey from hyperendemic to polio-free status.* The Indian journal of medical research 137.5 (2013) p.881.
33. Chaturvedi UC, Mathur A, Singh UK, *The problem of paralytic poliomyelitis in the urban and rural population around Lucknow,* India. 1978 p.81.
34. Pabhakar N, Srilatha V *The epidemiology and prevention of poliomyelitis in a rural community in South India.* Indian Pediatr.1981; p.32.
35. *Ibid.*
36. Patterson KD *The geography and mortality of the 1918 influenza pandemic.* Bull Hist Med. 1991 p.19.
37. *The control and eradication of smallpox in South Asia,* Internet Archive, 2018, Available from: https://web.archive.org/web/20081019023043/ http://www.smallpoxhistory.ucl.ac.uk/.
38. Greenough P. *Intimidation, coercion and resistance in the final stages of the South Asian small pox eradication campaign,* 1973-1975. Social science & medicine.1995 p.633.
39. Fenner F. *Global eradication of smallpox.* Reviews of infectious diseases. 1982 P.916.
40. Dutt, Ashok K., Rais Akhtar, *Surat plague of 1994 re- examined.* Southeast Asian journal of tropical medicine and public health 37. 4(2006) p.755.
41. Gupta, Manohar Lal, and Anuradha Sharma. *Pneumonic plague,* northern India, 2002. Emerging Infectious Diseases13.4 (2007) p.664.
42. Singh N P, Jhamb R, Agarwal S K, *The 2003 outbreak of dengue fever in Delhi,* 2005 & Dikid,T.Emerging & *re-emerging infections in India* The Indian journal of medical research 138.1 (2013) p.19.
43. Geneva: World Health Organization; 2003. Summary table of SARS cases by country, 1 November20 2007 August. Available from: https://www.who.int/csr/sars/country/200, 3_08_15/en/.
44. Manchanda V, G upta S, Bhalla P. *Meningococcal disease: History, epidemiology,* Indian J Med Microbiol 2006; p.19.
45. WHO, *Global Alert and Response, Meningococcal disease in India,* Available from: https://www. who.int/csr/don/2005_05_09/en/, Accessed on: 9 May2005.

46. Mavalankar D, Shastri P, *Increased mortality rate associated with chikungunya epidemic*, Ahmedabad, India. Emerging infectious diseases. 2008; 14(3) p.412.
47. *Ibid.*
48. Mavalankar, Dileep, PriyaShastri and Parvathy Raman. *Chikungunya epidemic in India: a major public-health disaster.* The Lancet infectious diseases 7.5 (2007): p.307.
49. More dengue, *chikungunya cases reported*, NDTV Web Version, Accessed on: 9 October 2006.
50. "Nationwide data on outbreak, The Hindu".Chennai, India. 9 October 2006.Archived from the original on 17 May 2009. Retrieved2006-10-09.
51. Patel DA, Gupta PA, Kinariwala DM, Shah HS, Trivedi GR, Vegad MM. Aninvestigation of an outbreak of viral hepatitis B in Modasa town, Gujarat, India. Journal of global infectious diseases. 2012; 4(1):55.
52. Naik SR, Aggarwal R, Salunke PN, Mehrotra NN. Indian Journal of Public Health Research & Development, August 2019, Vol. 10, No. 8 1509 A large waterborne viral hepatitis E epidemic in Kanpur, India. Bull World Health Organ. 1992; 70:597–604. & Pandemic (H1N1) 2009-Weekly update 112. 2010. Available from: http://www.who.int/csr/don/2010_ 08_06/en/index.html.
53. Galwankar S, Clem A. *Swine influenza* (H1N1) strikes a potential for global disaster. Emerg Trauma Shock. 2009; P.105.
54. Dangi T, Jain B, Singh AK, Mohan M, Dwivedi M, Singh JV, et al. *Influenza virus genotypes circulating in and around Lucknow*, Uttar Pradesh, *India, during post pandemic period*, August 2010-September 2012. Indian J Med Res. 2014; 139 p.418.
55. Kelly R. *India Weekly Outbreak Reports* 2013. *Emerging Disease and Other Health Threats* Winnter Park, Florida: Flutrakers.com, Inc. 2015.
56. Paul, Sourabh, et al. *Investigation of jaundice outbreak in a rural area of Odisha*, India: Community Acquired Infection 2.4 (2015) p.131.
57. *Ibid.*
58. Mishra B. 2015 *resurgence of influenza* (H1N1) Journal of global infectious diseases. 2015; 7(2) p.56.
59. NCDC, Ministry of Health (2019), *H1N1 Swine Flu*- number of cases and deaths from 2012-2019 Data. Available from: https://ncdc.gov.in/showfile.php?lid=280, Accessed on: 18 June2019.
60. Chatterjee P. *Nipah virus outbreak in India*. The Lancet (2018) p.220.
61. *The Hindu*, 30 January 2020.
62. World Health Organization *Novel Coronavirus (2019-nCoV)*, Situation Report 1. 21 January 2020. Available online: https://www.who.int/docs/default-source/coronaviruse/situationreports /2020 -21-sitrep-1-2019- ncov.pdf.
63. Ibid.
64. M.A. Andrews, Binu Areeka et.al COVID-19 infection in India: A case report, *Indian Journal of Medical Research*, 2020 May; 151(5): 490-492. & *The Hindu*, 27, January 2020.
65. *Hindustan Times*. 12 March 2020.
66. *Deccan Herald*, 31 December 2020.
67. Rajit Sengupta, *Our World in Data*, 31 December 2020.

