

PANDEMIC OUTBREAK OF COVID-19 AND HISTORY OF OTHER PANDEMIC OUTBREAK IN PAST CENTURIES: A REVIEW

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ABSTRACT:

Background: Pandemic Outbreak is an epidemic which is spread over multiple countries or continents. There were many pandemic outbreaks in the past centuries. Many pandemics have still not yet been identified and cure is also not identified. The present pandemic outbreak, COVID-19 started off at Wuhan, China in December 2019 and within a month it reached many countries across the world. However the preventive measures taken were somewhat similar to the previous pandemic.

Aim: The aim of the study is to review the pandemic outbreaks in the past century and in the present century.

Methodology: Articles were collected from the past 20 years (2000-2020). The Articles were collected from databases like scopus, google scholar and Pubmed and were reviewed based on the output variables.

Results and conclusion: Many pandemic diseases were reviewed from the past centuries, some of these diseases caused many deaths and also have caused a huge decline in the country's economy. Preventive measures were similar for all the diseases except for AIDS and Bubonic Plague.

KEYWORDS: Pandemic outbreak, COVID-19, Effects, Preventive measures

INTRODUCTION:

The word "pandemic" is defined as a sudden outbreak and wide spread of disease all over the world or country. In the past centuries, there were many outbreaks like cholera, influenza, SARS, AIDS and Plague. Cholera is a fatal disease caused by a bacterium *Vibrio cholerae*. This disease caused diarrhoea which leads to dehydration and sometimes even death if left untreated. Influenza which was also known as "FLU" was caused by influenza virus and the virus affects the lungs, nose and throat. Acquired Immunodeficiency Syndrome (AIDS) is a viral disease caused by Human Immunodeficiency Virus (HIV). It was spread through sexual contact. Vaccine is not developed for this virus and scientists are still working on it. Severe Acute Respiratory Syndrome (SARS) was first identified in China in 2002 and within months it became pandemic world wide. This was spread by nose droplets when someone sneezes. This virus is a type of coronavirus. In the current day, a new outbreak named "COVID-19" has been

developed. The species of Covid-19 are as same as SARS. It does not show symptoms till the 15th day. It spreads to lungs and damages the alveoli. Scientists are still working on vaccines.

The black death pandemic which is called a plague was caused in the mid 14th century and was eradicated in Mid 18th Century. After the eradication there were no traces of this disease[1]. The Acquired Immunodeficiency Syndrome did not spread as much as other pandemics [2]. SARS Cov-2 and Covid-19 have very similar structure and symptoms [3]. Covid-19 started at Wuhan and within 30 days it reached the Mainland of China [4]. Further studies can be done for more information. Previously our team had conducted numerous original studies [5–11] and surveys [12–19] over the past 5 years. Now we are focussing on applying this knowledge to write the review on pandemic outbreaks in the past and present century.

Many pandemics were noted in the past centuries. Cure has not been found till now for some of these fatal diseases. The current study has compared all the pandemic outbreak of the past and present century. The aim of this study is to review all pandemic outbreaks including Covid-19.

METHODS:

The study was conducted as a literature review by collecting sources from databases like google scholar, scopus and pubmed. The articles collected were from 2000 to 2020. The articles were reviewed based on the output variables like type of pandemic, centuries of the pandemic outbreak, effects of pandemic and the preventive measures taken. The search keywords for this review are Pandemic outbreak, COVID-19, Effects, Prevention, past pandemics. The outcome is to report the status of the pandemic outbreak of Covid-19 and similar outbreaks in the past century. The collected data will be analysed and reported. The selected articles were assessed for its quality and are at low risk of bias. This review was approved by the Scientific review board, Saveetha Dental College. The collected data is tabulated.(Table -1).

RESULTS:

Type of pandemic:

Cholera first became pandemic in Philadelphia, United States and then became deadly across the world[20]. “The Black Death” which is also called bubonic plague first started in Europe in the late centuries which was deadly[21]. Spanish Flu which was caused by a type of influenza virus first started in Spain but it did not spread world wide[22]. Acquired Immunodeficiency Syndrome which was first developed in Africa was caused by Human Immunodeficiency Virus(HIV)[23]. Asian flu which was also another type of influenza virus started in China[24]. Measles was first developed in South Africa[25]. Severe Acute Respiratory Syndrome which was also first developed in China was caused by a type of coronavirus[26]. The current pandemic Covid-19 was also first developed in China and it is also a type of coronavirus[27][28].

Centuries of Pandemic outbreaks:

Plague became pandemic in the 14th century and Cholera became pandemic in the 19th century[20,21]. Spanish Flu, Aisan Flu and AIDS occurred in the 20th century[22,23,29]. SARS and Covid-19 became pandemic in the 21st century[26,27]

Effects of Pandemic Outbreaks:

Due to Cholera, there was a big fall in the economy of the United States and many people died due to this pandemic[20]. Plague killed almost 75 million people which is known by the highest mortality rate in history[21]. Spanish flu almost killed more than 50 million people in Spain[22]. More than 37.9 million people died because of AIDS[23]. 4 million people died and all the hospitals were closed because

of Asian Flu [29]. Measles caused 2.6 million deaths approximately[25]. Around 8 million people died due to SARS and the economy of many countries became low[26] Covid-19 caused almost 4,70,000 deaths in the past 6 months. In India, it almost caused 13,000 deaths, whereas three months before only 3000 deaths were reported in the world and 900 deaths were reported in India.[27,28]. This shows the severity and vulnerability of the disease.

PREVENTIVE MEASURES:

The preventive measures taken for cholera were new water treatment plants, regular handwashing and avoiding areas with stagnant water. Later on, vaccine cholera named “Vaxchora vaccine” was developed[20]. Flea control spray and repellent sprays were used for preventive measures. Plague vaccine was developed in the 18th century[21]. During Spanish flu pandemic the people were in Quarantine and after that they were asked to wear masks for further prevention[22]. Vit A supplements and good nutrition was given for the prevention of measles[25]. The preventive measures taken for SARS were Quarantine, Antibiotics and goggles[26]. The primary prevention was Quarantine and the secondary prevention were masks, regular hand washing and alcohol-based sanitizers for Covid-19[27,28].

DISCUSSION:

The articles were from the past 20 years [2000 - 2020]. The pandemic outbreaks like AIDS, influenza, cholera, etc which became pandemic between 14th to 21st centuries. The present outbreak, Covid-19 which has almost caused 4,70,000 deaths till date. In the past outbreaks, the highest rate was due to bubonic plague and the lowest death rate was due to measles. However AIDS did not spread worldwide so the death rate was less when compared to others.

H1N1 was associated with severe pneumonia in young adults [30]. In recent days, Bacterial strains were identified for cholera pandemic. [31]. SARS was linked to zoonotic origin from rhinophid bats[32]. In southeastern Cameroon, Chimpanzees in the Zoo gave rise to HIV-1 a type of HIV [23]. The black death pandemic which is called a plague was caused in the mid 14th century and was eradicated in Mid 18th Century. After the eradication there were no traces of this disease[1] which impaired the innate immune responses by defective cytokine responses[33]. Asian flu mostly affected domestic ducks than domestic chicken[34]. Early stage testing of the disease can miss out the symptoms like respiratory illness in later stages[35]. SARS and MERS have similar pathogenicity which causes myocardial damage[36]. Doxycycline, an antibiotic, showed good effect on the reduction of cholera[37]. In the US, hospital finance became one fourth after the influenza outbreak[38]. Symptoms for Covid-19 were isolated and treatment was given for two weeks[39].

For Covid -19, Isolation and treatment in early stages were the primary preventing measures taken.[39]. Inhalation of Zanamivir which is a neuraminidase is used in preventing influenza[40]. Environmental control was done for H1N1and sometimes vaccines are used for high - risk patients [41]. E.coli is a heat-labile toxin gene which probes and reduces V. cholerae[42]. Water treatment plants, hand washing, avoiding areas with stagnant water were the preventive measures for cholera. Later , Vanchora was developed[20]. Good nutrition and vitamin A supplements were given for prevention measles [43].

CONCLUSION:

This review was done to know the pandemic outbreaks of past centuries and the present pandemic outbreak Covid-19 and can be concluded that there were many outbreaks in the past century and the preventive measures taken took some months to come under control.

CONFLICT OF INTEREST: Nil

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AUTHOR CONTRIBUTION:

Sl.no	Author Name	Contribution
1	Shilpa Merlyn Jose	Study design, data collection, drafting manuscript
2	Lavanya Prathap	Revising manuscript, final approval of manuscript
3	Jothi Priya A	collection of reviews, drafting manuscript
4	Preetha S	Collection of reviews

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Table 1: Characteristics of included studies

AUTHOR AND YEAR	TYPE OF PANDEMIC	CENTURY	EFFECTS OF PANDEMIC	PREVENTIVE MEASURES
CE Ammon,2002	Spanish Flu (influenza)	20th century	Killed more than 50 million people	Quarantine And masks
Minsheng Zhu et al, 2004	SARS-Cov	21st century	Around 8 million people died and economy of many countries became very low	Quarantine, masks, goggles and antibiotics
Grabowsky et al, 2002	Measles	21st century	Caused 2.6 million death approximately	Good nutrition, vit A supplements
Paul M Sharp, 2011	AIDS (acquired immunodeficiency Syndrome)	Early 20th century	Killed more than 37.9 million people	Prevent sharing needles
Philip Ziegler, 2013	Bubonic Plague	14th century	Killed more than 75 million people	Flea control sprays, bug repellent sprays, plague vaccine
Alison M. Devault et al, 2014	Cholera	19th century	Many people died and their economy became very low due to the outbreak	Water treatment plants, hand washing, avoiding areas with stagnant water, Vanchora

Korbes KJ, 2004	Asian flu (Influenza)	20th century	4 million deaths, hospitals were also closed	Quarantine
Zin Yue Zu et al. 2020	Covid-19	21st century	Have caused almost 3000 deaths in past months	Quarantine, mask, handwashing and sanitizers
Tanu Singhal, 2020	Covid-19	21st century	Have caused 900 deaths and economy of the country became very less	Quarantine, mask, handwashing and sanitizers