Viral Pandemics in The Past Two Decades

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Key Points
➢ A worldwide epidemic that involves multiple countries and affects a large population is called as a pandemic ➢ Deadliest viral pandemics in the last two decades include Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV), Influenza A virus subtype H1N1, Middle East Respiratory Syndrome Coronavirus (MERS-CoV), Ebola virus and the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2)

A worldwide epidemic that involves multiple countries and affects a large population is called as a pandemic. The current corona virus disease (COVID-19) pandemic has not only affected the global healthcare infrastructure, but also impacted world economy, socio-political and cultural environment.[1]

These two decades witnessed some of the deadliest viral pandemics having wide-ranging consequences. These are Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV) (2002), Influenza A virus subtype H1N1 (2009), Middle East Respiratory Syndrome Coronavirus (MERS-CoV) (2012) and Ebola virus (2013) and the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) (2019-present).[2]

219 different types of viruses have been known at present that are able to infect humans. There are a lot more undiscovered human viruses and millions of other virus species that can be infectious to humans. In human history there have been numerous pandemics and disease outbreaks that hindered economic growth and development. In this article I want to highlight major viral pandemics that have occurred in the last two decades, to understand factors that contribute to their emergence, transmission and ways to prevent future outbreaks.[1]

Pandemic 1: Severe Acute Respiratory Syndrome Corona Virus Infection (Sars- Cov-1)

SARS is an illness that affects respiratory system, caused by virus SARS CoV-1 which belongs to Coronaviridae family. It is the first strain to be discovered from severe acute respiratory syndrome–related coronavirus (SARS CoV) species. It was 2002-2004 SARS pandemic in which 30 countries were affected. Total 8,422 cases were reported, with 11% case fatality ratio (CFR). The virus was believed to have originated from cave-dwelling horseshoe bats found in Yunnan province of south-western China, pointing to non-animal to animal origin. The virus transmitted through respiratory route from droplets or fomites. Management focused on prevention and control of symptoms. There is currently no proven antiviral therapy that treat SARS. Preventive measures such as immediate isolation of confirmed cases, wearing protective kits by medical practitioners during handling of patients helped to control further spread of disease. However, till now there is no effective vaccine against virus.[1]

Pandemic 2: Influenza A H1N1 2009 (Swine Flu)

Influenza A group of viruses had caused 2 major pandemics, first was in 1918 called Spanish flu and other was the swine flu in 2009. It was a typical lung infection known as acute respiratory distress syndrome (ARDS). All symptoms were same that of flu or pneumonia. It was hypothesized that H1N1 virus that was responsible for the 2009 outbreak also spread for several months before being identified as a novel strain of influenza virus. It first began in Mexico. The pandemic lasted for about 19 months and finally was declared over in August 2010. More than 214 countries got affected. Total cases reported were nearly 700 million to 1.4 billion. The deaths reported to WHO were approximately more than 18,000. An

effective vaccine was able to control this pandemic. An effective antiviral treatment was also available. [1]

Pandemic 3: Middle East Respiratory Syndrome (MERS) CoV Infection

Middle East respiratory syndrome (MERS) is caused by a type of coronavirus named Middle East respiratory syndrome coronavirus (MERS-CoV). MERS-CoV is originated from camels, therefore it is also known as CAMEL FLU.

As the name infers, this disease is more prominent in the Middle East. The first case was reported in a 60 year old man, a resident of Jeddah, Saudi Arabia who died of severe pneumonia. There was minimal human to human transmission. The transmission mostly occurred due to close contact with severely ill patients. The early symptoms of MERS infection are myalgia, headache, fever, diarrhea and vomiting. Clinical signs of MERS-CoV ranged from mild upper respiratory symptoms such as cough and shortness of breath to pneumonitis and pneumonia with rapid progression which then lead to acute respiratory distress syndrome.

No specific antivirals or vaccine could be made available for this disease. A total number of 2519 laboratory confirmed cases, with 866 deaths having a case fatality of 34.3% was reported till 2021.[3]

Pandemic 4: SARS-CoV2 Pandemic

The SARS CoV-2 pandemic, is an ongoing global pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS CoV2) normally called as (COVID-19). The virus belongs to the Coronaviridae family and the virus is an enveloped, positive-sense, single-stranded RNA virus.[1]

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic started in early December in Wuhan, China, and was reported to the World Health Organization (WHO) on 31 December 2019.[4]

The predominant mode of transmission is respiratory, with droplets being spread by coughs and sneezes up to a distance of around 6 feet. Another mode of transmission is by indirect contact with contaminated surfaces. The common symptoms include fever, cough, weakness, loss of sense of smell and taste. Further complications of the disease include acute respiratory disease with pneumonia. Preventive measures for decreasing the chances of infection include hand hygiene, surface disinfection, wearing face masks, and avoiding close contact with people who have flu-like symptoms. Social distancing strategies have been adopted such as cancelling large public gatherings, shutting down schools, colleges, offices, and putting travel restrictions. At present there is no treatment for the management of COVID-19 and patients are managed symptomatically. Apart from antiviral drugs a new treatment has been tried with success against COVID-19 which is known as convalescent plasma therapy. Plasma of previously COVID-19 infected patients that contains neutralizing antibodies against SARS CoV-2 virus is given to neutralize the virus. An effective vaccine has been made. There are 3 major candidates of vaccine that are being tried, inactivated virus vaccine, vaccine using messenger RNA of virus and vaccines having recombinant protein of SARS CoV-2 on other viral vector.[1]

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