IMMENSELY IMPACTED EPIDEMIC AND PANDEMIC VIRAL OUTBREAKS IN INDIA: A REVIEW ARTICLE

M.Durga1, K.Janani1, A.Narmadha1, Dr.S.Gowri2, Dr.V. Dhana Rangesh Kumar*3

1Student, Department of Biochemistry
2Head, Department of Biochemistry
*3Assistant Professor, Department of Biochemistry

Abstract: The new discoveries and technologies are day by day progressing, on the same time new different diseases also increasing in the world. The microbes are one of the disease causing factors for human being. The viruses are the most dangerous microbes in the world, now a day there is no specific medicine and treatment for more number of viruses. In current outbreak SARS CoV-2 virus is fully changed the world environment. In this present study focused to the most important past, present viral outbreaks in India in 19th–21st century. This review has compiled with clear information’s about viruses which are highly affected in India.

Keywords: Microbes, Virus, SARS CoV-2, Outbreaks

INTRODUCTION
India has improved its ranking on global healthcare even it faced some pandemics and epidemics throughout history in current we facing corona virus SARS CoV-2. 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 proper public health system [1]. The 20th century has seen significant reductions in ecosystems and biodiversity and equally dramatic increases in the numbers of people and domestic animals inhabiting the Earth. In fact, continued inadvertent human activities leads to degradation of health care resources has increased the opportunity for various pathogenic microorganisms including some deadly viruses to pass from the animals to humans causing emergence of new diseases [2]. Microbes can make humans, animals and plants sick by causing infection and disease. A virus is a simple organism which is made up of a protein coating and some genetic material. Viruses are well reproduce and grow in living organisms. Viruses are transmitted as organisms much smaller than bacteria and incapable of multiplying outside the host, but often associated with larger particles in the water environment [3]. Since the dawn of man, he has been vulnerable to microbial attack, from a mild fever to a fatal disease. Scientists have been working diligently to prepare vaccines or to discover cures for various infections [4]. During the period of 19th–21st century India faced several epidemics and pandemics, among those some highly impacted viruses are discussed in this article.

IMMENSELY IMPACTED EPIDEMICS AND PANDEMICS
Here we discussed about Cholera, Dengue, Chikungunya, Swine Flu, Zika, Nipah and SARS-CoV-2 which are more affected outbreaks in India.

CHOLERA
Cholera is an acute, diarrheal illness caused by infection of the intestine with O1 or O139 sero groups of Vibrio cholerae. Profuse watery diarrhea and vomiting can lead to dehydration and shock. Without treatment, death can occur within hours. Oral and intravenous rehydration therapy has decreased fatality rates but cholera remains a dreaded illness because of its rapid onset, severity, and potential to cause outbreaks that easily overwhelm public health systems in impoverished settings [5]. Cholera infection is through ingestion of food containing Vibrio cholerae in company of fecal material via oral route. The bacteria dislike acid and they tend to die due to presence of gastric juice [6]. Beside this there are several other factors like contaminated foods, especially raw shellfish, may also transmit the cholera-causing bacteria [7]. India reported cholera cases and deaths from 1997 to 2006. Over the 10-year period, the average number of cases reported annually was 3,631 and fatality rate showed a decreasing trend (range: 0.57–0.07). The numbers of cholera cases and deaths in National health profile 2006 were found to be similar to the numbers reported to the WHO [8]. This outbreak was mainly caused by drinking contaminated water and the primary case person’s faeces contaminated the water inside [9].

DENGUE
Dengue viruses (DV) belong to family Flaviviridae and there are four serotypes of the virus referred to as DV-1, DV-2, DV-3 and DV-4. It is transmitted mainly by Aedes aegypti and Ae. albopictus mosquitoes. Dengue virus was isolated in Japan in 1943 by inoculation of serum of patients in suckling mice and at Kolkata in 1944 from serum samples of US soldiers [10]. The dengue virus symptoms are high fever, severe headache, muscle and joint pain, nausea, abdominal pain, respiratory distress, skin rashes and bleeding manifestations [11]. The different findings methods are used to detect dengue virus such as, demonstration of DV IgM antibodies or by NS-1 antigen in patients’ serum depending upon day of illness using ELISA kit, RT-PCR, DV isolation in tissue culture cells and its sequencing is also being done to identify this virus [12]. The outbreak of dengue (1, 88,401) cases and

ISSN: 2455-2631 © February 2021 IJSDR | Volume 6 Issue 2
325 deaths are reported at India [13]. There is no accurate vaccine treatment is available in dengue virus, the preventing and control measurement are used to protect human against dengue fever. Such prevention and control ideas are using mosquito coils and electric vapors mats during the day to prevent from dengue. Discard all wasted items getting gathered around the living area to avoid the breeding of mosquitoes. Patients suffering from dengue-fever must be isolated for at least 5 days. Keep the water stores clean and closed and take prompt medical advice once a fever starts [14].

CHIKUNGUNYA

Chikungunya virus (CHIKV), an alpha virus of the family Togaviridae. The virus is transmitted between humans through the bite of an infected Aedes mosquito, primarily A. aegypti or A.albopictus [15]. It is considered as a tropical disease because it had only been documented in Africa, Asia and India. In India the first outbreak occurred in 1964 in South India, followed by another in 1973 in central India. A.albopictus was the principal vector in the outbreaks in the Indian Ocean islands and A.aegypti in the 2006 Indian epidemic [16].Symptoms start with fever and the majority of infected persons develop severe, often debilitating polyarthralgias. The joint pains are usually symmetric and occur most commonly in wrists, elbows, fingers, knees, and ankles but can also affect more-proximal joints [17]. The virus re-emerged in 2006 and wreaked havoc in India by causing an epidemic that involved more than a million people [18]. Methods for Diagnosing are screened for CHIKV specific IgM antibodies in serum specimens by ELISA using a commercial kit and CHIKV RNA by RT-PCR [19]. There are no specific treatments for CHIKV. Treatment with medications according to the symptoms usually to relieve from fever and aching.

SWINE FLU

Virus belongs to the family Orthomyxoviridae. Influenza A (H1N1) virus has caused serious respiratory illness (swine flu) and death over the years. The first confirmed case of swine flu H1N1 in India was documented in May 2009, but huge numbers of cases were reported thereafter. In 2015, swine flu outbreak in India had led to significant morbidity and mortality [20]. The clinical signs may include fever, lethargy, anorexia, weight loss, coughing, sneezing, nasal and ocular discharge, conjunctivitis, listless behaviour and laboured breathing (respiratory dyspnea or “thumping”). The United States Centres for Disease Control and Prevention includes symptoms of swine flu infection are fever, cough, sore throat, diarrhea, vomiting, myalgia and joint pains [21]. The diagnosis of 2009 H1N1 influenza was confirmed by testing of combined nasal and throat swabs with the use of a real-time reverse transcriptase polymerase chain reaction (RT-PCR) assay [22]. The direct transfer of the virus probably occurs either by pigs touching noses, or through dried mucus and airborne transmission through the aerosols produced by pigs coughing or sneezing is also an important means of infection [23]. An outbreak of swine influenza A due to an H1N1 virus reached around 34,636 with death claimed cases 2123 [24].

ZIKA VIRUS

Zika virus is a type of Flavivirus which were first recognized in 1947 from monkey species rhesus macaque located from the Zika Forest. This virus was latterly isolated from the mosquito Aedes africanus in the Zika forest itself [25]. Zika virus commonly causes extremely low or no symptoms of illness during its earlier stages in children and adults. The symptoms like headache, pain in the body, fever or rashes can develop if any occurs [26]. The Zika virus was diagnosed two different methods, one is Nucleic Acid testing (NAT) is utilized to identify hereditary proof of the Zika infection. Blood and pee are used in this analysis and another one methods are Immunoglobulin M (IgM) testing is utilized to identify proteins, known as antibodies, which are created by the body in light of the Zika disease. The test is blood based analysis [27]. In 2017 the first four cases of ZIKV infection reported in India (three cases in Gujarat state and one in Tamil Nadu). The India National Centre for Disease Control, Ministry of Health and Family Welfare reported 159 confirmed cases of ZIKV infection from Rajasthan state (including 63 pregnant women), 130 cases from Madhya Pradesh and one case from Gujarat state in December 2018 [28]. There is no specific treatment for zika virus, only fever, headache, anti-inflammatory drugs are used. To controlling mosquito population, reducing mosquito-human interactions, sleeping under mosquito nets, wearing clothes that cover maximum parts of the body. Buckets, flowerpots or tyres that can hold water need cleaning or covering with suitable materials these are most significant prevention control measurement of zika virus [29].

NIPAH VIRUS

Nipah virus (NiV) is a member of the genus Henipavirus in the family Paramyxoviridae. Fruit bats of the genus Pteropus (flying foxes) are the main reservoir hosts for Nipahvirus [30]. Nipah virus experimentally isolated from urine, kidney and uterus of infected bats and also may be found in fruit or juice (e.g. unpasteurized date palm sap) contaminated with bat saliva or urine. Other sources for infection are contaminated drinking water and aborted bat foetuses or other fluids/tissues of parturition [31]. The symptoms were fever, headache, myalgia, vomiting, altered sensorium, respiratory symptoms (tachycardia to acute respiratory distress) and involuntary movements or convulsions. Late infection with subsequent reactivation of Nipah virus and death has also been reported months to years after exposure [32]. Diagnosing methods are Detection of IgM antibody in serum or CSF is used. ELISA also used for the antibody detection. The best test for direct detection is polymerase chain reaction (PCR) due to its high sensitivity, specificity and the rapidity with which results can be reported [33]. There is no treatment against Nipah Virus infections. Number of vaccines has been made but none of them proved to be effective against humans or animals [34].

SARS-CoV-2

Public Health Emergency of International Concern.SARS-CoV-2 is a member of the family Coronaviridae and order Nidovirales. The family Coronaviridae consists of two subfamilies, Coronavirinae and Torovirinae and members of the subfamily Coronavirinae are subdivided into four genera: (a) Alphacoronavirus contains the human Coronavirus (HCoV)-229E and HCoV-NL63; (b) Betacoronavirus includes HCoV-OC43, Severe Acute Respiratory Syndrome human Coronavirus (SARS-HCoV), HCoV-HKU1, and Middle Eastern respiratory syndrome Coronavirus (MERS-CoV); (c) Gamma corona virus includes viruses of whales and birds and; (d) Deltacoronavirus includes viruses isolated from pigs and birds [35]. Members of the Coronavirus family have four structural proteins: the spike (S), membrane (M), envelope (E), and nucleocapsid (N) proteins [36]. The most common symptoms at illness onset are fever (99%), fatigue (70%), dry cough (60%), myalgia (44%) and dyspnea. Less common symptoms are headache, dizziness, diarrhoea, nausea and vomiting. Symptoms such as pharyngeal pain, dyspnea, dizziness, abdominal pain and anorexia are more likely to be present in patients with severe illnesses [37]. The level and duration of infectious virus replication are important factors in assessing the risk of transmission and guiding decisions regarding isolation of patients. Because Coronavirus detection is more sensitive than virus isolation, most studies have used qualitative or quantitative viral RNA tests as a potential marker for infectious Coronavirus. For SARS-CoV, viral RNA was detected in respiratory specimens from patients as long as 4 weeks after disease onset. Similarly, the duration of MERS-CoV RNA detection in lower respiratory specimens persisted for at least 3 weeks, whereas the duration of SARS-CoV-2 RNA detection has not been well characterized [38]. Collecting specimens of nasopharyngeal and oropharyngeal swab for RT-PCR. Clinicians may also collect LRT (Lower Respiratory Tract) samples when these are readily available (for example, in mechanically ventilated patients). The first case of SARS-CoV-2 in India was reported on 30 January 2020. As of 26th March, the Indian Council of Medical Research and Ministry of Family Welfare has confirmed a total of 649 cases (subjected to change in due course), 42 recoveries, 1 migration and 13 deaths in the country. The Government has also issued lockdown across the country where confirmed cases have been reported [39].

CONCLUSION

India fought against several epidemics and pandemics with high responsibilities. Ayurveda and Siddha are traditional medicines also provide enormous growth in the standard of medical facilities that seems improvement in overall global healthcare ranking. Now we are facing a SARS CoV-2 pandemic globally. India fighting well against that hopefully we will reach the state to eradicate SARS CoV-2. This Article is comprised with clear references and information’s to know the previous virus outbreaks in India.

ACKNOWLEDGEMENT

The authors express their sincere thanks to the host Institution Dr.N.G.P. Arts Science college, Management, Principal, Deans, Head of the Department, Guide and all other staffs of Department of Biochemistry for rendering all the facilities and support with DBT-Star Scheme. Communication number: DrNGPASC 2020-21 BS036

CONFLICT OF INTEREST

No conflict of interest

REFERENCES


