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# REVIEW ON THE RECENT INFECTIOUS DISEASES IN THE STATE OF GOD'S OWN COUNTRY

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**Abstract**

***Introduction:*** *The burden of communicable and non-communicable diseases is increasing in Kerala. Despite the State's past success in keeping a variety of communicable diseases under control, the recent research of Dengue, Malaria, Leptospirosis, Hepatitis, Chikungunya and H5N1 has resulted in a marked rise in morbidity and mortality. Infectious diseases continue to be the main causes of morbidity and mortality in humans and animals with enormous healthcare costs in India. Over the past few years, Kerala, a state in the nation of India, has conflicted with nature. The nation's diverse terrains, extreme geoclimatic variations, and unequal population distribution exhibit distinctive patterns of viral illness dispersion. The state of Kerala has faced a significant public health issue over the past decade due to the resurgence of infectious illnesses, resulting in elevated rates of both mortality and morbidity.*

***Methodology:*** *This review article aims to investigate and discuss epidemics that are known to have happened during the 21st century. For this purpose, the investigator has done a literature review through Google Scholar and PubMed. All articles pertaining to reported infections in the state of Kerala and factors contributing to the outbreak of an infection were chosen for inclusion in the review.*

***Results:*** *From a number of sources, we culled a selection of articles covering the topic of viral infections. We found that many people in the Kerala state have fallen victim to and suffered many deaths from bacterial infectious diseases like chikungunya fever, scrub typhus fever, rotavirus diarrhea, the break bone fever, Nipah virus, Kyasanur Forest Disease (KFDV), leptospirosis, COVID-19 and monkeypox in the past decade. The people of Kerala are fortunate to have access to excellent medical care, and the government has recently begun to prioritize illness prevention and control.*

***Conclusion:*** *This report emphasizes the Kerala's infectious disease management strategy and the necessity for other Indian states to emulate it. States can prevent disease spread and protect residents by taking comparable steps.*

**Keywords:** health; emerging infectious illness; infectious diseases; communicable diseases; pandemic; outbreak; climatic diversity; Kerala; India.

**JEL Classification:** I10, I12, I18, I19, J11

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**Introduction**

India is dangerously on the verge of an outbreak of infectious illnesses. Some of them have made a comeback while others are waiting for the right occasion to do so. Due to its inherent geographic vulnerabilities, the southern state of India, Kerala, is in a unique position to experience epidemics of a variety of infectious diseases (Mourya et al., 2019). Despite Kerala's epidemiological transition from communicable to non-communicable diseases, re-emerging communicable diseases provide a challenge to the healthcare system. To live a healthy life, it is vital to have knowledge of illness trends, patterns, and seasonal variations (Raj et al., 2022).

Some of the most rapidly evolving infectious diseases of the twenty-first century are those spread by vectors (World Health Organization, 2014). The complicated dynamics of vector-borne, zoonotic and other infectious diseases have been significantly influenced by fast urbanization, deforestation, increased human incursions into forested territory for recreation and livelihood, and shifting weather patterns (Morand & Lajaunie, 2021).

The prevalence of communicable diseases in India is extremely high. The epidemiological tool of "surveillance of communicable diseases" is an important one for monitoring the existing disease burden, monitoring trends, and locating outbreaks of disease (Rajan et al., 2022). The initial occurrence of the Chikungunya outbreak in India was documented in Calcutta in 1963. However, after a period of 32 years, the virus resurfaced in the Alappuzha district in 2006. Encephalitis instances have been documented in several regions of Kerala. The aforementioned conditions encompass West Nile Encephalitis (WNV), Japanese Encephalitis (JEV), and Acute Encephalitis Syndrome. Asian nations have been much more vulnerable to endemic diseases since the dawn of the twenty-first century. Over the past 20 years, India has had more than ten outbreaks, including those of Severe Acute Respiratory Syndrome (SARS), Zika Virus disease (ZIKV) and Nipah Virus sickness (NIV) (Udhaya Kumar et al., 2020).

Due to water-borne illnesses, Kerala has significant death and morbidity rates. In order to effectively treat communicable diseases in a timely manner, it is crucial to have a comprehensive awareness of the trends, patterns, and seasonality associated with these diseases (Soorya et al., 2021). According to the World Health Organization (WHO), diarrheal illnesses are responsible for up to 4 million cases and 1.8 million deaths on an annual basis.

In Kerala, whose health indicators are thought to be the best among Indian states and when compared to developed nations, the epidemiologic transition from infectious diseases to non-communicable diseases is a reality. However, it has been documented that this particular region exhibits the greatest rates of morbidity in contrast to other states of India. Numerous studies have provided evidence of research conducted on diverse waterborne diseases, including diarrhea, severe jaundice, hepatitis A and leptospirosis inside the state (Chitra & Nair, 2010; Thankappan, 2002; Rakesh, 2014; Sebastian et al, 1998; Arankalle et al., 2006; Kuriakose, Eapen & Paul, 1997; Pappachan et al., 2004).

Kerala is a state in India's Southwest coastline region, covering a total area of 15,000 sq km. Kerala has 36 million people. It the state with the highest literacy rate in India (94%) according to the 2011 Census. However, the state has seen a number of epidemics.

Kerala is closely connected to other areas of the world and has a large population. This could be one of the key reasons Kerala remains a hotbed of several diseases. Many medical professionals, like doctors and nurses, work abroad from Kerala. Viral attacks are an occupational risk for these groups. Effective periodic surveillance, pre-assessment or forecasting of infectious diseases and capacity building are the only ways to stop the rising annual burden of contagious diseases on public health in India. Infectious disease onset in Kerala, their "knocking" trend during 12 years (2010-2022), detrimental effects on public health and future directions are all covered in this article (based on Patel et al., 2021).

**Methodology**

A thorough research was done in August 2022. We used keywords like "infectious diseases", "communicable diseases", "Kerala", "pandemic", "outbreak in Kerala in last ten years". Scientific research articles were collected on emerging and re-emerging infectious diseases in Kerala (through Pub Med, Google Scholar and ResearchGate).

## Major and Significant Findings

### Chikungunya Fever

An arthropod-borne Alphavirus from the Togaviridae family that causes chikungunya fever is what typically infects humans through the bite of Aedes mosquitoes.

The first Chikungunya outbreak in India was documented in Calcutta in 1963, and several outbreaks spread throughout the nation up until 1973. It was assumed that the Chikungunya virus had vanished from South-East Asia and the Indian subcontinent due to its prolonged absence since 1973. However, numerous states reported significant outbreaks in 2005 and 2006 in the Indian subcontinent due to its prolonged absence since 1973. Though numerous states reported significant outbreaks in 2005 and 2006, the virus returned in December 2005. Kerala, a southern Indian state, was severely impacted by the pandemic in the years 2006-2007. It was discovered that the detected in Kerala toward the end of 2007 had undergone an A226V mutation.

Between October and November 2007, a cross-sectional survey was carried out in Kerala's five districts of Kollam, Pathanamthitta, Allappuzha, Kottayam and Idukki during the 2007 epidemic. These five districts were among the hardest affected. Results revealed that 1913 (52.8%) of the 3623 surveyed samples had clinically diagnosed Chikungunya. The adult group (73.4%) made up of the majority. The most common symptoms among the patients were headache (64.1%), itching (50.3%) and joint swelling (69.9%). The knee joint was most frequently impacted (52%) (Vijayakumar et al., 2011).

### Scrub Typhus

One of the most prevalent infectious diseases in the Asia-Pacific region, Orientia tsutsugamushi, is the rickettsial disease known as scrub typhus.

Since 2009, Kerala has reported cases of scrub typhus infection. In 2009, nine people died as a result of the virus, which was the last time it claimed lives there. 2009 saw the first death from scrub typhus reported in the state. The victim was a 45-year-old farmer from Kozhikode.

Due to its vague clinical presentation, doctors' lack of awareness and low index of suspicion, as well as a lack of diagnostic resources, Scrub typhus is gravely underdiagnosed in India. O. tsutsugamushi is a gram–negative coccobacillus that must be present intracellularly. O. tstsugamushi is spread by agricultural work in rice fields, rubber plantations, oil palm plantations and outdoor enjoyment in forested or hilly locations. Clinically, the infection presents as an undifferentiated febrile illness that is frequently accompanied by headache, myalgia, nausea, vomiting, diarrhoea, cough or shortness of breath (Saifudheen et al., 2012).

### Rotavirus Diarrhoea

Hospitalized children under the age of five frequently get rotavirus diarrhoea. In order to estimate the prevalence of diarrhoea caused by rotavirus among hospitalized children under the age of five and to describe the circulating strains of rotavirus in this population, the researcher carried out a systematic study of rotavirus diarrhoea in children in the Ernakulam district of Kerala. The study's results revealed that, using the Rotaclone ELISA test, 648 (34.9%) of the 1827 kids tested positive for rotavirus. Infants younger than six months of age were more likely to experience rotavirus (24.7%) (Mathew et al., 2014).

### The Breakbone Fever: Dengue

In 2017, there has been a dramatic increase in cases of dengue in India. In 2012, South India experienced the detection of the common stereotype of the Dengue Asian genotype of DENV – 1. About 18,700 confirmed dengue cases were reported in India in 2017, which was quite concerning. Kerala was at the top of the list where the most reports from India were made until the second week of July 2017. Kerala had the most dengue patients (9104), followed by Tamil Nadu (4174), Karnataka (1945), Gujrat (616), Andhra Pradesh (606), West Bengal (469) and Delhi (100). Thiruvananthapuram, Kozhikode, and Palakkad districts reported the highest number of cases in Kerala. People in South India have stockpiled drinking water in big containers to deal with the water problem, and stagnant rainwater has caused mosquito growth to explode in the state, with a total mortality toll of about 115 in 2017 (Banerjee, 2017).

### Nipah Virus

A new, extremely virulent zoonotic disease called Nipah viral infection (NIV) has been found in South – East Asian nations. The virus is a member of the Henipavirus genus and Paramyxoviridae subfamily (Halpin et al., 2000).

India, Bangladesh, Singapore and Malaysia have all recorded NIV outbreaks. In the initial outbreak in Malaysia, the mechanism of transmission was through direct contact with infected pigs (1999). The eating of fresh date palm sap tainted by fruit bats was connected to epidemics in Bangladesh and India. In Siliguri, West Bengal, India (2001), hospital visitors and healthcare professionals caught the infection after being exposed to patients, indicating the first instance of human-to-human transmission. Bangladesh has also reported cases of human-to-human transmission (Sudeep et al., 2021).

The Nipah virus (NIV) poses a risk to global health security. West Bengal was the site of the first two NIV epidemics reported for India in 2001 and 2007. On 17 May 2018, a 28-year-old male with encephalitis was presented at a private facility in Kozhikode District, Kerala State, India. On the same day, both his father and aunt developed fever, body aches and vomiting. His brother had perished 12 days prior from a similar illness. The familial concentration of adult encephalitis cases prompted the laboratory to test for NIV in addition to testing for the most prevalent causes of encephalitis (Arunkumar et al., 2019).

**Kyasanur Forest Disease Virus (KFDV)**

The virus that causes Kyasanur Forest Disease (KFDV) was first discovered in 1957 after being isolated from sick monkey in Karnataka state, India's Kyasanur Forest. Since then, five districts in the state of Karnataka have reported the enzootic presence of the disease (Bhatt et al., 1966). Despite the fact that there is a vaccination available to prevent the illness, reports of human illnesses are increasing. There have been isolated cases and reports of antibodies to the KFDV virus from new locations in the Indian states of Kerala, Tamil Nadu and Maharastra. In Kerala, the Wayanad and Malappuram districts reported fresh KFDV outbreaks between 2014 and 2015. In these districts, an investigation into the outbreaks was conducted in May 2015 (Chakraborty et al., 2019).

**Leptospirosis**

Except for the north and south poles, Leptospirosis is one of the most prevalent and emerging zoonoses worldwide. Leptospirosis, often known as rat fever, is a bacterial ailment brought on by spiral-shaped bacteria (Spirochetes) belonging to the genus Leptospira. (Levett, 2001). The majority of rodent species, even those that are domesticated, have this illness. It is mostly spread to people through exposure of their mucous membranes (oral, nasal and eyes) and skin abrasions or cuts to the urine, tissues or soil contaminated by the urine of infected rats.

Mild Leptospirosis typically presents clinically with various symptoms, including fever, chills, headache, muscle pains, vomiting or diarrhoea, while some patients may not experience any symptoms at all.

According to data from the Integrated Disease Surveillance Project (IDSP) as of 11 September 2018, there were 1318 confirmed cases of Leptospirosis, with a confirmed mortality rate of 53 (4.0%). At the same time, there were 2598 suspected cases, with 95 suspected fatalities. However, according to figures from the Kerala state health department, there have been 1107 suspected cases and 33 suspected fatalities since 1 September of this year. 570 confirmed cases and 18 (3.2%) confirmed deaths were detected (James et al., 2018).

**COVID-19**

India reported its first COVID-19 case on 30 January 2020 in Kerala, a 35 million-person state on the country's Southwest coast. A Student leaving Wuhan University for home was patient zero.

In Kerala, there were few cases reported in the first six months of 2020, and then there were three major periods. The first phase began in June 2020 and continued for six months, with the biggest monthly peak occurring in October 2020 at 236,999 instances. The second phase started in April 2021, with May 2021 seeing the greatest monthly peak of 955,396. The third phase began in July 2021, with the biggest monthly peak occurring in August 2021 at 666,472 people and numbers sharply dropping in November and December (Andrews et al, 2020).

**Monkeypox**

A self-limiting illness with a low fatality rate is monkeypox. In India, the first case of monkeypox was identified on 14 July 2022 for a 35-year person returning from the United Arab Emirates (UAE). The second case of the same was identified on 18 July 2022 when a 31-year-old male arrived in Kannur from Dubai.

Fever, rashes and enlarged lymph nodes are just a few of the symptoms that monkeypox can produce. These symptoms are often mistaken for those of other illnesses like chicken pox, measles and bacterial skin infections. Monkeypox has already claimed the lives of four people in India, the first of whom died on 1 August 2022. The young guy was found dead in the southern state of Kerala (Singh et al., 2022).

**Conclusion**

Kerala, being characterized by remarkable climatic variability, is consistently exposed to the threat of developing and re-emerging viral diseases, which have substantial implications for public health. There is a need to enhance the emphasis placed on epidemiology and the assessment of disease burden in order to improve nationwide disease surveillance. Furthermore, it is imperative to acquire a more comprehensive understanding of disease biology, specifically in relation to vector biology and the impact of environmental factors on disease dynamics. Focusing on the "one health" paradigm is of utmost importance in enhancing preparedness and response to these diseases in emergency situations.

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