



OUTBREAK OF LEPTOSPIROSIS IN KERALA, INDIA AFTER FLOODS: A SURVEY

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Abstract

The state of Kerala in India has been receiving on the erroneous side of nature over the past few years. From powerful floods to massive outbreaks of diseases, the state of Kerala has been in chaos. The rains and floods have ceased departure at the back a disastrous world of abundant infectious diseases. Even after taking into consideration the great health care facilities in Kerala there have been multiple reports of infectious disease outbreaks, especially in flood affected areas. This short review is on paper with the purpose to review the facts into a single entity. In the consecutive years 2018 and 2019, the flood leads to the spread of Leptospirosis. Various databases were related to report infections in the state of Kerala and the factors which can lead to the public health crisis were selected and included in the review. A multiple numbers of articles on Leptospirosis infections were obtained in various databases.

Key words: Flood, Kerala, Leptospirosis, Review.

Introduction

Kerala is a state that is present in the fabulous southwestern part of the nation India. Kerala is acknowledged for its lofty literacy rates and its vivacious ethnicity. However, over the current few years, it has been the nucleus of a countless of natural calamities ranging from meteorological to biological (Datta, 2019). Kerala has a total 5,924 quarries, an average of six quarries per panchayat, of which 3,332 are in the ecologically receptive zones recognized by Gadgil. In sum, 56% of the quarries are on easily broken spots in the Western Ghats, making them prone to landslides (Viju, 2018).

The present rule mainly asks them to be 50 m away from housing zones. In Malappuram district's Kavalappara, which saying one of the two main damages in the rains as a landslide cracked down a hill submerging hundreds of houses in the valley, estimates point out to 27 quarries within a five km radius. This could be a conventional estimate because one quarry exposed in the satellite descriptions could in fact be five or six on the land. In Wayanad's Meppadi, the other major injure spot where 100 acres of a hilly tea estate were washed away

in a landslide, estimates demonstrate at least one quarry was in service on the other side of the hill. The hurt arising out of this situation is enormous for Kerala, with its thickly populated rural and urban areas. The vibrations from these blasts are shaking the hills. Sound waves go highest in diamonds, and the next in granites. The density variations arising out of quarrying are destroying millennia-old forests in the Western Ghats (Viju, 2018).

Kerala is getting better from a major flood, exactly a year after being hit by another one. Last year's floods were described as a once-in-a-century calamity; this one was an ecological disaster coming up to happen. In late May of 2018, the monsoon began in Kerala. Monsoon season regularly lasts from about June to September, a regular happening. But this year stands out for its incredible amount of rainfall and a disastrous season: over 500 people had died and over a million people had been displaced by the flooding and consequent landslides (Sengupta, 2018). The natural disaster presents significant implications for public health and the future. (Paul, 2018).

After one year in 2019 August, Kerala facing another hard hitting flood. Due to the flood there is lots of health issues were happening. After the water receded from

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most of the flood affected areas of Kerala, the state has been facing threat over the outbreak of Leptospirosis (Rat fever), a zoonotic infection which is caused by the bacteria *Leptospira*. According to Kerala Directorate of Health Services (DHS) report many have died of Leptospirosis. The DHS issued an alert on outbreak of the rat fever. There is a sudden increase of Leptospirosis from Wynad, Thrissur, Palakkad, Kozhikode, Malappuram and Kannur districts. All of them had direct contact with flood water.

Methods

Various databases were searched like Scopus and Google scholar and all articles related to reported infections in the state of Kerala and the factors which can lead to the public health crisis were selected and included in the review.

Diseases reported in Kerala after flood

In South Asia, the monsoon brings life to vegetation, but at the same time has potential to cause public health problems. Notably, the climate change due to global warming is affecting the extent of monsoon rainfall in the region causing flooding which increases the risks of major disease outbreaks (Sruthi James, *et al.*, 2018). Flooding and standing water after heavy rainfall increases the risk of vector-borne diseases such as dengue, malaria, plague, chikungunya, West Nile, typhoid, cholera and Leptospirosis (Morgan, 2004 and Gayer and Connolly, 2005). In Kerala after the floods, the above mentioned diseases were reported. Among them Leptospirosis was most noted diseases cause hazard in flood affected areas. Flood-hit Kerala, already grappling with vector-borne diseases such as dengue and chikungunya, now also faces the threat of water-borne illnesses, with public health experts warning of an outbreak of cholera, typhoid, hepatitis and Leptospirosis.

Leptospirosis

Universal, Leptospirosis is one of the most ordinary and rising zoonotic diseases, apart from on the North and South Poles. Rat fever or Leptospirosis is a bacterial infection caused by the spiral-shaped bacteria (spirochete) of the genus *Leptospira* (WSDH, 2018). This disease is mostly seen in untamed and even domesticated species of rodents. It is largely transmitted to humans by exposure of the mucous membranes (oral, nasal & eye) and skin abrasions or cuts to the urine or tissues of infected rodents or soil contaminated by their urine (WHO, 2018). Rats are the primary pool of Leptospirosis, although farm animals and livestock, such as horses, pigs, dogs or cattle, and even wild animals can also be a reservoir for the

bacteria. However, human-to-human transmission seems to occur occasionally (WSDH, 2018). It is also an occupational hazard with potential risk of exposure among outdoors workers such as farmers, cleaners, veterinarians, agricultural workers. Moreover, there exists an increased chance of a recreational hazard to those who swims and wades in contaminated waters (WHO, 2018).

Rat fever has long been a most important threat to the State of Kerala with more than 1,000 cases is being reported annually. Nationally, it causes the main number of deaths among all communicable diseases in the state of Kerala. At least 100 deaths were reported yearly in Kerala before 2010. In 2006, there were 1,821 cases of rat fever of which 104 (5.7%) died and in 2007 there were 1,359 cases with 229 (16.9%) deaths. The number of Leptospirosis cases in 2008, 2009 and 2010 were 1305, 1237 and 1016 with mortality rate of 136 (10.4%), 107 (8.6%) and 85 (8.4%), respectively (DHS, 2018). In 2011 and 2012, the number of established cases was 944 and 736 with death rate of 70 (7.4%) and 18 (2.4%). It has been also reported that in 2013 and 2014, confirmed cases was 814 and 717 with 34 (4.2%) and 19 (2.6%) deaths respectively. Particularly, the occurrence and mortality of Leptospirosis in Kerala for the following years showed a declining trend as compared to the preceding years. In 2015, 43 people died of rat fever and in the subsequent years the death toll was found to be 35 and 80 in 2016 and 2017, respectively. From the month of January till July 2018 (before the flood), 28 deaths were reported due to Leptospirosis in Kerala. (Sukumaran and Pradeepkumar, 2018)

Kerala suffered strangely heavy rainfall and faced a disastrous flood in August and September 2018, in which around 500 people died. The result of the flood brings several epidemics. The Directorate of Health Services delivered an action plan for the avoidance and control of communicable diseases and knowledgeable the public regarding the symptoms and suitable treatment of such diseases with the help of volunteers. Despite that, there was a major danger of outbreak of Leptospirosis in Kerala after this floods and the uppermost number of Leptospirosis cases was reported from Kozhikode district of Kerala which was affected most by the flood.

As of September 11, 2018, the Integrated Disease Surveillance Project (IDSP) data revealed that there were 2598 supposed Leptospirosis cases with 95 suspected deaths, whereas the confirmed cases stood at 1318 with a confirmed death rate of 53 (4.0%). On the other hand, statistics from the Kerala State Health Department reported 570 confirmed cases and 18 (3.2%) confirmed deaths; however the suspected cases were

1107 with 33 suspected deaths since 1 September, 2018 (IDSP, 2018).

Conclusion

As in the previous year's records, there is a possibility of outbreak of Leptospirosis in this time also. In the year 2019 on August 14, the state has already recorded 846 cases of dengue fever, 191,945 cases of Acute Diarrhoeal Disease (ADD), 518 cases of Malaria, 34 cases of Chikungunya and 225 cases of Leptospirosis, according to the directorate of health services (DHS), Kerala. The numbers are expected to rise further with flood waters accumulating everywhere, according to doctors. The major causes of diseases associated with flooding are the contamination of drinking water. Stagnant water pools caused by heavy rainfall or the overflow of rivers act as breeding sites for mosquitoes and, therefore, increase the exposure of the disaster-affected population to infections such as Dengue, Malaria. Although the management of public health in Kerala has been idealistic, it is important for the improvement of health care facilities in flood affected areas to prevent a massive outbreak of Leptospirosis.

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