

DENGUE PREDOMINANCE IN INDIA: A REPORT

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ABSTRACT

Dengue keeps on being a significant reason for infection trouble in India, influencing the population in their typical pace of the life. Dengue in India has drastically extended in the course of the most recent couple of decades, with quickly evolving the study of disease transmission. The pervasiveness of dengue is diverse in different examinations in India, as a result of thought of a population of specific district or state at various purposes of times. The principal major dengue hemorrhagic fever episode in the whole country happened in 1996 by dengue infection serotype 2, and after a hole of very nearly 10 years, the nation confronted one more dengue fever flare-up in the year 2003 by dengue infection serotype 3. An emotional increment in the number and repeat of scenes followed, and, at present, in a huge part of the states of India, dengue is basically endemic. At present, all the four serotypes are discovered accessible for use; however, the prevalent serotype continues evolving. In spite of this pattern, observation, revealing, and conclusion of dengue remain to a great extent uninvolved in India. Progressively dynamic network-based epidemiological investigations with escalated vector control and activities for dengue immunization improvement ought to be outfitted to control the spread of dengue in India. All the distributed information related to dengue from audit of all zones of India from 2015 to 2018 is available on government official websites. Despite the fact that, the quantity of dengue cases has demonstrated a consistent ascent as time passes, the mortality has decreased. The general death pace of 1.2% in 2015 dropped to 0.25% in 2018.

Keywords: Dengue, *Aedes aegypti*, *Aedes albopictus*, Dengue virus-2, Dengue virus-3.

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INTRODUCTION

Dengue is a mosquito-borne viral contamination of people as an expected 2.5 billion individuals are in danger of disease [1]. Dengue virus (DENV) infection causes a wide range of clinical illness varying from mild to more dangerous as dengue shock syndrome and dengue hemorrhagic fever (DHF) [2]. Developing countries simultaneously have to take burden of both contagious and non-contagious diseases. Among the 128 countries, 70% of the actual burden is taken up by Asia. India's novel, typical demographic profile and geographic position confer a unique challenge to infectious disease management. Dengue is a vector-borne disease that is a major public health threat globally. Dengue, transmitted by *Aedes* mosquitoes, is a cause of great concern to public health in India. Since 2015, the number of dengue cases has gradually increased in India. In India, dengue is the leading cause of hospitalization due to its endemic eruption in almost all the state [3,4]. According to the surveillance conducted by a network of 600 essential clinics under National Vector Borne Disease Control Programme (NVBDCP) is correct for Dengue [5], Integrated Disease Surveillance Program (IDSP) [6], and system of 52 Virus Research and Disease Laboratories built up by branch of health research [7]. In 2010, an expected 33 million cases recorded in nation which builds a few overlay up to 2016 giving a disturbing sign of dengue malady trouble been terribly under-evaluated in India [8,5]. This article reviews the current status of dengue during 2015–2018 as per the data assimilated from the NVBDCP.

DISTRIBUTION IN INDIA

In India, the primary case was accounted for in 1963 in Kolkata [9]. The second significant flare-up of dengue/DHF was accounted for in Delhi and neighboring states in 1996. It took right around 30 years for this infection to spread everywhere throughout the nation and now all the four serotypes are pervasive all through the entire nation. The first outbreak in 1996 was caused by DENV-2 in which 10,252 cases and 423 deaths were reported [10,11]. Although despite the increase in frequency of dengue cases, the fatality rate is reduced to a certain extent which might be the result of more watchful and timely reporting of all the cases by health authorities of the country. The reemergence and its persistence in population lead to

another shift in epidemiology, and subsequently, reoccurring outbreak of dengue fever/DHF has been reported over the past two decades involving mainly the states of (Andhra Pradesh, Delhi, Goa, Gujarat, Karnataka, Kerala, Maharashtra, Rajasthan, Uttar Pradesh, Pondicherry, Punjab, Tamil Nadu, West Bengal, and Chandigarh) [12], due to the predominance of DENV-3 strain, the drastic shift in age group has also been shown from children's to adults by several studies in India [6,13].

WHY THIS CONDITION

Over the past decade, the dengue has outspread to the rural areas as it was mostly affecting the urban states and the extension of dengue has been identified with spontaneous urbanization, parasite – has collaboration, changes in atmosphere, natural elements, and populace immunological components [14]. As indicated by the Intergovernmental Panel on Climate Change, the worldwide normal temperature has expanded by ~ 0.6 C as the high and muggy temperature improves the life expectancy and lessens the viral hatching time frame inside vector and it's blood taking care of interims, therefore bringing about the fast popular replication and expanded transmission intensity [15]. India gets 75% of rainstorm precipitation during the southern storm interim from June to September which gives bottomless reproducing living spaces to *Aedes aegypti*, consequently prompting expanded vector densities [16].

HOW IT IS TRANSMITTED

Infection is transmitted to people through the chomp of tainted female mosquitoes, particularly *A. aegypti* mosquito. This fundamentally relies on the heap of viremia and the brooding time frame. Human to mosquito can happen as long as 2 days before somebody shows manifestations of illness [17,18]. Infected mother can pass infection to her baby during pregnancy; to date, one example of dengue has been accounted for to spread through bosom milk. Through the available data of contaminated blood, the government bodies are introducing new research projects and social health insurance programs. Once in a while, dengue can be transmitted through blood transfusion, organ transplant, or by a needle stick injury [19].

STATUS IN INDIA

Since 2007, determination and information digestion for dengue in India have been encouraged by the National Vector Borne Ailment Control Programme (NVBDCP). Later and methodical information are presently accessible on account of the NVBDCP. During 2015–2018, dengue infringed into all the zones of India. Figs. 1-6 show the mortality and bleakness by dengue among the different zones of India from 2015 to 2018. The information absorbed from NVBDCP shows that dengue emitted as endemic in northern zone of India. Punjab, Haryana, Uttar Pradesh, and Delhi were the most provoked states while just a couple of cases were accounted for in Jammu and Kashmir and Himachal Pradesh (Fig. 1). Northeastern and western zones were least affected around then (Figs. 3 and 5). Practically comparable status was found in 2016 yet more cases were analyzed in Assam and Uttar Pradesh also.

In 2017, a precarious ascent in dengue patients was accounted for in southern zone (Fig. 7). Tamil Nadu was generally influenced among these zones (Fig. 2). A decrease in dismalness rate was seen in northern and northeast zone in that year and further increment in dengue cases was found in Punjab, Himachal Pradesh, and Delhi in

2018. The viral disease enrolled an expansion across southern and western zones in 2018.

HOW TO DIAGNOSE

A wide scope of symptomatic strategies has been utilized for the early, quickly, and precisely identification of dengue which may include the recognition of infection, viral nucleic corrosive, antigens or antibodies, or blend of these techniques [20]. Among the strategies accessible for dengue analysis, infection disconnection gives the most explicit test outcomes. Seroconversion of immunoglobulin (Ig) M or IgG antibodies is the standard serological technique for the affirmation of dengue infection [21]. For infection detachment, examples ought to be gathered right on time during viremia as infection is frequently secluded from serum; however, plasma, fringe blood, leukocytes, entire blood, and tissues got at examination can likewise be used [20]. Nucleic acid amplification tests involve the use of molecular and advanced methods which detects the viral genomic sequences, real-time Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) or nonstructural protein 1 (NS-1), and isothermal amplification techniques [20].

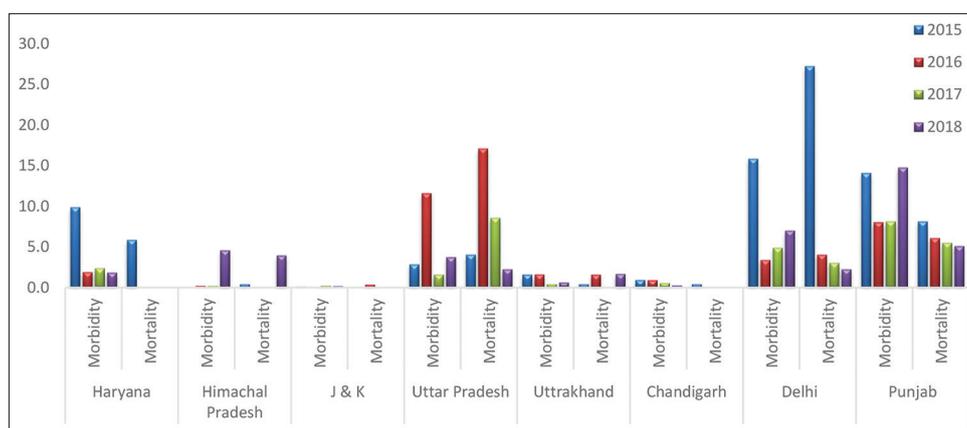


Fig. 1: Morbidity and mortality rate of dengue in northern zone of India from 2015 to 2018

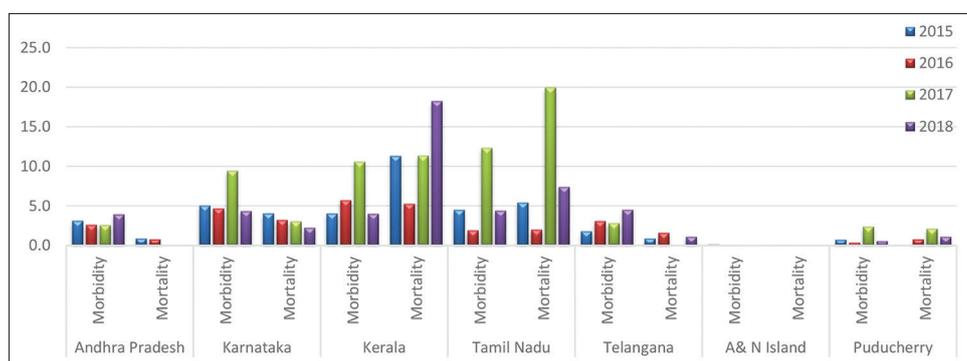


Fig. 2: Morbidity and mortality rate of dengue in southern zone of India from 2015 to 2018

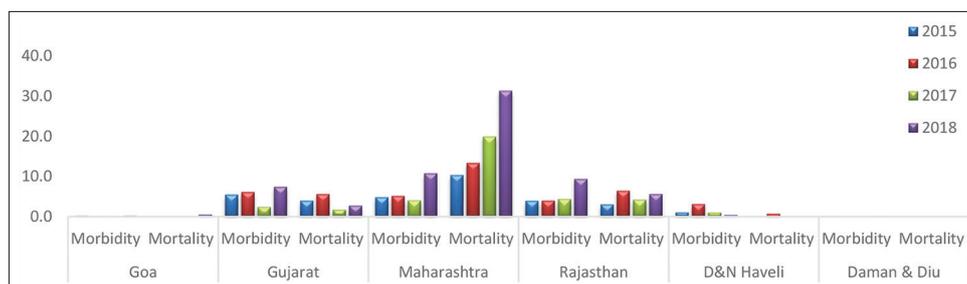


Fig. 3: Morbidity and mortality rate of dengue in western zone of India from 2015 to 2018

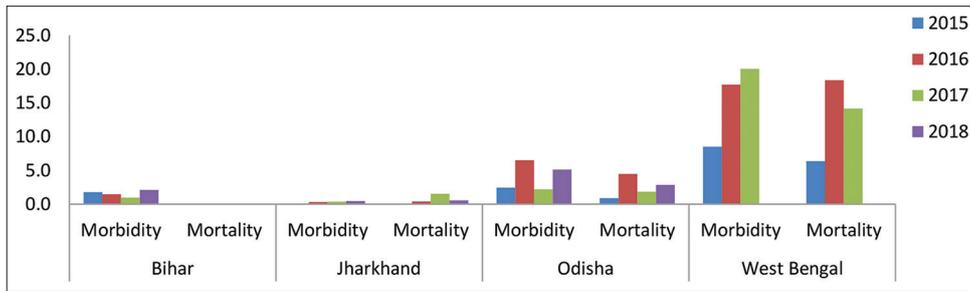


Fig. 4: Morbidity and mortality rate of dengue in eastern zone of India from 2015 to 2018

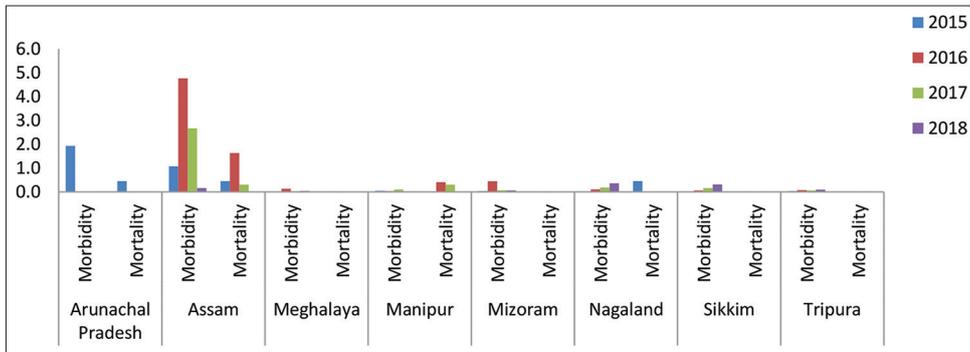


Fig. 5: Morbidity and mortality rate of dengue in North-east zone of India from 2015 to 2018

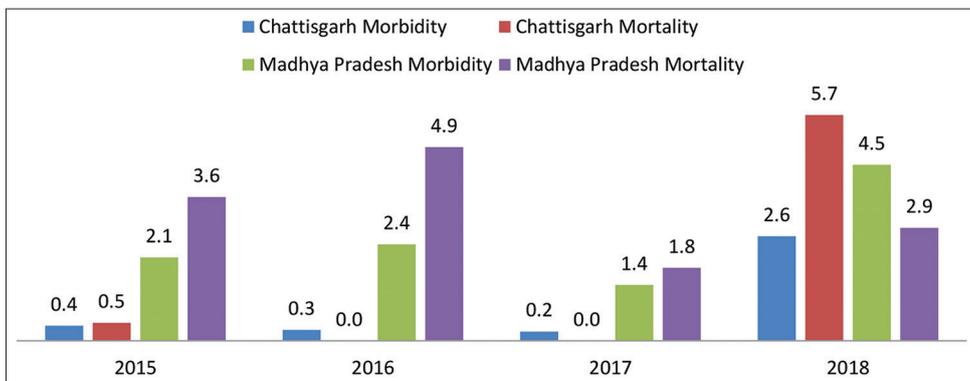


Fig. 6: Morbidity and mortality rate of dengue in central zone of India from 2015 to 2018

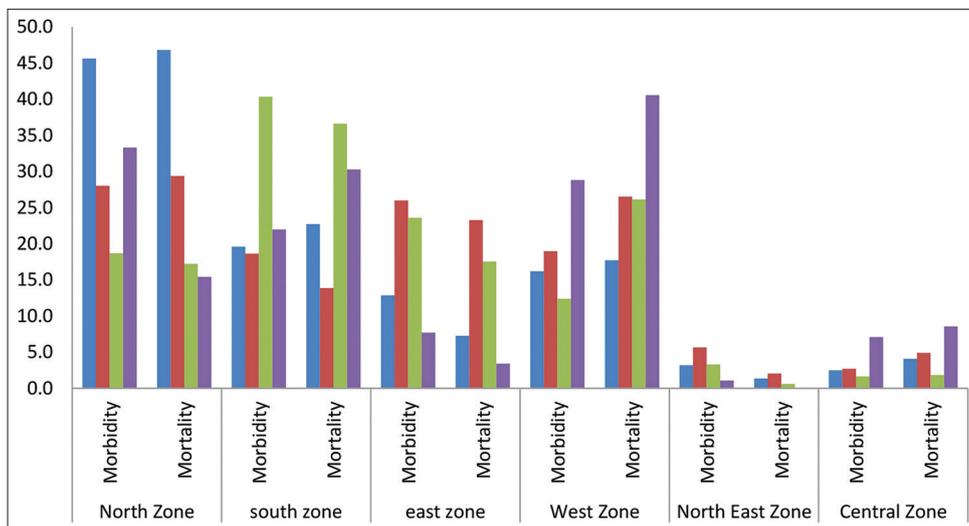


Fig. 7: The comparison of morbidity and mortality rate of dengue in all zones of India from 2015 to 2018

Serological tests incorporate the routinely exhibit of anti-dengue IgM antibodies, or NS-1 antigens in patients serum/plasma considering the range of sickness by utilizing either chemical connected immunosorbent test (IgM antibody capture (MAC)-enzyme-linked immunosorbent assay) or safe chromatographic-based fast card tests [22]. Expanded titers of IgG immune response can likewise supportive for the recognition of the constant disease with dengue. Anyway translation of results gets mind boggling as cross-reactivity might be appeared with different individuals from the Flavivirus family [23].

DENGUE CONTROL AND PREVENTION STRATEGIES

A worldwide technique for the control and avoidance of dengue was made known over 10 years back focusing on the three crucial angles: Observing for arranging and reaction, lessening the malady trouble, and changing conduct to improve vector control [1].

VECTOR CONTROL

A. aegypti is the most predominant vector of dengue in India joined by *A. albopictus*. Vector control strategies include a blend of ecological, substance, and organic approaches [24]. Mindfulness working in the network in regard to the source decrease, cleanup, crusades, and procedure of exhausting the man-made holders or arrange them in a methodical or in legitimate way, establishment of safe water spots, and appropriate strong waste management [25].

Substance controls, particularly bug spray, larvicide showering ends up being successful for put away water for residential use, in spite of the utilization of enormous endeavors their viability, have been undermined as a result of conveyance, inclusion and worthiness, expanding levels of opposition, and householders dismissal for the treatment of their drinking water [1].

Network-based methodologies including better control administrations utilizing new instruments and organization techniques, in light of the standards of coordinated vector the executives, instruction of populace in endeavors to diminish rearing locales will bigly affect dengue infection transmission [5,26].

SURVEILLANCE AND RESPONSE

Observation uses both aloof just as dynamic method of gathering information as the laboratories assumes a basic job in recognizing the nearness of infection as well as its serotype and to relate with the clinical ailment and whether the contamination experienced by patients is essential or optional dengue infection [27]. Furthermore, data with respect to the hereditary arrangements of all the four serotypes, both during and between dengue pandemics, would be of significant incentive to figure epidemics [6].

VACCINE DEVELOPMENT

Because of the disappointment of vector control, antibodies think of a biggest trust in the avoidance of proceeding with spread and expanding power of dengue and have restored of intrigue and subsidizing in dengue immunization advancement as setting up a legitimate, protected, compelling and reasonable tetravalent dengue immunization is the most extreme need of worldwide open health [25]. Tetravalent immunizations initiate to give invulnerability against each of the four kinds of serotypes as in a rhesus monkey model; one tetravalent live-lesened antibody gives approval Seroconversion of 100, 100, 90, and 70% against various serotypes of dengue [28]. The most exceptional applicant of immunization at present situation is in live-lesened tetravalent antibody dependent on the illusory yellow fever dengue infection and has advanced up to stage third adequacy studies [29]. The present examination just utilizes the defensive resistance against dengue by the killing antibodies as a significant patron; all things considered that the job of cell insusceptibility should be illuminated further. The number of different antibodies, for example, live-lesened immunization, subunit, deoxyribonucleic corrosive (DNA),

and cleansed inactivated immunization is at the beginning periods of clinical improvement [30].

CONCLUSION

Dengue in India has set up its foundations. At present, it is endemic and nearly hyper endemic in our population. The associations are working with the WHO and national governments to grow new apparatuses and methodologies to improve diagnostics and clinical medicines and to accomplish an effective immunization.

In western and central zone of India, the mortality and dreariness by dengue have extended practically on numerous occasions from 2015 to 2018 while southern zone was for the most part impacted with this contamination in 2017.

AUTHORS' CONTRIBUTIONS

All authors contributed for the preparation of this review and editing of manuscript.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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