

## Original Research Article

# Trend of morbidity and mortality of dengue in Tamil Nadu and Puducherry, South India

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## ABSTRACT

**Background:** Globally, dengue infection is a mosquito borne viral disease accounts for nearly 50 million cases per year. South East Asia (SEA), Western Pacific, Africa, Eastern Mediterranean and Latin America are all endemic for frequent outbreaks of dengue fever. The burden of dengue is 17 times higher in SEA countries as compared to Japanese encephalitis, upper respiratory tract infections and Hepatitis B. Thus a study was planned to assess the trend of morbidity and mortality of dengue for the period of five years from 2012 to 2016 in Puducherry and Tamil Nadu (TN), South India.

**Methods:** The data were sourced from National Health Profile 2017, WHO vector borne disease fact sheets and official website of National Vector Borne Disease Control Program. Analysis of secondary data was done and results were tabulated. Graphs were plotted to study the trend of the disease.

**Results:** There is a fall in the morbidity of Dengue cases whereas increase in the mortality over the period of five years (2012-2016) in Puducherry. In TN, there is a decrease in trend of morbidity over the past five years and mortality since 2015. However, there is a rising trend of disease in India.

**Conclusions:** Considering the above facts there is no doubt that dengue is a public health problem in Puducherry and Tamil Nadu, which needs urgent action to reduce the burden of dengue.

**Keywords:** Dengue, Trend, Secondary data analysis, Morbidity, Mortality

## INTRODUCTION

Dengue infection is one of the rapid spreading mosquitos- borne viral disease in the world which accounts for nearly 50 million cases, annually.<sup>1</sup> The intensity of transmission of dengue virus is fatally high because of global warming, climate change, rapid urbanization, improper sanitation, inadequate public health services and migratory population.<sup>2</sup> South East Asia, Western Pacific, Africa, Eastern Mediterranean and Latin America are all endemic for frequent outbreaks of dengue fever.<sup>3</sup>

There are four serotypes of dengue virus. DENV1, DENV2, DENV3 and DENV4. Dengue is transmitted by bite of an infected (dengue virus- DENV) female Aedes mosquito, occurring commonly in tropical and sub-tropical climates. Climate change also plays a major role in the spread of disease and transmission of virus. As the temperature rises, the development rate of DENV is also accelerated enormously thereby increasing the mosquito biting rate dominated up to a temperature of 40degree C.<sup>4</sup> The dengue fever is the early clinical manifestation. When the patients develops signs of dehydration and bleeding manifestations along with laboratorial changes in platelet counts leads to next stage called dengue

hemorrhagic fever (DHF). Severe DHF is a leading cause of morbidity and mortality among adults and children.<sup>5</sup>

Over the last few decades, epidemiology of dengue has rapidly changed which has led to a dramatic expansion in India.<sup>6</sup> In South East Asia (SEA) there is a substantial economic and disease burden caused by dengue. When compared to Japanese encephalitis, upper respiratory tract infections and hepatitis B, the burden of dengue is 17 times higher.<sup>7</sup> Studies have concluded that the annual cost attributed to treatment of dengue is about \$950 million in SEA.<sup>5,7</sup> Thus the study was planned to assess the trend of morbidity and mortality of dengue for the period of five years from 2012 to 2016 in Tamil Nadu and Puducherry, South India.

## METHODS

A study was planned to assess the trend of dengue morbidity and mortality in Puducherry and Tamil Nadu by analysis of secondary available data from different sources. Puducherry is third most densely populated state/union territories of India. Tamil Nadu covers about 130,060 km<sup>2</sup> in terms of geographical area. Data were obtained as number of cases of dengue and number of deaths due to dengue, every year from 2012 to 2016 in Tamil Nadu and Puducherry.

The Central Bureau of Health Intelligence (CBHI) has been releasing its annual publication "National Health Profile (NHP)" on a regular basis since the calendar year 2005. It brings about substantial health information of vital national significance viz demographic, socio-economic, health status, health finance, health infrastructure and human resources and much more relevant information for an efficient public health system in our country.

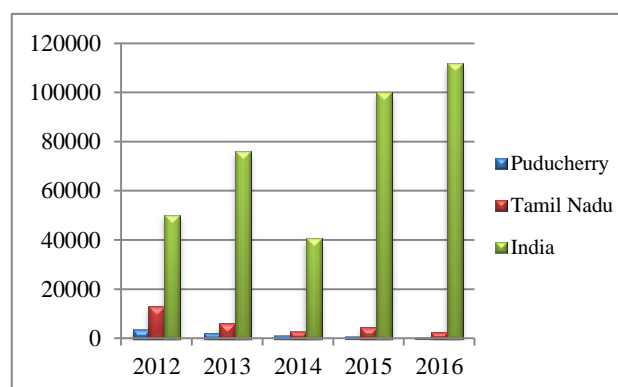
The dengue data were sourced from National Health Profile 2017, certain public statistics databases like WHO vector borne disease fact sheets and National Vector Borne Disease Control Program (NVBDCP), Government of India (GOI) websites.

Then data were compiled, tabulated and secondary data analysis was carried out. The results were plotted in graphs wherever required. Line diagrams and as well as

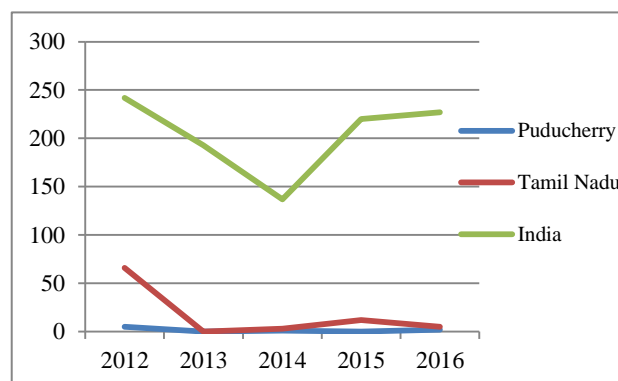
bar diagrams were laid to study the trend of the morbidity in Puducherry, Tamil Nadu and India. Likewise the mortality patterns for the above were also studied.

## RESULTS

In Puducherry and Tamil Nadu, the trends of morbidity have decreased from 3506 to 463 and 12826 to 2531 respectively over the past five years. The mortality trends from 2015 to 2016 have increased to 2 from null in Puducherry whereas decreased from 12 to 5 in Tamil Nadu. However, there is near doubling of cases from 50222 to 111896 (2012 to 2016) and steady rise in the trends of mortality in India from 2014 to 2016.



**Figure 1: Trend of morbidity of dengue in Puducherry and Tamil Nadu, India (2012–2016).**



**Figure 2: Trend of mortality of dengue in Puducherry and Tamil Nadu, India (2012-2016).**

**Table 1: Morbidity and mortality due to dengue in Puducherry and Tamil Nadu, India (2012-2016).**

Region	Year	2012	2013	2014	2015	2016
Puducherry	Number of cases	3506	2215	1322	771	463
	Number of deaths	5	0	1	0	2
Tamil Nadu	Number of cases	12826	6122	2804	4535	2531
	Number of deaths	66	0	3	12	5
India	Number of cases	50222	75808	40571	99913	111896
	Number of deaths	242	193	137	220	227

## DISCUSSION

As per the secondary analysis of the data available on dengue, the dengue cases reported in Puducherry in 2012 was 3506 and later over a period of few years due to increasing awareness and behavior change among the population led to tremendous decrease to 463 cases in 2016, which is approximately 7.5 times less than 2012 data. All the necessary environmental modification made at the right time to cut down the transmission cycle of the dengue virus had reduced the morbidity burden to such a low level.<sup>8</sup> The mortality due to dengue has been quite fluctuating since 2012. In 2013 and 2015 there were no dengue deaths reported, but 2 deaths were recorded in the year of 2016. Puducherry was formed out of four exclaves of former French India namely Pondicherry, Karaikal, Mahe and Yanam. Deaths would have occurred due to unfavorable environmental factors of the other states surrounding the districts of Puducherry which would have contributed to the number of dengue deaths in 2016. However, the individual report from all the 4 districts Puducherry, Karaikal, Mahe and Yanam is unavailable (Table 1).

As far as Tamil Nadu is concerned, the number of dengue cases was declining at a rate of 4.5 from 2012 to 2014. However, there is an approximate two-fold rise in the morbidity in 2015, the most likely cause being the Northeast monsoon in November and December 2015 along the Coromandel Coast region of South Indian states. The heavy rainfall generated by the northeast monsoon resulted in 2015 South Indian floods; worst hit was Chennai city, the capital of Tamil Nadu.<sup>9</sup> This environmental change gave rise a suitable temperature for the breeding of mosquitoes which led to outbreak of vector borne disease; dengue. However in 2016, there is a drastic fall in the morbidity from 4535 to 2531. Likewise during the same year, the mortality numbers are also four time high when compared to previous year in Tamil Nadu (Table 1).

In 2016, West Bengal and Punjab were the major contributors for morbidity of dengue in India nearly 17702 and 10475 cases respectively. This has resulted in 10.6% rise in the total number from 2015 at national level. West Bengal has reported 34 dengue deaths in the same year followed by Maharashtra with a mortality number of 32 cases. West Bengal has the highest incidence of dengue related morbidity and mortality across the country in the year 2016.<sup>10</sup> However Southern states and Union territories like Tamil Nadu and Puducherry, the morbidity and mortality figures are low, comparatively. This reveals the answer to the query for high morbidity and mortality rates due to dengue in India over the period of years, the major contributors from Eastern India.

## CONCLUSION

There is a fall in the morbidity (2012-2016) of dengue cases whereas increase in the mortality (2013-2016) within the period considered for the study (2012-2016) in Puducherry. In Tamil Nadu, there is a decrease in trend of morbidity over the past five years and mortality since 2015. However, from 2012 to 2016, there is an increase in the morbidity of dengue cases and marginal rise in the mortality, nationally.

## Recommendations

Considering the above facts there is no doubt that dengue is a public health problem in Puducherry and Tamil Nadu, which needs urgent action to reduce the burden of dengue morbidity and mortality. In general, the ultimate goal for national surveillance system should be early detection of the dengue outbreak, in fact prediction of dengue. In a dengue endemic country, usage of electronic reporting systems should be made mandatory to government.

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