

## DANGER OF DENGUE IN INDIA: A STATISTICAL OVERVIEW

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Dr. Vandana G. Trivedi\*

### ABSTRACT

*In present era, the world is facing a health crisis. Recently, Covid-19 is detected as a pandemic. Along with this, there are other diseases that cannot be taken lightly. Dengue is one of them. It is a tropical disease that is spread via mosquito. The death rate due to Dengue is very high in India. In this paper, we will discuss about the spread of this disease in India through state-wise statistical data. The paper will also indicate that in which state or Union territory the number of cases of Dengue was high during 2014 to 2018. In which state the death rate is higher during 2014 to 2018 in India. We shall also compare the change in the number of total cases of Dengue during in this time period. It will also inform us that in which region this disease had spread more rapidly. This study indirectly indicates the efforts taken by the state / UT to control the disease.*

**Keywords:** Dengue, Disease, State Wise, Death.

### Introduction

In India, there are many diseases which are spreading speedily. Malaria, chikungunya fever, Dengue, Kala Azar, acute Encephalitis syndrome, Japanese encephalitis, Cholera, acute Diarrheal disease, Typhoid, Respiratory infections, Tetanus, Diphtheria, Whooping Cough, and many more. These diseases are counted as communicable disease in National profile of health report Government of India. Dengue has become a worldwide health problem. The disease is spread through the bite of female Aedes Aegypti mosquito. Normally, it takes about 5 to 6 days to spread the disease in the entire body after the mosquito bite.

Dengue is a communicable disease as it can be spread from an infected person to a non infected person through mosquito bites. Dengue can be divided into two types, Classical Dengue fever (Black bone) and Dengue hemorrhagic fever (DHF). Dengue hemorrhagic fever is dangerous than the other as this disease attacks on everyone irrespectively their age or gender. This is generally spread after rainy season. Since the last two decades, Dengue expanded widely in India. As mentioned earlier, it has become a global health issue now. More than hundred countries have become the victim of Dengue. In India, medical science works for the treatment of this disease. Research is still going on to find out a particular cure to Dengue. The statistical data about cases and death due to Dengue shows that even after so many years, Dengue is still as a danger.

### Objectives

- To examine the state wise spread of Dengue in India.
- To examine the state wise death rate in India.
- To make comparison between states of India.

### Review of Literature

- The research paper entitled "Dengue in India" by Nivedita Gupta, Sakshi shrivastava, Amita Jain, and Umesh Chaturvedi published in The Indian Journal of medical research 136 (3), 373-390, 2012. Explain the, Dengue disease creates highly complex Pathophysiological, economic and ecological problems. In India, many clinical efforts have been taken by the physicians to control Dengue, the paper also discussed about the scientific research and progress to control Dengue.

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\* Assistant Professor in Economics, Gujarat Commerce College, Ahmedabad, Gujarat, India.

- The paper entitled, "India general health risks- Dengue" published in International Association for medical assistance to travelers. Discusses about the cause of Dengue, the risk of Dengue and the symptoms of the disease. It suggests the measures of prevention from the disease.
- The paper by Anita chakravarti, Rohit Arora and christain Luxmberger entitled, "The transaction of the royal society of tropical medicine and hygiene reviewed the epidemiology of Dengue in India", also shows the picture of expansion of Dengue in last 50 years. It discusses about the medical efforts to prevent and control the disease. The paper mainly throws light on the reasons and strategy of the spread of the disease.
- The paper by Atanu Bhattacharji and Dibyojyoti Bhattacharji discusses about state wise ranking on the basis of the performance of the state dealing with death control. In this paper they tried to find out the real burden of the disease on the state via examining the death rate.
- The paper by Swati Sinha and co others entitled, "An Epidemiological study of Dengue and its co infections in Delhi." Explain the epidemiology of Dengue with reference to serological, demographic profile spatio-temporal distribution, vectors, circulating serotypes and co infections.

#### State / UT wise cases and deaths due to Dengue in India, 2014 to 2018 (P)

Sr. No.	State/UT	2014				2015				2016				2017				2018(P)			
		No. of Cases	%	No. of Deaths	%	No. of Cases	%	No. of Deaths	%	No. of Cases	%	No. of Deaths	%	No. of Cases	%	No. of Deaths	%	No. of Cases	%	No. of Deaths	%
1	Andhra Pradesh	1262	3.11	5	3.65	3159	3.16	2	0.91	3417	2.85	2	0.82	4925	2.61	0	0.00	4011	3.96	0	0.00
2	Arunachal Pradesh	27	0.07	0	0.00	1933	1.93	1	0.45	13	0.01	0	0.00	18	0.01	0	0.00	1	0.00	0	0.00
3	Assam	85	0.21	0	0.00	1076	1.08	1	0.45	6157	4.77	4	1.63	5024	2.67	1	0.31	166	0.16	0	0.00
4	Bihar	297	0.73	0	0.00	1771	1.77	0	0.00	1912	1.48	0	0.00	1854	0.98	0	0.00	2142	2.12	0	0.00
5	Chhattisgarh	440	1.08	9	6.57	384	0.38	1	0.45	356	0.28	0	0.00	444	0.24	0	0.00	2674	2.64	10	5.81
6	Goa	168	0.41	1	0.73	293	0.29	0	0.00	150	0.12	0	0.00	235	0.12	0	0.00	335	0.33	1	0.58
7	Gujarat	2320	5.72	3	2.19	5590	5.59	9	4.09	8028	6.22	14	5.71	4753	2.52	6	1.85	7579	7.49	5	2.91
8	Haryana	214	0.53	2	1.46	9921	9.93	13	5.91	2493	1.93	0	0.00	4550	2.42	0	0.00	1898	1.88	0	0.00
9	+Himachal Pradesh	2	0.00	0	0.00	19	0.02	1	0.45	322	0.25	0	0.00	452	0.24	0	0.00	4672	4.62	7	4.07
10	J & K	1	0.00	0	0.00	153	0.15	0	0.00	79	0.06	1	0.41	488	0.26	0	0.00	214	0.21	0	0.00
11	Jharkhand	36	0.09	0	0.00	102	0.10	0	0.00	414	0.32	1	0.41	710	0.38	5	1.54	463	0.46	1	0.58
12	Karnataka	3368	8.28	2	1.46	5077	5.08	9	4.09	6083	4.71	8	3.27	17844	9.47	10	3.08	4427	4.37	4	2.33
13	Kerala	2575	6.35	11	8.03	4075	4.08	25	11.36	7439	5.76	13	5.31	19994	10.61	37	11.38	4083	4.03	32	18.60
14	Madhya Pradesh	2131	5.25	13	9.49	2108	2.11	8	3.64	3150	2.44	12	4.90	2666	1.42	6	1.85	4506	4.45	5	2.91
15	Maharashtra	8573	21.13	54	39.42	4936	4.94	23	10.45	6792	5.26	33	13.47	7829	4.16	65	20.00	11011	10.88	55	31.98
16	Manipur	0	0.00	0	0.00	52	0.05	0	0.00	51	0.04	1	0.41	193	0.10	1	0.31	14	0.01	0	0.00

17	Meghalaya	0	0.00	0	0.00	13	0.01	0	0	0.00	172	0.13	0	0.00	52	0.03	0	0.00	44	0.04	0.00
18	Mizoram	19	0.05	0	0.00	43	0.04	0	0	0.00	580	0.45	0	0.00	136	0.07	0	0.00	68	0.07	0.00
19	Nagaland	0	0.00	0	0.00	21	0.02	1	0.45	142	0.11	0	0.00	357	0.19	0	0.00	369	0.36	0.00	
20	Odisha	6433	15.86	9	6.57	2450	2.45	2	0.91	8380	6.49	11	4.49	4158	2.21	6	1.85	5198	5.14	2.91	
21	Panjab	472	1.16	8	5.84	14128	14.14	18	8.18	10439	8.08	15	6.12	15388	8.17	18	5.54	14980	14.80	5.23	
22	Rajasthan	1243	3.06	7	5.11	4043	4.05	7	3.18	5292	4.10	16	6.53	8427	4.47	14	4.31	9587	9.47	5.81	
23	Sikkim	5	0.01	0	0.00	21	0.02	0	0.00	82	0.06	0	0.00	312	0.17	0	0.00	320	0.32	0.00	
24	Tamil Nadu	2804	6.91	3	2.19	4535	4.54	12	5.45	2531	1.96	5	2.04	23294	12.36	65	20.00	4486	4.43	7.56	
25	Telangana	704	1.74	1	0.73	1831	1.83	2	0.91	4037	3.13	4	1.63	5369	2.85	0	0.00	4592	4.54	1.16	
26	Tripura	6	0.01	0	0.00	40	0.04	0	0.00	102	0.08	0	0.00	127	0.07	0	0.00	100	0.10	0.00	
27	Uttarakhand	106	0.26	0	0.00	1655	1.66	1	0.45	2146	1.66	4	1.63	849	0.45	0	0.00	689	0.68	1.74	
28	Uttar Pradesh	200	0.49	0	0.00	2892	2.89	9	4.09	15033	11.64	42	17.14	3092	1.64	28	8.62	3829	3.78	2.33	
29	West Bengal	3934	9.70	4	2.92	8516	8.52	14	6.36	22865	17.70	45	18.37	37746	20.03	46	14.15	0	0.00	0.00	
30	A&N Island	139	0.34	0	0.00	153	0.15	0	0.00	92	0.07	0	0.00	18	0.01	0	0.00	49	0.05	0.00	
31	Chandigarh	13	0.03	0	0.00	966	0.97	1	0.45	1246	0.96	0	0.00	1125	0.60	0	0.00	301	0.30	0.00	
32	D&N Haveli	641	1.58	1	0.73	1154	1.16	0	0.00	4161	3.22	2	0.82	2064	1.10	0	0.00	483	0.49	0.00	
33	Daman and Diu	46	0.11	0	0.00	165	0.17	0	0.00	89	0.07	0	0.00	59	0.03	0	0.00	163	0.16	0.00	
34	Delhi	895	2.45	3	2.19	15867	15.88	60	27.27	4431	3.43	10	4.08	9271	4.92	10	3.08	7136	7.05	2.33	
35	Lakshadweep	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0.00	
36	Puduchery	1322	3.26	1	0.73	771	0.77	0	0.00	490	0.38	2	0.82	4568	2.42	7	2.15	592	0.59	1.16	
	INDIA	40571		137		99913		220		129166		245		189401		325		101192			

Source: Directorate of National Vector Borne Disease Control Program, Dte. GHS, Ministry of Health and Family Welfare.

Notes: (P) = Provisional

### Data Analysis

During the five years of analysis, the average cases of Dengue were found highest in West Bengal. The cases were gradually increased in West Bengal.

#### 2014

In 2014, the picture was not so bad in West Bengal. The total numbers of Dengue cases were 3934 and the percentage share all over India was 9.70%. In 2014, compared to West Bengal, the situations of a few other states were worse. In 2014, the total numbers of cases were the highest in Maharashtra. The numbers of cases in Maharashtra were 8573, which was almost 21.13 % of total cases all over in India. The death rates due to this disease were very high in Maharashtra and it was 39.42 % of total death in the country.

Odisha stood second in 2014 as the total numbers of cases were 6433 and the percent age share was 15.86 % and the death rate was 6.57 % in Odisha.

In Madhya Pradesh total numbers of cases were 2131 which was 5.25 % of total cases in the country but the death rate was 9.49 % which were very high.

In Kerala the total numbers of cases were 2575 which was 6.35 % of total number of cases in the country but death rate was 8.03 % in all over the country. It is also high.

Karnataka is performing well. The total numbers of cases were 3358 and the percent age share was 8.28 % and the death rate was 1.46 % in all over the country.

The case of Chhattisgarh was totally inversed from that of Karnataka as the total numbers of cases in Chhattisgarh were 440 and the percent age share was 1.08% while the death rate was very high. It was 6.57 % in all over the country.

The situation in Punjab was also likely to be same. The total cases were 472 which was just 1.16 % of total number of cases in the country while the death rate was high it was 5.84 %.

In Tamil Nadu, total cases were 2804 and % share was 6.9, and the death rate was 2.19 % in the state all over the country.

In Gujarat the total numbers of cases were 2320 and the % share was 5.72 while the death rate was 2.19.

During the five year analysis, in 2014, five major states in India where cases and death rates were highest were Maharashtra, Odisha, West Bangal, Karnataka and Tamil Nadu. In these states, numbers of Dengue cases were 8573, 6433, 3934, 3358 and 2804 respectively. It was also respective 21.13%, 15.86%, 9.7%, 8.28% and 6.91% of total cases in India. If we discuss about death due to Dengue in 2014 Maharashtra has total 54 deaths it is equal to 39.42% death in India.

## **2015**

In 2015, cases in West Bengal doubled. The numbers of cases shot up to 8516. It was 8.52 % of total cases in India. Death rate was 6.36 %.

In 2015 Delhi came into highlight with total number of 15867 cases with 15.88 % of total cases of the country and 27.27 % death rate all over the country.

During 2015 there was a good control over the disease spread in Odisha with 2450 cases which was 2.45 % all over the country. Another thing to notice was reduced death rare which was 0.91 % all over the country.

In Punjab the situation was worsening. Total numbers of cases were 14128 which were 14.14 % in the country and death rate was 8.18 % all over the country.

In Karnataka total number of cases increased. They were 5077 which was 5.08 % of the total cases and death rate was 4.09 %.

In Kerala the total numbers of cases were increased and became 4075 with 4.08 % in India. Death rate was 11.36 which are very high.

In Maharashtra total numbers of cases decreased but were still very high with 4936 cases which were 4.94 % of total cases and the death rate were very high it was 10.45 % of total death in the country.

In Gujarat the numbers of cases were 5590 which was 5.59 % of total cases in the country and the death rate was 4.09 %.

## **2016**

In 2016, in Assam, the total numbers of cases were 6157 which was 4.77 % of total cases in the country and the death rate was 1.63 %.

In Gujarat the total numbers of cases were 8028 which was 6.22 % of total cases in the country and death rate was 5.71 % in the country.

In Karnataka total numbers of cases were 6083 which was 4.71 % of total number of cases and death rate was 4.71 %.

In Kerala total number of cases was 7439 which was 5.76 % of total cases and the death rate was 5.31 %.

In Maharashtra total numbers of cases were 6792 which was 5.26 % of total cases and death rate was 13.47 of total death in the country.

In Odisha total numbers of cases were 8380 which was 6.49 % of total cases and death rate was 4.49 % of total death in the country.

In Punjab total numbers of cases were 10439 which were 8.08 % of total cases in the country and the death rate was 6.12 % of total number of death in the country.

In Uttar Pradesh total numbers of cases were 15033 which were 11.64 % of total cases and death rate was 17.14 % of total death in the country.

In West Bengal the total numbers of cases were 22865 which were 17.70 % of total cases in the country and death rate was 18.37 % which is highest among all the states.

The cases in Delhi had decreased compared to 2015.

## 2017

In 2017, in Karnataka there were 17844 cases of the disease which was 9.47 % of total cases in India and death rate was 3.08 % here we can notice that Karnataka has a big jump in the number of cases in compare to 2016. It is also remarkable that in Karnataka, the death rate control was very good.

In Kerala the numbers of cases were 19994 which were 10.61 % of total numbers of cases and death rate was 11.38 %. In compare to 2016, in this state the number of cases doubled.

In Maharashtra total cases were 7829 which was 4.16 %. The total number of cases did not increase much but the death rate was very high in this state. It was 20 % of total deaths due to the disease.

In Punjab the total numbers of cases were 15398 which were 8.17 % of total cases and the death rate was 5.54 %.

In Tamil Nadu total numbers of cases were 23294 which were 12.36 % of India and death rate was 20 % which was very high.

In Uttar Pradesh total numbers of cases were 3092 which was 1.64 % and death rate was 8.62 % all over the country.

In West Bengal total cases were 37746 which were 20.03 % of total cases in the country and death rate was 14.15 % of the total death rate in the country. It shows that the cases are increased in compare of 2016 in this state.

In Delhi total numbers of cases were 9271 which was 4.92 % of total cases in the country and the death rate was 3.08 %.

## 2018

In 2018, total numbers of cases were 7575 in Gujarat which was 7.49 % of total cases in the country and death rate was 2.91 % of the country.

In Maharashtra total number of cases jumped to 11011 which was 10.88 % of total cases in the country and death rate was 31.98 which were very high. Both, the cases and death rate increased in Maharashtra compared to 2017.

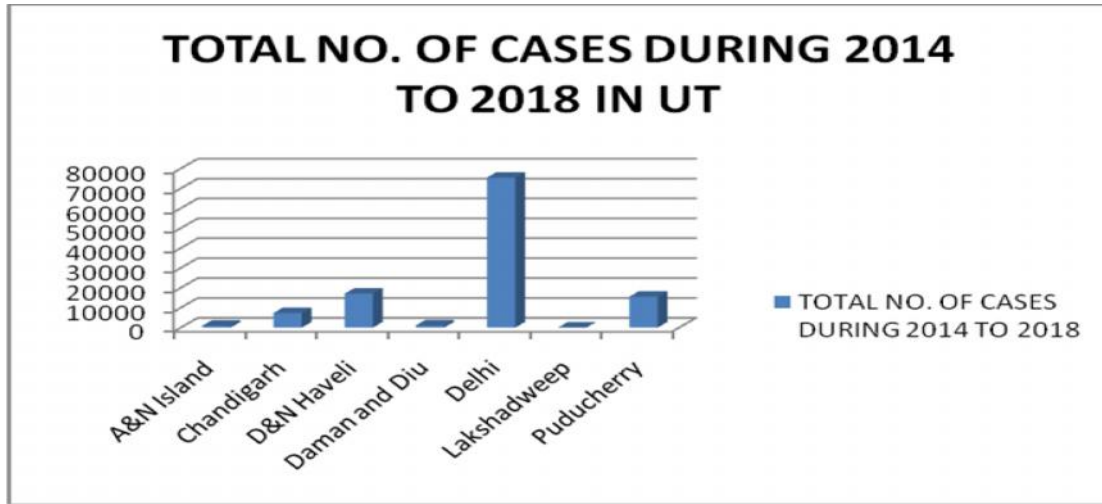
In Punjab total numbers of cases were 14980 in Punjab which was 14.80 % of total cases of the country and death rate was 5.23 % of the country. There is a decrease in both, the total cases and death rate.

In Rajasthan total numbers of cases were 9587 which was 9.47 % of total cases in the country and death rate was 5.81 % of the country.

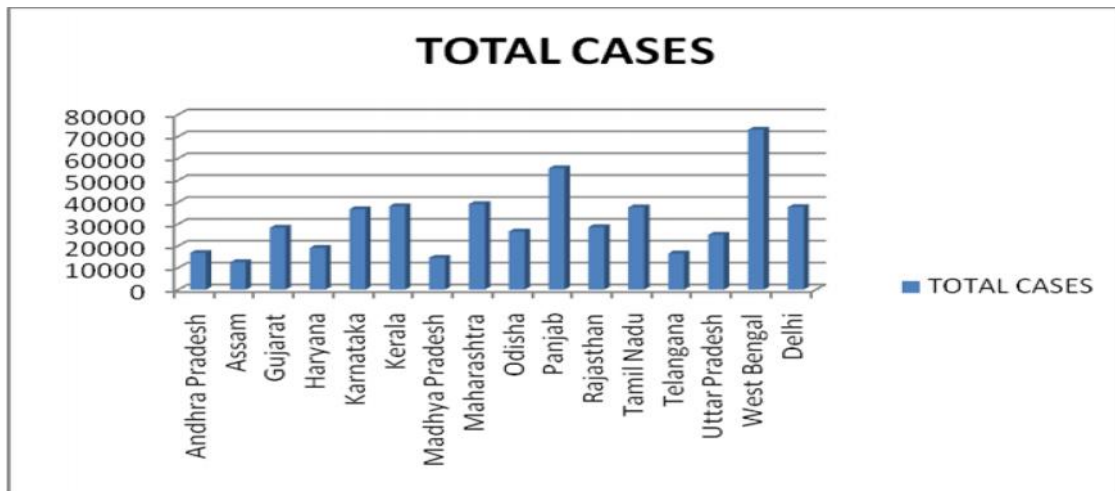
In Delhi total numbers of cases were 7136 which was 7.05 % of total cases and death rate was 2.33 % of India. Compared to 2017, the total number of cases and death rate decreased in Delhi in 2018.

Total number of Dengue cases in Union territory (2014-2018)

Sr. No.	UT	Total No. of Cases during 2014 to 2018
1	A&N Island	902
2	Chandigarh	7302
3	D&N Haveli	17026
4	Daman and Diu	1044
5	Delhi	75400
6	Lakshadweep	0
7	Puducherry	15486



Sr. No.	State	Total No. of Cases during 2014 to 2018
1	Andhra Pradesh	33548
2	Assam	25016
3	Bihar	15952
4	Gujarat	56540
5	Haryana	38152
6	Himachal Pradesh	10934
7	Karnataka	73578
8	Kerala	76332
9	Madhya Pradesh	29122
10	Maharashtra	78282
11	Odisha	53238
12	Panjab	110834
13	Rajasthan	57184
14	Tamil Nadu	75300
15	Telangana	33066
16	Uttarakhand	10890
17	Uttar Pradesh	50092
18	West Bengal	146122



Sr. No.	Year	Total Cases of Dengue in India
1	2014	40571
2	2015	99913
3	2016	129166
4	2017	188401
5	2018(P)	101192

### Conclusion

During the five year of analysis, 16 states exceeded more than 10,000 cases. Highest cases were in West Bengal. There were more than 60,000 during 2014 to 2018. Punjab is on second position, during the time period.

Delhi, Maharashtra, Tamil Nadu, Rajasthan, Uttar Pradesh, Odisha, Kerala, Karnataka, and Gujarat had more than 20,000 cases during the time period.

Haryana, Madhya Pradesh, Telangana had more than 10,000 cases during the time period.

It was remarkable that no cases were registered in Lakshadweep during 2014 to 2018.

There were ups and downs in the number of cases in the most affected states. The major task was to control the death rate and prevent the spread of Dengue. Government is working to control the spread of the disease, but it not enough for the Government to work; the support of people plays an important part too. We should be aware and take precautions to stop the further spread of Dengue.

We must keep our surroundings clean and tidy, nor should we leave stagnant water around our residence. We should light diya with cow ghee and Camphor every evening in our home which stops the entry of mosquitoes in home. We should keep wet garbage separate and should destroy it timely.

In rainy season, the chance of spread of Dengue is higher and we must be more careful during the season. We should wear clothes that can cover our full body. We must close the doors and windows at evening. We should also take responsibility for our society. We must follow the rules of cleanliness.

We should follow the slogan, "*Be Healthy and Make Healthy*". It is very important to control and prevent the disease.

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