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DENGUE OUTBREAKS IN JHARKHAND: RECENT TRENDS (2017-2021)

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ABSTRACT Dengue is a vector-borne disease that is a major public health threat globally. In Jharkhand, dengue remains an important public health issue and outbreaks are not uncommon. **Aim:** To study different demographic variables in the outbreaks of dengue infection in Jharkhand from January 2017 to December 2021. **Methods:** Surveillance data were collected monthly, as a part of the Integrated Disease Surveillance program, India. The clinical definition of cases and outbreak were used for the surveillance rates and outbreaks. Dengue outbreaks were analyzed in different districts of Jharkhand for a period of 4 years (2017 - 2021) and trends were analyzed according to age, sex, residency and seasonality. **Results:** The number of outbreak attacks were 4 outbreaks in 2017, 2 outbreaks in 2018, 5 outbreaks in 2019, no outbreak in 2020 and 1 outbreak in 2021. DUE TO COVID CASES , DATAWAS NOT AVAILABLE FOR 2020. During a four-year period, from January, 2017 to December, 2021, in Jharkhand region we reported 65 positive cases in 2017, 33 cases in 2018, 43 cases in 2019 and 12 cases in 2021. Interestingly, there is a clear seasonal pattern in dengue outbreak occurrence. **Conclusion:** Over the past several decades there have been various outbreaks of dengue in India. An overview of reported outbreaks in Jharkhand state has been presented here . There is an urgent need for the development of vaccine for dengue infection.

KEYWORDS : Dengue; Surveillance; Outbreaks; India, Vaccine, DF(dengue fever)

INTRODUCTION:

Dengue is a vector-borne disease that is a major public health threat globally. It is caused by the dengue virus (DENV, 1–4 serotypes), which is one of the most important arboviruses in tropical andsubtropical regions[1,2]. Upto 75% of DENV infections are subclinical or can cause self-limiting mild dengue fever (DF) whereas the rest could lead to severe life threatening condition described as dengue hemorrhagic fever/dengue shock syndrome (DHF/DSS) which is characterized by capillary leakage resulting in skin and gastrointestinal bleeding. Four DENV serotypes (DENV-1- 4) are currently responsible for dengue viral disease[1,3].

Dengue infections are endemic to Africa, Asia and South America. However, the incidences of dengue infections and outbreaks have gradually increased in Africa and India. In addition, it is difficult to estimate the real burden of dengue disease in India and in other developing or under developed countries due to lack of proper health care infrastructure [4].

The number of dengue cases reported to WHO increased over 8 fold over the last two decades, from 505,430 cases in 2000, to over 2.4 million in 2010, and 5.2 million in 2019. Reported deaths between the year 2000 and 2015 increased from 960 to 4032, affecting mostly younger age group[5].

First outbreak occurred in Calcutta (now Kolkata) in 1963; subsequent outbreaks have been reported in different parts of India[6,7]. Since 1956, four serotypes (one to four) of dengue virus have been reported in various parts of the country[8]. The total number of dengue cases has significantly increased in India since 2001. In the early 2000s, dengue was endemic in a few southern (Maharashtra, Karnataka, Tamil Nadu and Pondicherry) and northern states (Delhi, Rajasthan, Haryana, Punjab and Chandigarh). It has recently spread to many states, including the union territories[9].

The current vector control methods such as larviciding, source reduction and fogging has proved to be less worthy as there is an alarming increase in the population of Aedes albopictus[10].

DF is characterized by flu-like illness with symptoms such as severe headache, pain behind the eyes, muscle and joint pains, nausea, vomiting, swollen glands and rashes, etc. Escalation of symptoms may result in fatal complications from leaking of plasma, fluid accumulation, respiratory distress, severe bleeding and organ failure. Current practices of dengue detection involve virological methods (virus culture and reverse transcriptase-PCR) and serological methods (ELISA for detection of IgM and IgG anti-dengue antibodies). No specific treatment is available for dengue; however the first dengue vaccine (Dengvaxia® – CYD-TDV) has been under controlled trials with limited success[11].

AIM & OBJECTIVE:

Our main objectives of this study were i) To describe the outbreak of Dengue infection in Jharkhand region between 2017 -2021 and study the various demographic variables

METHODS:

Case Definition: For the purpose of this study : A case compatible with clinical description*

*Clinical description: Acute febrile illness of 2-7 days with any one of the following; Nausea, vomiting, rash, headache, retro orbital pain, myalgia or arthralgia.of dengue fever during outbreak[12].

Blood samples received in our laboratory from different districts of Jharkhand through IDSP Programme were tested for IgM by MAC - ELISA for dengue as per the standard protocol.

RESULTS:

Table 1. Number of outbreaks every year

Year	2017	2018	2019	2020	2021
Number of outbreaks	4	2	5	-	1

***IN YEAR 2020 CASES WERE NOT REPORTED DUE TO COVID**

The number of outbreak attacks were 4 outbreaks in 2017, 2 outbreaks in 2018, 5 outbreaks in 2019, no outbreak in 2020 and 1 outbreak in 2021.

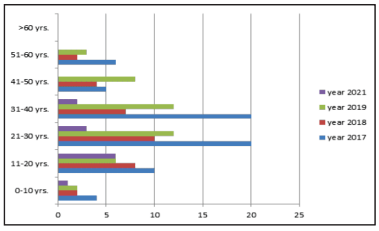
Table 2. Number of positive cases occuring every year during outbreak

Year	2017	2018	2019	2020	2021
Number of cases	65	33	43	-	12

During a four-year period, from January, 2017 to December, 2021, in

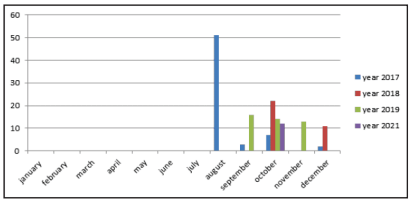
Jharkhand region we reported 65 positive cases in 2017, 33 cases in 2018, 43 cases in 2019 and 12 cases in 2021.

Figure 1 : Distribution of number of cases in different age groups from Year 2017-2021



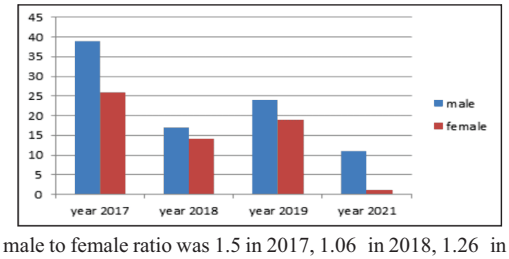
Distribution of cases among different age groups : In 2017, the maximum number of cases occurred in age group of 21-30 years and 31-40 years(20 cases each). This was followed by 11-20 yrs. of age group with 10 cases. In 2018, the maximum number of cases occurred in age group of 21-30 years (10 cases) followed by 11-20 years(8 cases).In 2019, maximum cases occurred in 21-30 years of age group and 31-40 years of age group(12 cases each) . In 2021, maximum cases occurred in 11-20 years of age group (6 cases).

Figure 2 : Distribution of number of cases in different months of Year 2017-2021



Interestingly, there was a clear seasonal pattern in dengue outbreak occurrence. In the year 2017, the peak month of outbreak have been the month of August (51 cases). In 2018, maximum cases occurred in October (22 cases) followed by December (11 cases) . In 2019, it has been September (16 cases), followed by October (14 cases) and November (13 cases). In 2021, all the outbreak cases occurred in the month of October (12 cases).

Figure 3 : Distribution of number of cases among male and female Year 2017-2021



The male to female ratio was 1.5 in 2017, 1.06 in 2018, 1.26 in 2019 and 11 in 2021.

Figure 4 : Distribution of cases among different district of Jharkhand in the Year 2017-2021

Year	Districts	Number of cases
2017	Pakur	3
	West Singhbhum	48
	Bokaro	6
	Sahebganj	8
2018	Godda	11
	Sahebganj	22
2019	East Singhbhum	9
	Bokaro	7
	Sahebganj	8
	Godda	10
	Deoghar	9
2021	Garhwa	12

In 2017 maximum number of cases were from West Singhbhum, in 2018 from Sahebganj district, in 2019 from Godda district and in 2021 from Garhwa district of Jharkhand.

DISCUSSION:

Dengue is emerging as a major public health problem in India.In the present study, we reported about the ongoing outbreaks in the state of Jharkhand, during a four year passive surveillance study period (2017-2021). During a four-year period, from January, 2017 to December, 2021, in Jharkhand region we reported 65 positive cases in 2017, 33 cases in 2018, 43 cases in 2019 and 12 cases in 2021.

Distribution of cases among different age groups : In 2017, the maximum number of cases occurred in age group of 21-30 years and 31-40 years(20 cases each). This was followed by 11-20 yrs. of age group with 10 cases. In 2018, the maximum number of cases occurred in age group of 21-30 years (10 cases) followed by 11-20 years(8 cases).In 2019, maximum cases occurred in 21-30 years of age group and 31-40 years of age group(12 cases each) . In 2021, maximum cases occurred in 11-20 years of age group (6 cases). The male to female ratio was 1.5 in 2017, 1.06 in 2018, 1.26 in 2019 and 11 in 2021.

Gupta et al.[13] and Chakravarti and Kumaria[14] also reported maximum cases in the age group 21–30 years with male preponderance. Sarkar et al.[15], however, reported maximum cases in the age group 0–10 years with female preponderance. Garg et al.[16] and Vijay Kumar et al.[17] also reported higher incidence in children. Ukey et at have reported a male: female ratio of 2.15:1.[18]

Interestingly, there was a clear seasonal pattern in dengue outbreak occurrence. In the year 2017, the peak month of outbreak have been the month of August (51 cases). In 2018, maximum cases occurred in October (22 cases) followed by December (11 cases) . In 2019, it has been September (16 cases), followed by October (14 cases) and November (13 cases). In 2021, all the outbreak cases occurred in the month of October (12 cases). The majority of the cases were reported during the monsoon and postmonsoon seasons, in accordance with the reported patterns of dengue transmission[19].

CONCLUSION:

There are lack of implementation of prevention and control strategy . The outbreaks in our country India, including Jharkhand state have to be studied scientifically so that we can handle the burden of dengue infection in a better way. The spread and transmission can be controlled through implementation of vector control measures . Currently there are no drugs or vaccine present for this disease.

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