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Study On Trends Of Dengue Cases And Effects Of Papaya Extract In Treatment Of Dengue Fever

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Abstract

Dengue is a viral disease that today affects a high number of people in comparison to other Arboviral diseases reported in India. The Ranchi district of Jharkhand reports sporadic cases of dengue since 2006 followed by an outbreak of dengue in localized area in the months of August to November from year 2017 to 2019 & 2021 to 2022. In the past few years, cases of dengue are often reported in large numbers which increased the probability of any outbreak of dengue in the district. In most of the cases of dengue infection, patients are treated symptomatically. No any proven and specific antiviral drug is available to treat Dengue. In the absence of an effective antiviral drug to treat the disease, various treatments are being investigated. Studies have indicated that the juice of the leaves of the Carica papaya plant from the family Caricaceae could help to increase the platelet levels in dengue patients. The research was done on reported and admitted cases of Dengue. Several studies have been conducted previously by many researchers although these literature lack adequate information, some of the studies do raise the possibility that this treatment could be an important option in the future. Further large-scale studies could establish the usefulness or ineffectiveness of this natural product in the treatment of dengue.

Keywords: Carica papaya leaves, Dengue, Dengue treatment, Antiviral drugs

Introduction

Dengue Fever (DF), an outbreak prone viral disease, transmitted by Aedes mosquitoes. DF is characterized by fever, headache, muscle and joint pains, rash, nausea and vomiting. The agent, i.e. dengue virus is categorized under the genus Flavivirus. The virus contains single stranded RNA and is small in size (50nm). There are four dengue virus serotypes which are designated as DENV-1, DENV-2, DENV-3 and DENV-4. Infection is caused by any one of four closely related dengue viruses [2,4] which can lead to a wide spectrum of symptoms, including some which are extremely mild to those that may require medical intervention and hospitalization. In severe cases, fatalities can occur. There is no treatment for the infection itself hence the symptomatic treatment is being given to the patient. A normal human being has a platelet count between 1.5 lakhs and 4 lakhs. But individuals with dengue fever can experience a drastic fall in platelet count to around twenty to forty thousand.

Carica papaya is the only genus in the family *Caricacea.* Plants which are used for medicinal purposes are generally cheap and are best sources of pharmacologically active substances and are good resistance to bacterial activity [10]. Whole *C. papaya* i.e. its fruits, seeds, bark and leaves are used for treatment and curing many disease. Much work and literature have been published related to papaya fruits and seeds. The edible portion of the fruit of *C. papaya* contains both macro and micro minerals like Na, K, Ca, Mg, Fe, Cu, Zn and Mn [11]. The plant is a source of carotenoides, vitamin C, thiamine, riboflavin, niacin, vitamin B6 and vitamin K.

Leaf extract of *C. papaya* is well known as an anti-tumor agent [12]. The leaves of papaya have been shown to contain many active components that can increase the total antioxidant power in blood and reduce lipid peroxidation level, such as papain, chymopapain, cystatin, tocopherol, ascorbic acid, flavonoids, cyanogenic glucosides and glucosinolates.

Jharkhand state reported the first dengue outbreak in 2006 [7]. Since, the year 2013 epidemics of dengue in Ranchi have reported more frequently. In the present study, increasing trend in cases of Dengue have seen in Ranchi district in the past few years data reported from the year 2017 to 2022.

Reports on different parts of C. papaya have been published, but still a comparative study is to be needed to study the effects on various types of viral infections. The observation on trends of Dengue and analysis of Positivity Rate, Age-wise distribution & occurrence of the cases through laboratory surveillance based on three years data analysis has been discussed in this paper. Also effects of oral intake of papaya leaf extract in the treatment of the positive Dengue patients were observed in this study.

Materials and methods -

Laboratory methods- Serum was separated from blood samples and tested for anti-DENV immunoglobulin M (IgM) antibodies using an IgM capture enzyme-linked immunosorbent assay

(ELISA) kits. Test was strictly performed as per the protocol supplied with the kits manufacturer. Confirmed DENV infection was defined as a positive anti-DENV IgM ELISA result.

Climate Data - Locally collected temperature and rainfall were used to calculate the average

monthly rainfall and the average daily minimum temperature for the study period.

Preparation of C. papaya leaf extract – Fresh C.papaya leaves were collected. Leaves were washed and the stem was removed. Leaves were blended without adding water or any liquid. Finally pure extract filtered from the mixture and stored at 4 °C until use.

Analysis of Data – Line list of all suspect febrile outpatients and inpatients of any age and gender enrolled from January'2017 through December'2019 & from January'2021 through December'2022 were made. As COVID pandemics was occurred in year 2020 and hence no any patient other than COVID suspect has visited the health facility. Therefore no any Dengue suspect was reported in such period. So, this research exclude the year 2020.

For each enrollee, a standardized clinical history and provisional clinical diagnosis were recorded. Before the initiation of antimicrobial therapy, blood samples were collected for performing ELISA test. Total 25 Dengue tested positive patients reported in the month of July'2022 were selected to analyze the effects of Papaya extracts in the treatment of Dengue fever. Pure extract of C. papaya leaves is given to 10 patients of Dengue tested positive out of 25 patients and comparative analysis is done. Time – Trend analysis were used to observe the recent disease burden . Incidence rate & Positivity rates were analyzed to see the trends and the extent of spread of the dengue.

Result and Discussion -

There were 928, 3153 , 1594 , 1175 & 2270 patients in the Year 2017, 2018, 2019, 2021 & 2022 respectively found clinically suspected for Dengue and tested for IgM ELISA. In the year 2017, out of 928 samples tested 225 samples found positive for IgM ELISA in which maximum cases were reported in the month of November (Fig. 1). In the year 2018, out of 3153 samples tested 343 samples found positive for IgM ELISA in which cases were reported from the month of August to November (Fig.2). In the year 2019, out of 1594 tested samples 364 samples found IgM ELISA positive with throughout the year sporadic cases and maximum

occurrence in the months of September and October (Fig.3). In the year 2021, after the COVID pandemic, lesser number of patients had visited the health facility. Hence, out of 1175 samples tested 196 samples found positive for IgM ELISA in which maximum cases were reported in the month of August to October (Fig. 4). In the year 2022, out of 2270 tested samples 280 samples found IgM ELISA positive with throughout the year sporadic cases and maximum occurrence in the months of October and November (Fig.5). Study Analysis of Dengue cases showed the increasing trend in the three years with a peak of cases reported from the months of August to October and after the COVID pandemic , in the Year 2021 to Year 2022 also seen the increasing trend with the maximum occurrence in the months between September to November(Fig.6). Most affected age group reported is the persons age from 21-30 years with the percentage of 42.6%, 35.8% ,40.3% , 22.9% & 21.4% in the year 2017, 2018, 2019.2021 & 2022 respectively(Table1 & Fig. 7).

Study showed the Positivity Rate of 24.2% in year 2017, 10.9% in year 2018, 22.8% in the year 2019, 16.7% in year 2021 and 12.3% in the year 2022. Pure extract of C. papaya leaves is given to 10 patients of Dengue tested positive out of 25 patients and comparative analysis is done(Fig.8). Significant increase in platelet count were observed in the 8 patient among 10 that suggests that the C. papaya leaf extract can boost the production of platelets faster than the patients not given the leaf extract and were only treated through medicines.

Figure 1 Monthwise cases of Dengue reported in Year-2017

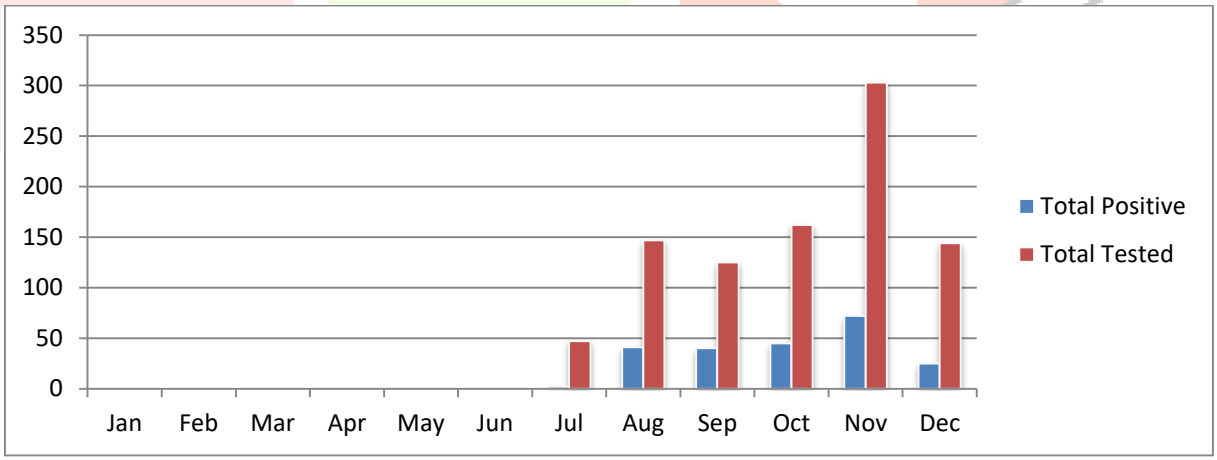


Figure 2 Monthwise cases of Dengue reported in Year-2018

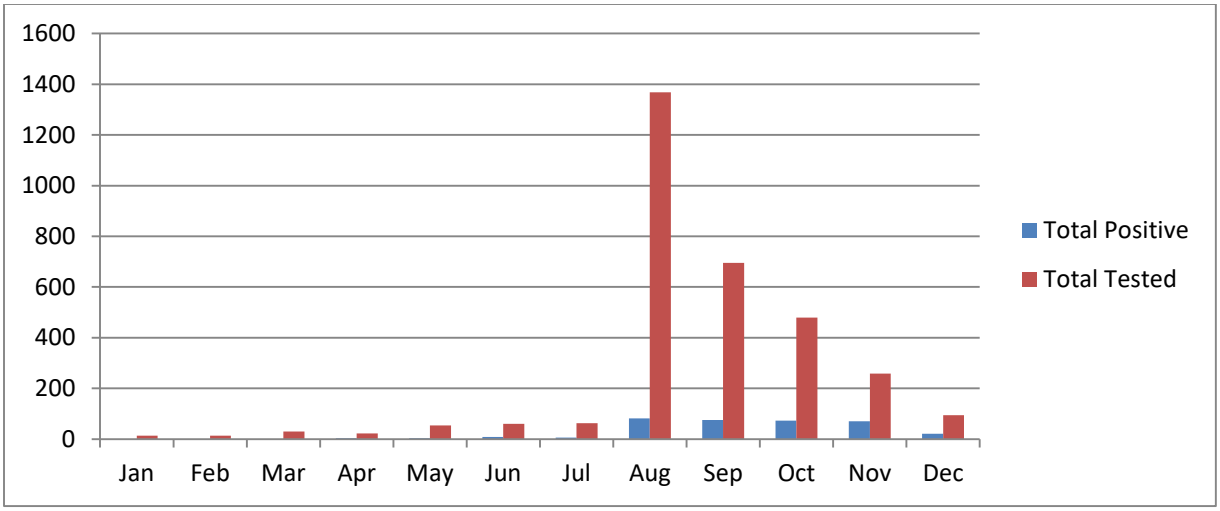


Figure 3 Monthwise cases of Dengue reported in Year-2019

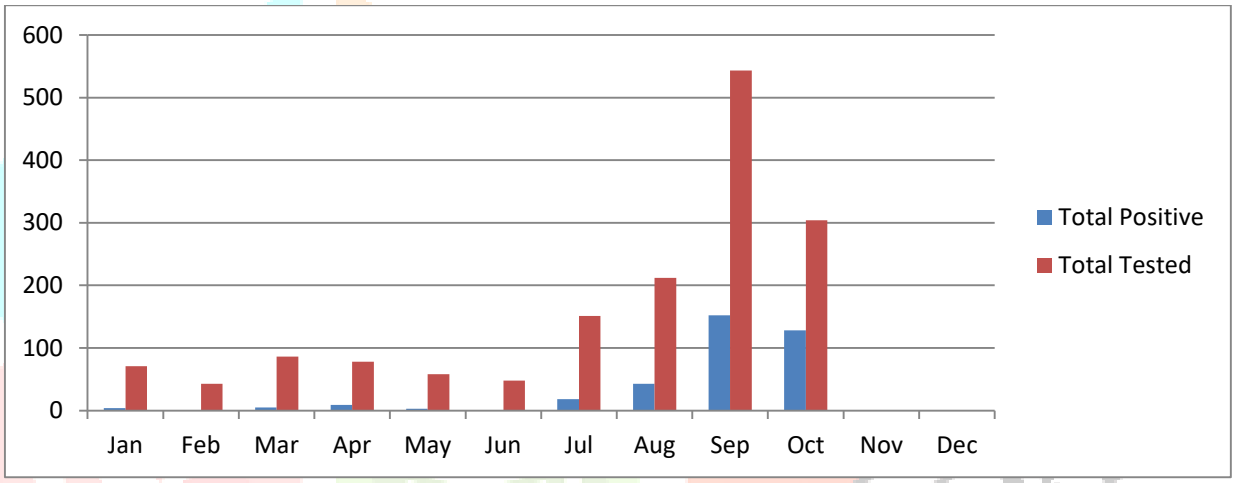


Figure 4 Monthwise cases of Dengue reported in Year-2021

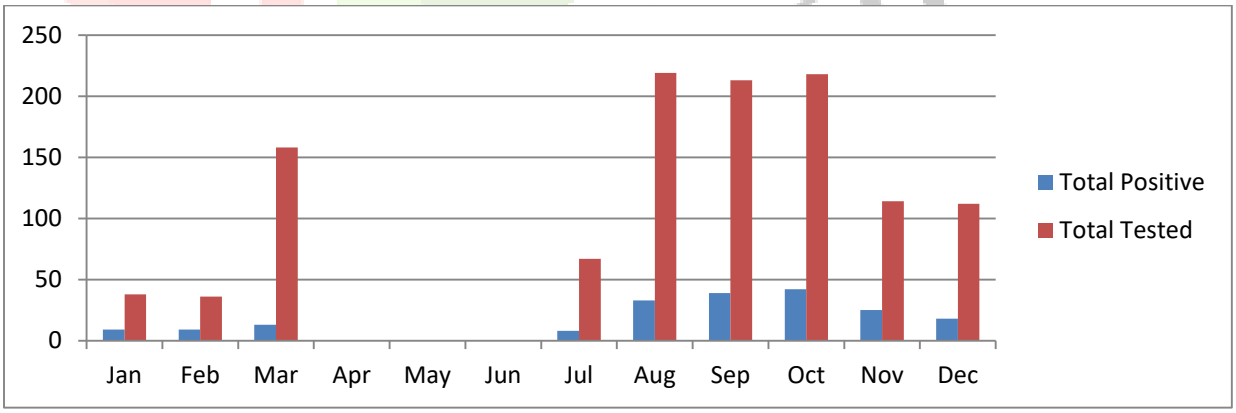


Figure 5 Monthwise cases of Dengue reported in Year-2022

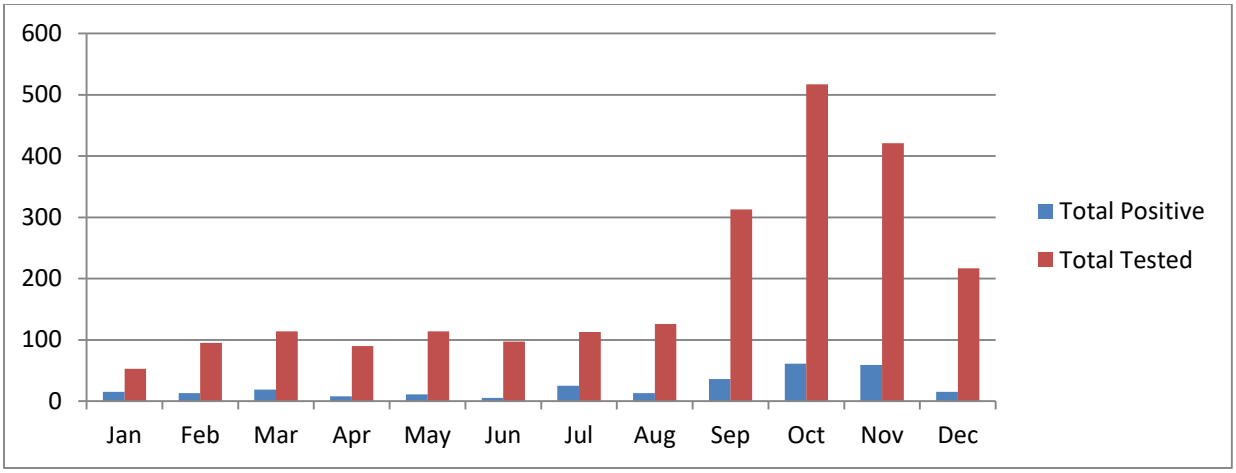


Figure 6 Trend of Dengue disease reported from Year 2017-2022 in Ranchi

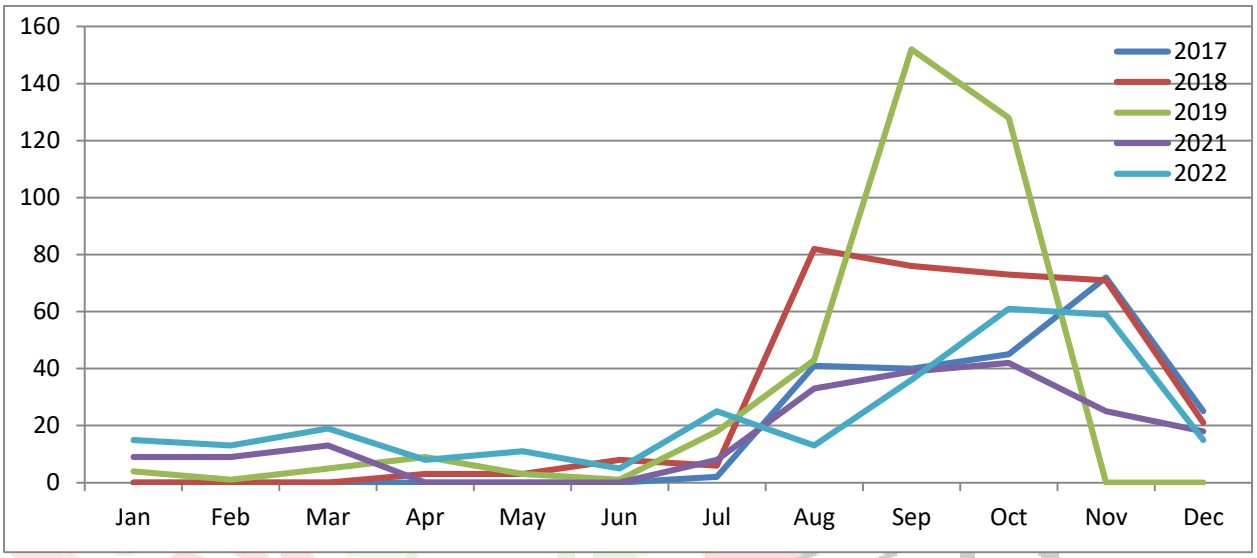


Table-1 Year-wise Age distribution of Dengue Cases

Age-Group	Year-2017	Year-2018	Year-2019	Year-2021	Year-2022
0-10 yrs	6	17	12	32	30
11-20 yrs	46	73	75	44	58
21-30 yrs	96	123	147	45	60
31-40 yrs	50	72	65	32	46
41-50 yrs	16	36	35	22	36
51- 60 yrs	10	18	20	12	34
Above 60 yrs	1	4	10	9	16
Total	**225**	**343**	**364**	**196**	**280**

Fig.7 Graphical representation of Age wise distribution of Dengue cases

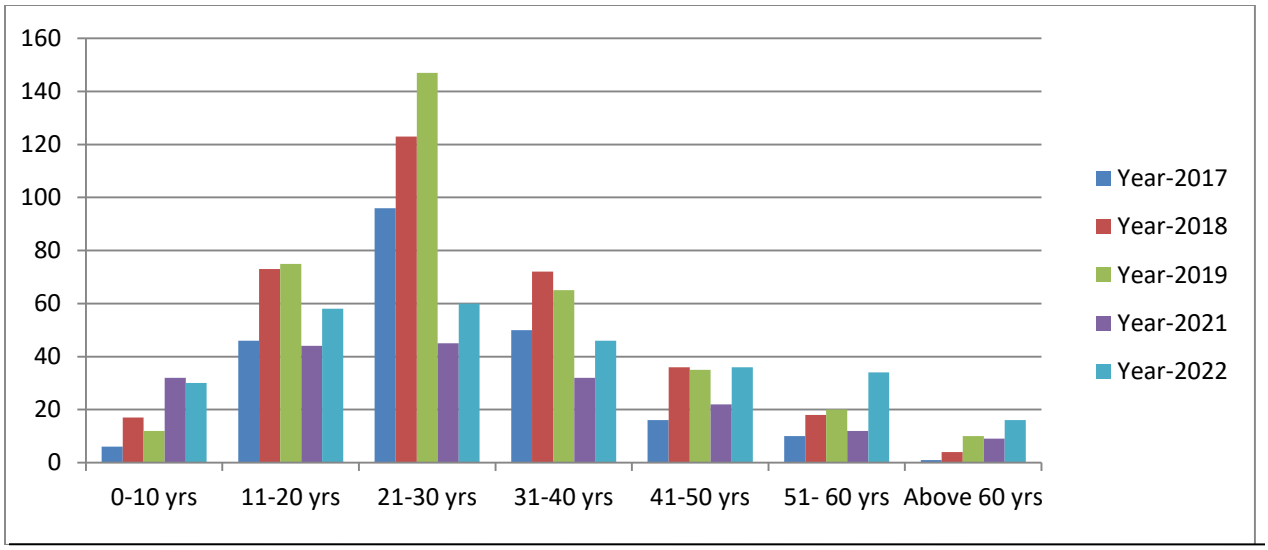
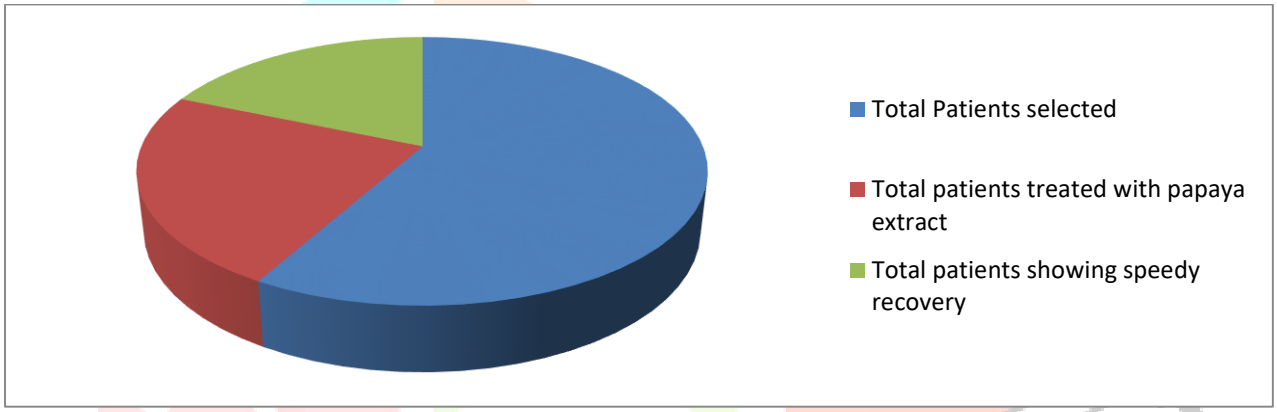


Fig. 8 Percentage of Effects of Papaya extracts in Dengue patients



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