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Post Monsoon Rise in Incidence of Dengue Viral Infections among Patients Admitted at a Tertiary Care Center during the year 2018-2019: A Prospective Study

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Abstract **Original Research Article**

Purpose: This study was done to find out relationship of dengue infection with climatic factors &clinical status of the patients who were serologically positive for dengue and their clinical outcome during the year 2018-2019 from March2018 to October2019. Dengue is endemic all over India. Confirmation of Dengue viral infection is the most important & essential prerequisite for managing complications associated with dengue viral infection. Infection with the DENV serotypes may be asymptomatic in majority of cases or may result in wide spectrum of clinical symptoms ranging from mild flu like syndrome to complications such as coagulopathy, increased vascular permeability & fragility. ***Materials and Methods:*** Serum samples were collected from 1600 patients presenting, with febrile illness clinically consistent with dengue infection. Serological confirmation of dengue infection was done using IgM ELISA dengue NIV pune kit &NS1 Ag detection by ELISA. ***Results*:** Out of 1600samples, 356 were confirmed serologically positive, of which 219 were IgM positive and 137 were NS1 antigen positive. Large proportions were adult Males. Outbreak coincided with post monsoon period. Among 300 positive patients all presented with fever but duration of less than 5 days were 137 (45.6%) rest had fever more than 5 days , fever with rash were 152(50.6%) & fever with thrombocytopenia were257(85.6%) &on discharge platelet count reverted to normal 263(87.6%) cases and some cases were referred to higher center for further management of DHS&DSS. ***Cocnclusion*:** This study highlighted climatic factors as major criteria responsible for viral infection & some important information in clinical & laboratory data that can be used for early prediction of on coming dengue fevers, early diagnosis & subsequently for appropriate treatment of dengue fevers and preventive measures.

Keywords: DENV, DHS, DSS, IgM ELISA, NS1 Ag.

INTRODUCTION

Dengue viral infection has emerged as a notifiable public health issue in recent decades as it has become leading cause of morbidity and mortality in India [1]. According to WHO Dengue is considered as fastest spreading tropical disease and represents a pandemic threat [5].

Dengue virus (DENV) infection has become a global threat, affecting atleast 3.6 billion people living in more than 125 countries in tropical and subtropical areas.it isone of the most common arthropod borne diseases seen now a days [2] 52% of the global population are at risk of contracting dengue fever and dengue hemorrhagic fever (DHF) belong to South east Asian countries [3].

Growing population and urbanization along with changing climate has significantly contributed for increased number of cases in India [5].

Ecological and Climatic factors mainly influence the seasonal prevalence of the vector i.e Aedes aegypti and Aedes albopticus, epidemics mostly occur during warm, humid and rainy seasons, which is considered as breeding phase for mosquitoes [3].

Temperature and Precipitation are considered as important factors for disease transmission dynamics [7].

Dengue virual infection is mainly caused by 4 serotypes (DENV1-4) It is a single stranded, positive

sense RNA enveloped virus belonging to genus Flavivirus and Flaviviridae family [4].

Infection with Dengue virus can cause spectrum of illness ranging from nil symptoms to life threatening complications like DHF/DSS, Dengue hemmorhagic fever and Dengue shock syndrome characteristic clinical features include fever, headache, nausea, vomiting, rash, myalgia [4].

Accurate diagnosis is most important for prompt treatment and also for surveillance activities, outbreak control, pathogenesis and academic purpose, vaccine development and clinical trials, Laboratory diagnostic techniques include detection of virus, viral nucleic acid, antigens or antibodies or combination of all [6].

The present study was conducted to show the association of climatic factors with dengue viral infection during an outbreak in the year 2018-2019 at a tertiary care center.

MATERIALS AND METHODS

Study design, Population and sample size

It is a Cross sectional study conducted over a period of 2 years during recent dengue outbreak in Hyderabad at a tertiary care center.

The study population comprised of all age groups attending the outpatients and inpatients departments of Sir Ronald Ross Institute of tropical and communicable diseases in the year 2018-2019

Blood samples were collected from 1120 patients who were clinically suspected with dengue viral infection and selection was done based on inclusion and exclusion criteria.

Inclusion Criteria

All clinically suspected dengue viral infection cases were included in the study according to WHO criteria

Exclusion Criteria

Patients with history of fever of unknown origin for prolonged duration and any other proven febrile illness were excluded from the study.

Hb%, Total count, Differential count, Platelet count, were also documented in the study.

Sample Collection: The Blood sample which was collected and allowed to clot at Room temperature (20^0C-25 ^{0}C) and then serum separated by centrifugation at 3000rpm for 10 mins and aliquoted and stored at -80^0C until further tested.

PanBio Dengue Early Enzyme linked immunosorbent assay (ELISA) kit (Standard Diagnostics Inc, Republic Korea) for NS1 Ag detection and IgM Capture ELISA kit supplied by National Institute of Virology, Pune were used and test was performed as per manufacturers instructions.

RESULTS

A total of 1600 samples with suggestive clinical features over a period of 2 years were included in the present study, Out of which 356 (22.25%)were seropositive of dengue with classical dengue fever. IgM was found to be 219(61.5%) and NS1 Ag was 137(38.48%) In the present study male preponderance was observed with males 942 (58.8%) and females were 658(41.1%), Male to Female ratio was 1.4:1 ,Maximum number of positive cases were reported in the post monsoon season, The predominant age group affected were in between 21 -30 yrs, Fever being the most common presentation followed by headache, myalgia and rash.

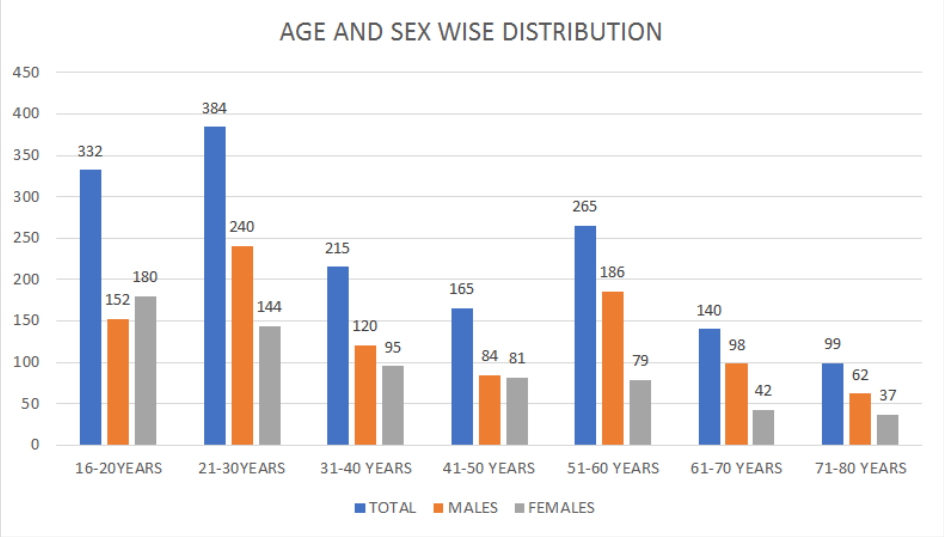

Chart-1: Gender Wise Distribution

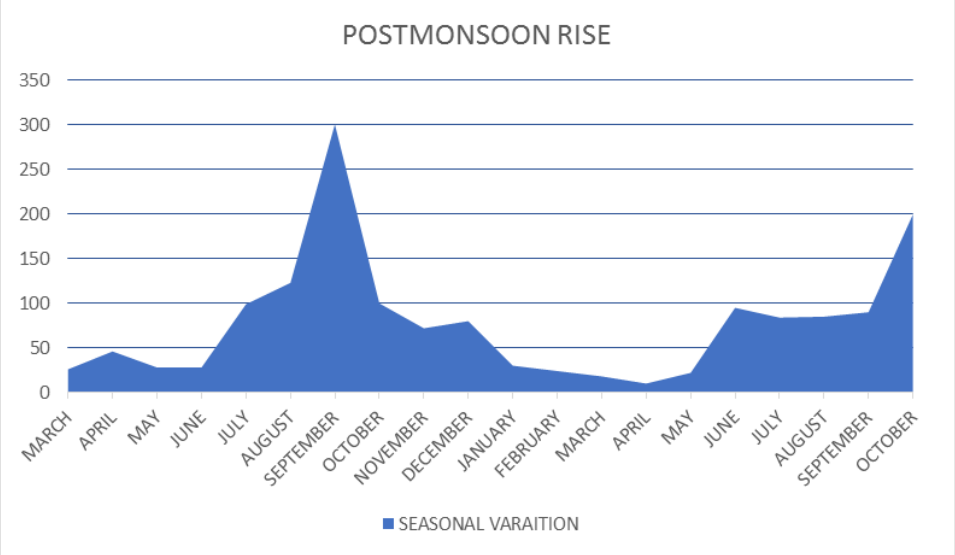

Chart-2: Seasonal Variation

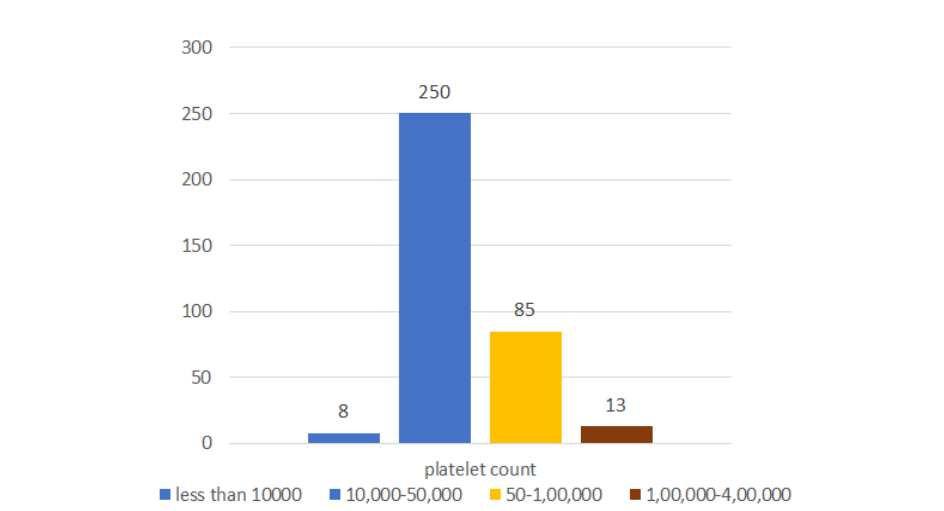

Chart-3: Platelet Count

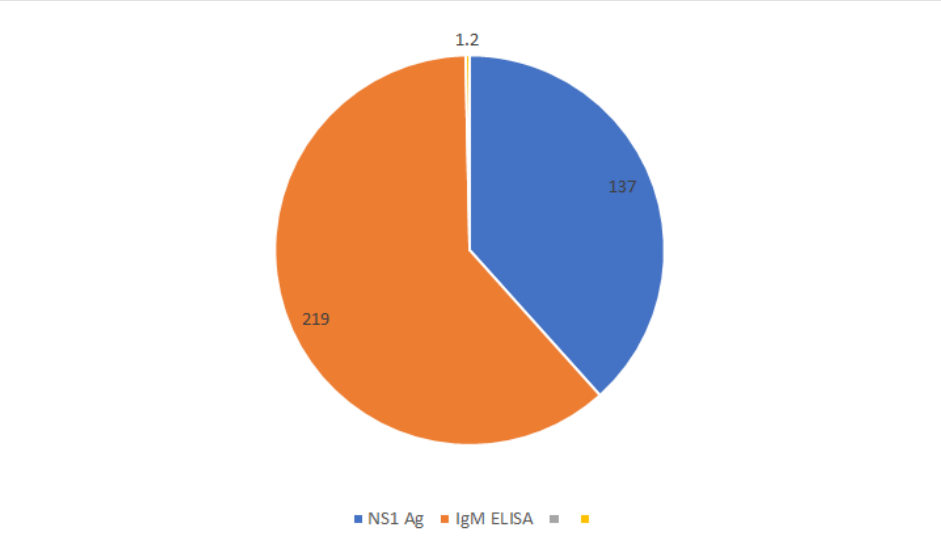

Chart-4: Seropositivity with Elisa for Dengue

DISCUSSION

Incidence of dengue viral infection is mainly associated with the climatic conditions. Dengue is considered one of the major re-emerging viral infections to date; Major factors which contribute to the rapid spread of dengue viral infections are urbanization, transport development, changing habitats, and improper water storage practices, which facilitate breeding of Aedes aegypti mosquitos [8]. Dengue was thought to be a pediatric disease in south east Asian countries, However in recent years increasing trend of dengue viral infection was observed in adults; which was similar to the present study and Anita Chakravarti *et al*., [3], Sing-Sim *et al*., [9] and Prakash *et al*., [10].

In the present study maximum number of cases were reported among 21-30 yrs age group wich was similarly seen in study done by Ashwini Kumar *et al*., [11], P. M. Ukey *et al*., [1], Bhaswati *et al*., [12]; Median age group was 25 years in the study done by Manoj Murhekar *et al*., [13].

Males are more commonly affected than females in the present study which was comparable with Bhaswati *et al*., [12], Prakash *et al*., [10], S. L. Annaporna *et al*., [14], Manoj Murhekar *et al*., [13].

Post monsoon rise in dengue viral infections was seen in the present study which was compared to Anita Chakravarti *et al*., [3], Prafulla Dutta *et al*., [4] and Bhaswati *et al*., [12], Prakash *et al*., [10] and S. L. Annapoorna *et al*., [14], Manoj Murhekar *et al*., [13].

Fever is most common clinical feature seen in all the suspected patientsfollowed by headache, retroorbital pain myalgia and rash which was also seen in Ashwini Kumar *et al.*, [15], Siraj A. Khan *et al*., [5], Among the laboratory parameters platelet count was low in many patients also seen in Avinash Kumar *et al.*, (2017) and Taruni *et al.*, (2017)

On comparison of both the ELISA tests maximum number of seropositivity was seen in IgM ELISA test when compared to NS1 Ag ELISA test which was also seen in study done by Bhaswathi *et al*., [12] and Om Prakash *et al*., [10].

On the whole the seropositivity of dengue in the present study was 22.25% which correlated with Bhaswati *et al*., [12] (25.6%) and Chakravarti *et al*., [3] (31.1%) and Patankar *et al.*, (21%)

Simple source reduction methods through community efforts and awareness campaigns may help in effective elimination of vector population and further control of the disease [16].

Illiterate people are not usally aware of the transmission of dengue, Information, Education and Communication (IEC) Activities/Awareness campaigns are needed to motivate the local illiterate population of high risk areas to take protective measures against further transmission of the disease [16].

CONCLUSION

This study has provided major insights into the incidence and epidemiology of dengue viral infection in Hyderabad mainly during Post monsoon season, and also dengue surveillance and control should be enhanced by wider use of laboratory testing to confirm dengue especially during the local dengue transmission season. Control of the source is one of the major key for combating dengue fever and it requires active participation from all the sectors of the community and detailed studies are required in future to use climatic variables to predict any disease outbreak well in advance.

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