Original Research Article

Clinico-epidemiological profile of paediatric dengue patients in a tertiary care hospital: a retrospective study in Visakhapatnam, Andhra Pradesh, India

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ABSTRACT

Background: Dengue is a mosquito borne viral disease in the world with unpredictable clinical course and outcome. Though it is self-limiting in most of patients, the dengue hemorrhagic stage and dengue shock syndrome are life threatening.

Methods: It is a retrospective cross-sectional observational record-based study conducted in King George Hospital in Andhra Medical College, Visakhapatnam, AP, India. Upon clinical suspicion, Dengue fever was confirmed by NS 1 antigen and/or Dengue antibody IgM, IgG in KGH laboratory in patients who were admitted in the hospital data was collected from records after ethical committee approval. Data of pediatric dengue positive cases in the age group ranging between 0-14 years from January 2018 - November 2018 were reviewed.

Results: In this study the highest percentage of age group was found between 0-5 years. Fever was present in 100% cases, abdominal pain in 47% cases, rash, nausea/vomiting were found in 37%, headache in 12.35%, myalgia/ arthralgia or backache in 13.48%, retro orbital pain in <1% cases. Dengue fever (DF) was found in 46 % cases, dengue hemorrhagic fever (DHF) in 50% and dengue shock syndrome (DSS) in 3.9 cases.

Conclusions: The study found among these 50% developed DHF and 46% DF and 3.9% DSS. Early admissions of pediatric cases can prevent major complications like DHF and DSS. The predominant complaints found were fever, vomiting and abdominal pain in paediatric group.

Keywords: Dengue Fever, Dengue hemorrhagic fever, Dengue shock syndrome

INTRODUCTION

Dengue viruses are arbo viruses capable of causing disease in Humans.[1] Dengue is most rapidly spreading mosquito borne viral disease worldwide with unpredictable clinical course and outcome. Though it is self-limiting in most of the patients the dengue haemorrhagic stage and dengue shock syndrome are life threatening requiring expert medical services. Globally every year there is an incidence of 390 million dengue infections in which 96 million (67-136) manifest clinically. The number of cases reported worldwide has increased from 2.2 million in 2010 to 3.2 million in 2015[2]. In India 6 million cases were reported from 2006 to 2012. 190,000 cases (NVBCDP data) have been reported with 40% burden from southern states and 60% from north-eastern states. In AP Dengue cases increased from 910 in 2013. Total dengue fever (DF) cases in the year 2017 were 15,799 with highest number of case reports from Kerala, Tamil Nadu and west Bengal. In Andhra Pradesh in 2018 as per national health profile there were 4844 number of cases and 253 deaths due to dengue. Vishakhapatnam city has a tropical climate with more rain fall during summer, there is a gradual increase

in the incidence of Dengue from 159 positive cases from 2013 to 983 cases in 2017 (IDSP Nodal Centre KGH). In King George Hospital in 2018, 1446 positive cases were found following 6494 suspected tested cases (IDSP Nodal Centre KGH). In Vishakhapatnam there has been a steady increase in the number of dengue cases. The cases peaked in the year 2018 with 2414 cases in KGH. As KGH is a tertiary care hospital there used to be more referral cases.

Greater Vishakhapatnam Municipal Corporation also recorded 1464 cases in the year 2017. In the vector borne diseases dengue was the most common. In India, Dengue is a notifiable disease in 14 states and is endemic in 29 states. According to the annual report of the Department of Health and Family Welfare 2017, total Dengue cases in

India in 2017 were 15,7996 with maximum cases reported from Kerala, Tamil Nadu and West Bengal and in Andhra Pradesh. There is gradual increase in incidence from 2012 onwards with 159 positive cases in 2013, 983 cases in 2017 and total of 4844 were recorded as per NHP 2018 in A.P. In Visakhapatnam at Integrated Disease Surveillance Program (IDSP) Nodal centre in King George hospital, 1446 positive cases were found following 6494 tested cases highest in 2018. The objective of the study was to study the epidemiological profile and to analyse the variation in clinical spectrum, outcome and possible risk factors for fatality among Dengue infected children.

METHODS

The study is a retrospective record-based study conducted in King George hospital. Upon clinical suspicion Dengue was confirmed by NS 1 antigen and/or Dengue antibodies like IgM and IgG in KGH laboratory. All admitted patients were treated and discharged. This Data was collected from hospital records with prior permission from hospital authorities and only records of paediatric dengue positive cases from KGH in age group 0-14 years from Jan-Nov 2018 were reviewed. Objective of the study is to determine the epidemiological profile and clinical presentation and outcome of paediatric dengue cases admitted in a tertiary care hospital (KGH) in Visakhapatnam A. P. India. Case records of total of 256 paediatric dengue patients tested positive for Dengue from KGH lab, who got admitted and treated and discharged from King George hospital from Jan-Nov in 2018 were retrieved, reviewed and analysed. Children who were positive for Malaria, Meningitis, Enteric fever and co morbid infection with Dengue were excluded from study. Children tested positive for Dengue from other labs were excluded from study. The study variables include Age, gender, area of residence urban /rural, clinical signs and symptoms namely fever, vomiting, abdominal pain, headache, haemorrhagic tendency, myalgia, clinical fluid accumulation, retro-orbital pain, clinical types like DF, dengue hemorrhagic fever (DHF), dengue shock syndrome (DSS) based on recent WHO guide lines, serology, and outcome like either recovered /death were

analysed. Institutional Ethics committee approval was taken prior to the study.

Statistical method

The association between categorical variables were studied by Pearson's Chi-square test. Data was analysed using SPSS statistical software. Patient information schedules were used as study tool.

Study design

A retrospective record based cross-sectional observational study 3 from January 2018 to November 2018. The data of paediatric patients was collected from the record section of King George Hospital, Vishakhapatnam.

Inclusion criteria

Study subjects were patients who tested positive for dengue fever from KGH lab and were admitted, treated and discharged from King George Hospital.

Exclusion criteria

Children who were positive for Malaria, Meningitis, Enteric fever, co morbid infection with Dengue were excluded from study. Children tested positive for Dengue from other labs were excluded from study. The paediatric data of dengue fever was collected and variables namely: age, gender, area of residence, symptoms, serology, duration of hospital stay, clinical types based on WHO guideline, lab reports and outcomes were analysed.

Case definitions as per WHO recent classification

Classical dengue fever: patients who were presented with acute febrile illness with more than two symptoms like headache, retro orbital pain, myalgia, arthralgia, rash, abdominal pain and platelet count less than 1.5 lac and hematocrit 5-10% raise from baseline were suspected as dengue fever.

Dengue haemorrhagic fever with Acute-onset febrile phase – high-grade fever lasting from two days to one week. Haemorrhagic episodes from any orifices in body and platelet count less than 1 lac and rise of haematocrit more than 20% from base line. DHF1 includes patients with only mild bruising or a tourniquet test positive. DHF2 includes patients with spontaneous haemorrhage into skin or elsewhere with evidence of plasma leak. DHF3 includes patients with clinical signs of shock and DHF4 means patients with severe shock like undetectable blood pressure and feeble pulse. DSS comprises both DHF3 and DHF4.[4]

RESULTS

Based on age, patients were grouped into less than 1yr, between 1-5 ys and 6-14 yrs. Data was uploaded and

continuous variables were summarised by means and remaining categorical values were summarised as percentages. The association between categorical variables were studied by Pearson's Chi-square test. Data was analysed using SPSS statistical software. Epidemiological findings revealed 47 hot spots with 19,600 Mosquito breeding points were identified during drive. Majority were found inside the houses or nearby areas and terraces of urban Visakhapatnam from where most of pts have come from (Figure 1).
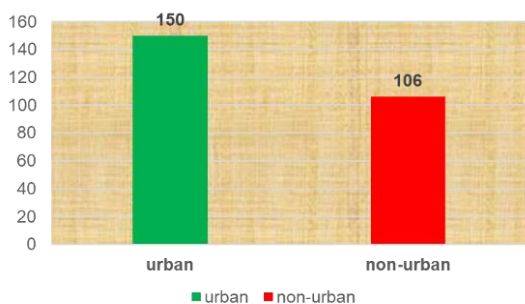

Figure 1: Age of residence.

Secondary data like rain fall, temperature and humidity of the year 2018 was collected from GVMC (Greater Visakhapatnam Municipal Corporation) and it revealed 133.3 mm rain fall in July to 163.6mm in August High temp of 32.9 0c and Humidity of 76%. All these factors precipitated the mosquito breeding areas.[5]

Age appropriate measurements were taken into consideration to measure the haematocrit, platelets, blood pressure and patients were classified clinically according to WHO criteria. Total number of paediatric patients were 256 (0 to 14 yrs.), out of these under year were 14, 1 to 5 years were 63 and between 6 to 14 years were 179. (Figure 2).
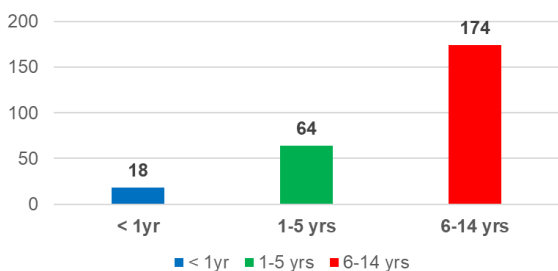

Figure 2: Age distribution of the study participants.

Girls aged between 6 and 14 years were more affected with DHF (49) as compared to boys (45) whereas DF was more in boys than girls (Figure 3).

There were a total of 14 infants and out of these 8 of them developed DF, 4 DHF and 2 DSS. There were 63 preschool children (0-5 years). Of these 33 were found to have DHF, 3 DSS and 27 DF cases. There were 179 school children (6-14) out of these 93 were DHF, 7 were

DSS and 79 were DF. This indicates that 51.9% of school children developed DHF. Out of 256 cases spontaneous bleeding was found in 6 of the DF patients and 27 of the DHF patients. Mean duration of hospital stay was 6 days (Figure 4).
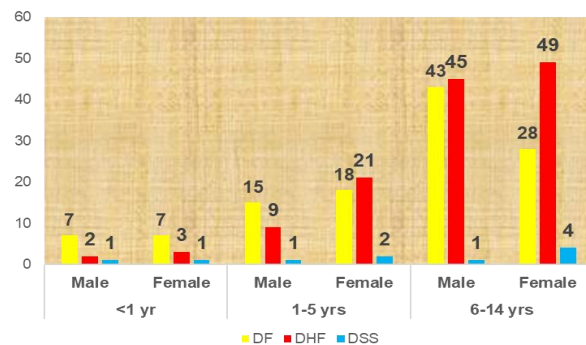

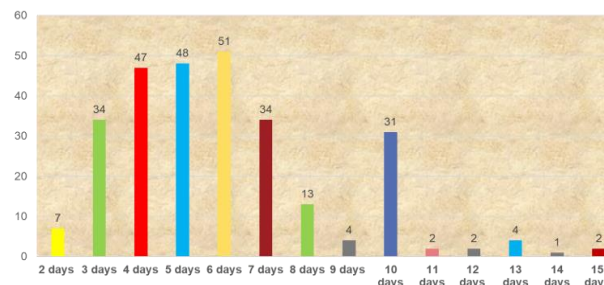**Figure 3: Age and gender distribution.**

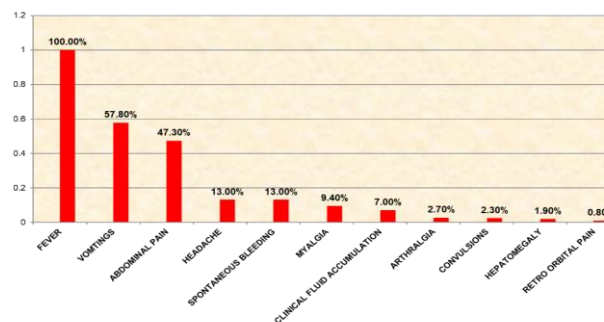**Figure 4: Duration of hospital stay.**

Figure 5: Clinical complaint.

Commonest clinical complaint was fever seen in 100% of cases. Vomiting was found in 57.8% of cases. Abdominal pain was present in 121 patients out of 256 admitted. Majority of patients who had abdominal pain with fever progressed to DHF and two of them to DF. Hence, vomiting and abdominal pain developments are ominous symptoms to be given much attention and required early admission and treatment. Symptoms of plasma leak found in 7 percent of patients (Ascites and Pleural effusion). Hepatomegaly was found in 1.9% of cases. Other symptoms like myalgia (9.4%), arthralgia (2.7%), convulsions (2.3%) and retro orbital pain (0.8%) were found (Figure 5).

Thrombocytopenia was found in 67 percent of patients and Spontaneous bleeding was seen in 13% of cases (Figure 6).
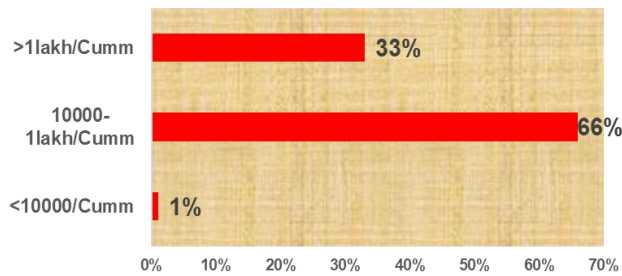

Figure 6: Platelet count.

In our study 50% DHF cases and 46% DF cases and 4% DSS cases were found (Figure 7).
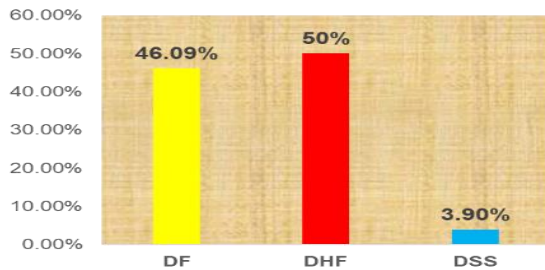

Figure 7: Distribution of cases according to different fever.

In the results we found 71% NS1 positivity, 21% of NS1IgM positivity, 4% only IgM positivity and 1.5% of NS1, IgM, IgG positivity (Figure 8).
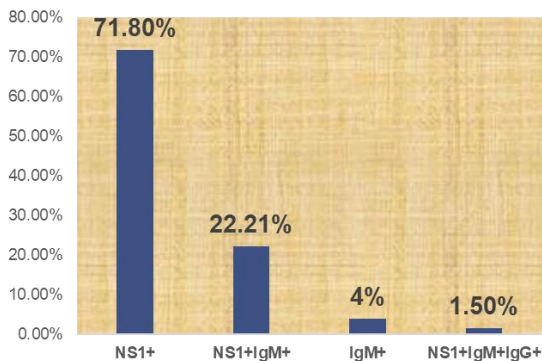

Figure 8: Distribution of patients according to serological test report.

DISCUSSION

In our study fever was found in all (100%) cases followed by vomiting, abdominal pain and spontaneous bleeding as common presentations. These findings were correlated with studies done by Kumar et al, Kedia et al and Dhobale et al.[6,7]

Majority of patients with vomiting and abdominal pain developed DHF. These findings correlated with studies done by Dhobale. Therefore these warning symptoms can be considered as predictors for development of DHF during critical phase of illness in children with Dengue fever.[8] Early diagnosis of cases with these symptoms and treating will decrease morbidity and mortality. Nearly 50% of patients with DHF fever required hospital stay for one week which was a similar observation found in Dhobale study.

50% children developed DHF, this could be due to infection with multiple serotypes in this area. Serotype specific sero prevalence study by Garg revealed 59.6% children of 5-10 yrs found infected at least once and is an evidence for hyper endemic Dengue transmission in India and all 4 serotypes were found in south east Asia.[9]

In Andhra Pradesh state of India, a study done by department of microbiology and medicine at SVIMS, Tirupati revealed that DENV-2 serotype was the commonest followed by DENV4.

But serotype specific prevalence work was not done in this place due to lack of facilities. Early detection of severe cases, case confirmation and differential diagnosis is important for accurate diagnosis of dengue. In this study there were 50% of DHF cases, 46% DF and 4% DSS.

A study done by Senthil et al from Kerala found 87% of non severe dengue and 13% were severe cases in 2018 which were not correlated with our study results. 66% of children had platelet count ranging from 10,000 to 100,000.[3]

Hepatomegaly with raised liver enzymes were common findings in a study by Mishra et al (47%) and Kedia et al (64%) where as in our study hepatomegaly was found only in 2% of the total cases.[10]

Majority of cases are from urban population (150 cases) than non urban areas. In serology tests NS1 positivity wad found in 71.8% followed by NS1IgM positivity. Girls aged between 6 and 14 years were affected more with DHF than boys.

CONCLUSION

Both DF and DHF are common presentations which call for measures at primary level for prevention and control. Early identification and management of cases helps in reducing the duration of hospital stay and favorable outcome. Serotyping should be done as co circulation of multiple serotypes allows for sequential infection which is a risk for severe disease and requires effective vector control measures before onset of monsoons. Public awareness regarding warning signs and symptoms of Dengue should be increased and symptomatic children should be brought within 72 hours of fever for better

follow-up and treatment [Thailand approach]. All cases in our study were cured with effective treatment except one who died of DSS. As high viral load, nutritional status, AB blood group, co-morbidities, age, raise of. Hematocrit of more than 20% from base line, very low platelets also predicts the development of DHF. So, early diagnosis and proper support can help to prevent complications and case fatality.

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