

A Study of Clinico-Demographic Profile of Dengue Cases in A Teaching Hospital

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ABSTRACT

Introduction: Dengue is world's most rapidly spreading mosquito-borne viral disease accounting for nearly 390 million cases across the globe each year. Unfortunately, India shares the highest burden accounting for nearly 34 per cent of all cases. During 2012, a total of 35,066 cases were reported in India with 216 deaths, while southern states contributed most of the cases. Further, in many studies from various parts of the country, several atypical presentations of dengue fever have been reported. With this in the backdrop, an observational study was undertaken to analyse demographic and clinical profile of dengue cases admitted in AJ Institute of Medical Sciences & Research Centre, Mangalore, Karnataka, India, during a period of three years from, 01 January 2011 to 31 December 2013.

Materials and Methods: A record-based observational study was undertaken to study demographic and clinical profile of all patients admitted to AJ Institute of Medical Sciences & Research Centre, Mangalore, a teaching hospital in Karnataka; during a period from 01 January 2011 to 31 December 2013 and were found positive for dengue.

Results: - A total of 766 patients were included in the study. Majority of the patients were males, (92.03%) and belonged to the age group of 15-44 years (88.6%). Admissions increased steadily from 2011 to 2013. A total of 244 (31.85%) cases presented with platelet count of less than 50,000. The most common presentation was fever 746 (97.38%), followed by headache 427 (55.74%), vomiting 328 (42.81%), myalgia 377 (49.21%), orbital pain 344 (44.90%) and abdominal pain 322 (42.03%). A total 09 (1.17%) patients presented with dengue haemorrhagic fever, while 04 (0.52%) cases reported with dengue shock syndrome. A small percentage of patients, i.e. 27 (3.52%) reported with rashes. The overall outcome of patients care was good, with only four cases (0.13%) resulting in fatality.

Conclusion: The present study provides important information into the epidemiological trends in this part of the country while its rising incidence suggests failure of vector control measures at all levels. The study also highlights its varied manifestations, complications and outcome of the disease.

Keywords: Complication, Dengue fever, Disease, Incidence, Vector

INTRODUCTION

Dengue ranks today as the most important mosquito-borne viral disease in the world, having undergone a 30-fold increase in the global incidence during past 50 years. Outbreaks exert a huge burden on populations in most tropical countries of the world. Although the complete global burden of the disease is still uncertain, the patterns are alarming for both human health and the economy [1]. Transmission of dengue has shown significant geographic expansion during the past decades and is now endemic in more than 125 countries. It is estimated that nearly 3.6 billion people are at risk, while approximately 50 million to 200 million dengue infections, 500,000 severe dengue cases and over 20,000 dengue related deaths occur each year [2]. Although the true impact of dengue is difficult to measure owing to inadequate disease surveillance, lack of diagnostic facilities and poor reporting; the burden of dengue is expected to further rise due to globalisation, increase in

travel and trade, global warming and lack of vaccine and specific antiviral therapy [3].

The epidemiology of dengue in the Indian subcontinent has substantially changed during the past decades in terms of prevalent strains, geographical distribution and severity of disease. DV-2 strains were isolated in India over a time span of more than 50 years (1956-2011). However, the re-emergence of DV-3 in Delhi in 2003 and its persistence in subsequent years has marked a changing trend in DV circulation in this part of the country [4]. During 2012, India recorded 35,066 dengue cases and 216 deaths showing an increase of 267% over the last decade, while Tamil Nadu accounted for more than one fourth of all dengue cases and deaths in the country, i.e. 9,249 cases and 60 deaths [5]. Though, classical clinical presentation of dengue virus infection has generally been observed in the country, yet several atypical presentations have been reported in recent outbreaks [4].

The present study has been undertaken to determine demographic and clinical profile of dengue cases admitted during 2011-2013 in the AJ institute of Medical Sciences & Research Centre, Mangalore, Karnataka, a southern state in India.

MATERIALS AND METHODS

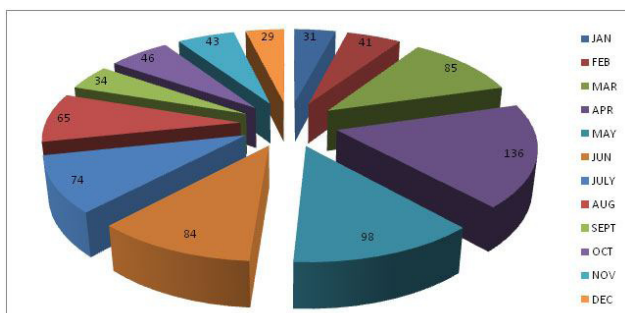
A record-based observational study was undertaken to determine the demographic and clinical profile of all patients who were admitted from 01 January 2011 to 31 December 2013 to the teaching hospital of AJIMS&RC, Mangalore, Karnataka; and were found positive for dengue NS1 Antigen and dengue specific IgM and IgG antibodies. A total of 766 patients were included in the study. Details of the patient pertaining their age, gender, clinical features, complications and disease outcome were retrieved from the Medical Records Department (MRD) of the hospital and were subsequently analysed.

RESULTS

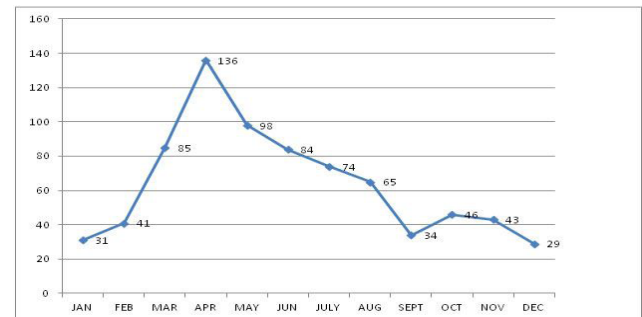
A total of 766 patients were admitted in the hospital from 01 Jan 2011 to 31 Dec 2013. During the period of study, highest admissions, i.e. 136 (17.75%) were noted in the month of April, followed by May 98 (12.79%), June 84 (10.96%), while lowest incidence was reported in the month of December 29 (3.78%) [Table/Fig-1a,b].

A substantial number of patients belonged to the age group of 15-44 years (88.6%). On analysis of data, a steep rise was observed in the number of admissions from 2011 to 2013, i.e. 32(4.17%) in 2011, 168 (21.93%) in 2012 while there were maximum admissions in the year 2013, i.e. 566 (73.89%). The majority of the patients were males, (92.03%) while females constituted only a small number (7.96%). Maximum numbers of cases were in the age group of 15-44 years, i.e. 678 (88.51%), while the numbers of cases among under-five were only 09 (1.17%). Most of the cases i.e. 463 (60.44%) were unskilled labourers [Table/Fig-2]. Average duration of stay of these dengue cases in hospital was 11.65 days.

As seen in [Table/Fig-3], fever was present in almost all cases, i.e. 746 (97.38%), followed by headache 427(55.74%), orbital pain 344 (44.9%), vomiting 328(42.81%), abdominal pain 322 (42.03%), diarrhoea 189 (24.67%), skin rash 89 (11.61%),



[Table/Fig-1a]: Pie diagram showing month wise breakdown of dengue cases



[Table/Fig-1b]: Line diagram showing month wise break down of dengue cases

petechiae 71 (9.26%), and haematuria 37 (4.83). Fifty seven (07.44%) patients reported with neurological manifestations. Out of these 57 cases, 11(19.29%) had encephalopathies, 07(12.28%) had unilateral UMN type facial nerve involvement, 04 (07.01%) Guillain-Barre' syndrome while the remaining patients presented with disorientation, confusion and other

Characteristics	Number	Percentage
Age Group in Yrs		
<05	09	1.17
05-14	25	3.26
15-44	678	88.51
45-60	42	5.48
>60	12	1.56
Gender		
Male	705	92.03
Female	61	7.96
Occupation		
Unskilled	463	60.44
Semi-skilled	119	15.53
Skilled	87	11.35
Professional	43	5.61
House wives	54	7.04

[Table/Fig-2]: Socio-demographic profile of dengue cases(N=766)

minor neurological symptoms.

In the study, 43 patients suffered from various complications out of which, 07 (0.91%) had Acute Respiratory Distress Syndrome (ARDS), 23 (3.00%) had pleural effusion, 09 (1.17%) had DHF while 04 (0.52%) patients suffered from Dengue Shock Syndrome (DSS). A total of 244 patients (31.85%) reported platelet count below 50,000/cumm, 182 (23.75%) patients had count between 50,000 and 100,000/cumm while remaining 340 (44.38%) patients had platelet count more than 100,000/cumm. Out of these 244 patients with less than 50,000 platelet counts, 23 (09.44%) patients had petechiae, 31 (12.70%) had rashes, 27 (11.06%) had haematuria, while 07 (0.28%) patients had other minor bleeding episodes.

Biochemical parameters of these cases have been given in [Table/Fig-4]. All patients were managed well and the overall

Symptoms	Number	(%)
Fever	746	97.38
Myalgia	377	49.21
Vomiting	328	42.81
Headache	427	55.74
Abdominal pain	322	42.03
Skin Rash	89	11.61
Petechiae	71	09.26
Orbital Pain	344	44.90
Neurological manifestations	57	7.44
Haematuria	37	04.83
Diarrhoea	189	24.67
Pleural effusion	23	03.00
DHF	09	01.17
DSS	04	00.52
ARDS	07	00.91

[Table/Fig-3]: Asymptoms and complications of cases (n=766)

outcome of these cases was good, with only four cases (0.52%) resulting in fatality. The year-wise distribution of cases and outcome is given in [Table/Fig-5].

DISCUSSION

The word "dengue" is derived from the Swahili phrase *Kadinga pepo*, meaning "cramp-like seizure" [4]. Dengue viruses (DV) belong to the family *Flaviviridae* and have four serotypes, i.e. DV-1, DV-2, DV-3 and DV-41 [6]. While the incidence of disease has risen many fold during last few decades world over, the mechanism by which DENV causes disease is still not clear; hence no antiviral agents or vaccine are yet available [7]. India is one of the seven countries in the South-

Parameters	Mean ± SD
Haemoglobin (gm/dL)	11.2± 1.93
Total count (/cumm)	5230± 1217
Platelet count (/cumm)	87925 ± 5473
Urea (mg/dL)	34.76± 12.65
Creatinine (mg/dL)	1.04±0.23
Serum - bilirubin	1.03± 0.22
Total protein (gm/dL)	5.44 ±0.63

[Table/Fig-4]: Biochemical parameters of dengue fever patients (n=766)

Year	Total cases	Dengue fever	Dengue haemorrhagic fever	Dengue shock syndrome	Total no. of deaths
2011	32	27	00	00	00
2012	168	156	2	01	01
2013	566	563	7	03	03

[Table/Fig-5]: Year-wise distribution of cases and outcome (n=766)

East Asia endemic for DF and dengue haemorrhagic fever and may soon become a major niche for dengue infection [8]. Rapid population growth, urbanization, and other growing challenges faced by the urban poor require redefining the paradigm for public health interventions. Dengue fever is an example whose spread has been accelerated by the growth of large cities [9].

Dengue virus was first isolated in Japan in 1943 by inoculation of serum of patients in suckling mice and at Kolkata in 1944 from serum samples of US soldiers [4]. The first evidence of the occurrence of DF in the country was reported during 1956 from Vellore district in Tamil Nadu [6]. Since then intermittent outbreaks of DF have been reported from various parts of the country, namely Assam, Meghalaya, West Bengal, Uttar Pradesh, Rajasthan, Punjab, Haryana, Chandigarh, Delhi, Andhra Pradesh, Goa, Gujarat, Maharashtra, Karnataka, Kerala, Pondicherry, and Tamil Nadu. Though, classical presentations of dengue virus infection have generally been reported in the country, yet in recent outbreaks, atypical presentations have also been described by researchers from many parts of the country [4].

To identify the seasonal variations an analysis of the data was done on a monthly basis. A gradual increase in the number of cases was observed from February with a peak in April, during all the three years of the study [Table/Fig-1a,b]. A pre-monsoon increase in the number of cases was noted in the months of March and April which could be explained by the rise in temperature and collection of water, after a few bouts of pre-monsoon showers which facilitate mosquito breeding. However, Kumar A. et al., [8] in their study reported the maximum number of cases during the month of September i.e. 19.1%. The correlation between occurrence of dengue cases and the monsoon season is clearly evident in this study and is further supported by similar findings from Kerala, [10] Ludhiana, [11] and Karachi [12]. These findings suggest that preventive measures against dengue should start well before the monsoon and continue till the end of the season.

In the present study, it was observed that the majority of the patients were males, (92.03%), while females constituted only a small number (7.96%). Maximum number of cases belonged to the productive age group of 15–44 years (88.51%), [Table/Fig-2]. Further, the majority of the cases (60.44%) were from low socio-economic strata belonging to unskilled labour class. Kumar A et al., [8] in their study from south India also found maximum cases belonging to this group i.e. 15–45 yrs. S. Saini et al., [13] and Prakash Duke et al., [14] in their studies from Maharashtra also reported similar findings. However, Bandyopadhyay Bhaswati et al., [15] in their study from Kolkata found majority of the cases in the age group of 11–30 years. It is thus, observed that dengue fever generally affects the male population in productive age group belonging to low socio-economic class, leading to loss of income to the affected household nearly for a duration of 2-3 weeks thereby further adding to the economic misery and burden of the involved people.

In the present study the majority of the patients (78.46%) had classical presentations of the disease. However, a small percentage of patients (21.54%) also presented with atypical features [Table/Fig-3]. Fever was the most common symptom (97.38%), while myalgia, headache, vomiting and diarrhoea were other important presenting features. A small percentage of patients presented with renal involvement (4.83%), neurological involvement (07.44%), and other complications (05.61%). Similar clinical patterns with fever as the most common clinical presentation; were also observed in studies by Narayanan et al., [16] who reported fever and vomiting, as the leading clinical features, Mandal et al., [17] who reported fever (100%) as most common symptoms followed by headache (62.16%), with some atypical features like transaminitis while Daniel et al., [18] reported fever (96.8%) and headache (72.2%) as the main presenting features. Further, Seema A et al., [19] in their study among dengue cases from Uttar Pradesh also reported fever and rashes as main clinical presentations.

However, Bethell D B et al., [20] in their study in peri-urban areas of Chandigarh found no specific pattern of fever among dengue cases and reported headache (52.6%), as the most common clinical feature followed by myalgia (63.1%), vomiting (26.3%), diarrhoea (21.05%) and macula-papular/erythematous rashes (10.5%). Similar observations were also found by Karoli Ritu et al., [21] in their study who reported headache (76%), and not the fever, as the most common symptom among dengue cases followed by abdominal pain (63%), vomiting (58%) haemorrhagic manifestations (40%), rash (26%), and cutaneous hypersensitivity (16%).

Bleeding diathesis is a known feature in dengue fever owing to drop in platelet count and leakage from blood vessels. However, in the present study, although 31.85% patients had thrombocytopenia (platelet count <50,000 cumm); but only 11.48% patients presented with haemorrhagic manifestations, [Table/Fig-4]. Mandal et al., [17] in their study reported bleeding gums and malena among 13.51% patients; while 37.84% patients had a platelet count below 50,000/cmm. In a Hyderabad based study by Khan AH et al., [22], only 5% patients had bleeding disorders, though 40% of the patients had thrombocytopenia. In another study by Seema A et al., [19], only 8% patients had bleeding diathesis, even though 26% patients had a platelet count below 20,000/cumm. Mittal H et al., [23], in their study reported a rather high incidence of thrombocytopenia (92.6%) while bleeding diathesis was found only in 48.8% of the cases. Similarly in many studies in India among dengue cases, no definite correlation between drop in platelet count of the patients and their bleeding tendencies had been found. However, Ageep AK et al., [24], in their study in Sudan observed rather high bleeding episodes (93%) among dengue cases though thrombocytopenia was found in 88% cases.

In present study, year-wise breakdown of cases revealed a steady rise in admission rate from 2011 to 2013 i.e. from 4.17% in 2011, to 73.89% in 2013, [Table/Fig-5]. Similar

findings were reported by Kumar A. et al., [8] in their study from Udupi, a neighboring district, who found an alarming rise in the hospitalisation rate of dengue cases which increased nearly 66 times from 2002 (07 cases) to 2008 (466 cases), and Padhi Sanghamitra et al., [25] from Odisha who found many fold rise in hospital admission from 2010 to 1012. Sharma Y et al., [26] from Delhi in a retrospective study after the 2006 outbreak also observed a steady rise in dengue cases from 2007 to 2010, though there was a dip in the intervening period. This may be partly attributed to the rapid, unchecked construction activities in the urban townships and prevailing poor sanitary conditions contributing to manifold rise in breeding pockets coupled with lack of vector control measures on part of the public health authorities and a floating population of labourers from neighboring states. The WHO aims at reducing mortality and morbidity from dengue fever by 2020 by 50% and 25% respectively [27]. These objectives can only be achieved by continuous epidemiological surveillance, timely interventions, training of health personnel, implementing appropriate referral systems and integrated vector management.

LIMITATION

Present study has the limitations that are inherent to any record-based study and these include likelihood of many manifestations having been missed in the case sheets. There is also a probability of inclusion of some false negatives cases as IgM remains negative for the first few days of fever. There was also lack of information on meteorological data and vector control measures in the affected areas during the period of study.

CONCLUSION

Dengue fever is presently the most common vector borne infection in the world, causing significant morbidity and mortality mainly among productive age group i.e. 15- 44 yrs. The current as well as predicted trends are disturbing. Further, in many studies from various parts of the country, several atypical presentations have been reported making its diagnosis even more difficult. With no specific antiviral therapy or vaccination in sight, mortality from dengue fever can only be prevented by its early diagnosis and timely management. Importantly, the research will continue to play a key role in further improving the methods of surveillance, prevention and control. Needless to say, that with existing understanding of vector bionomics and availability of its multiple control options; the goal to eliminate dengue fever as a public health problem is achievable.

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