ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2018; 4(6): 92-96
www.allresearchjournal.com
Received: 07-04-2018
Accepted: 09-05-2018

Thomas George
MBBS Student, Father Muller Medical College, Kankanady, Mangalore, Karnataka, India

Ramakrishna Pai Jakribettu
Department of Microbiology, Father Muller Medical College, Kankanady, Mangalore, Karnataka, India

Sharanya Yesudas
MBBS Student, Father Muller Medical College, Kankanady, Mangalore, Karnataka, India

Andrew Thaliath
MBBS Student, Father Muller Medical College, Kankanady, Mangalore, Karnataka, India

Michael LJ Pais
MBBS Student, Father Muller Medical College, Kankanady, Mangalore, Karnataka, India

Soniya Abraham
MBBS Student, Father Muller Medical College, Kankanady, Mangalore, Karnataka, India

Manjeshwar Shrinath Baliga
Father Muller Research Centre, Kankanady, Mangalore, Karnataka, India

Correspondence
Ramakrishna Pai Jakribettu
Department of Microbiology, Father Muller Medical College, Kankanady, Mangalore, Karnataka, India

Trend analysis of dengue in greater Mangalore region of Karnataka India: Observations from a tertiary care hospital

Thomas George, Ramakrishna Pai Jakribettu, Sharanya Yesudas, Andrew Thaliath, Michael LJ Pais, Soniya Abraham and Manjeshwar Shrinath Baliga

Abstract
Background: To evaluate the seasonal, gender, domicile related incidence in dengue fever in a tertiary care teaching hospital of Mangalore, India
Methods: This was a retrospective study and was carried out checking in to the aggregate medical records for three years (January 2014 to December 2016). The incidence, season and age of the patients were analyzed.
Results: The results indicate that dengue was more common in the monsoon seasons and men were affected more. Most of the patients were between the age groups of 21 to 40
Conclusions: The results indicate that the seasonal patterns of dengue outbreaks coincide with the rainy season and early winter. This observation is useful for planning special preventive strategies.

Keywords: *Aedes aegypti*, *Aedes albopictus*, dengue, Mangalore, rainfall, epidemiology

Introduction
Recent reports suggest that dengue; an arboviral infection transmitted by *Aedes aegypti* and *Aedes albopictus* mosquitoes breeding in the underprovided waste water management systems, is emerging as one of the most important arthropod borne viral disease in many parts of the tropical countries [1, 2]. The word Dengue derives its origin from the Swahili phrase *kidengapepo*, which stands for "bone breaking fever". From a historical perspective, the first detailed description of such a case was reported by Dr. Benjamin Rush in 1779 [3]. Dengue is endemic to Africa, America, parts of Middle East, Asia and western Pacific and reports suggest that 2.5 billion people are at risk and that annually 50 to 390 million are infected [4-7]. Although dengue has been reported in India since 1996, the disease's impact has been underestimated because of insufficient information on incidence especially in the rural areas [8, 9]. Recent trends indicate a considerable increase in the frequency and severity of dengue outbreaks with a spread to both peri-urban and rural areas [2].
Mangalore, the main city of the Dakshina Kannada district of Karnataka is the trade and commercial centre. According to the 2011 census of India, the urban area of Mangalore has a population of 619,664; while the city metropolitan area has a population of 484,785 [10]. Mangalore is well connected with land, sea and air transportation and is today recognized as one of the rapidly growing two tire cities of India. Dengue is a major health issue in Dakshina Kannada district and considerable numbers of people are afflicted by it [11-14]. However a literature study indicated that the overall trend of prevalence of dengue is not studied or well-documented in the region. From a epidemiological perspective, analyzing prevalence trends each year are important for the expansion of intervention strategies or to design new ones to tackle the disease. In lieu of these observations we studies the trends of dengue by analysing the date from January 2014 to December 2016 from medical records department of a 1250 bed tertiary care hospital of Mangalore.

Material and Methods

This study was carried out at Father Muller Medical College Hospital, Mangalore, Karnataka state, India. The departments of Microbiology and Research were involved. A retrospective review on dengue data was conducted to determine the three year dengue prevalence trends from January 2014 to December 2016. The inclusion criteria included to collect the data on hospital admission of patients requiring treatment for dengue. The exclusion criteria included patients' who had been admitted for all other acute and chronic illness. The details on year, age, gender, month and year of admission were retrieved from the medical record department and information on age, gender, domicile, month and year of admission were collected. The data were entered in to Microsoft Excel 20013 and then imported into SPSS version 20 (SPSS INC, Chicago, IL, USA). The data were analysed for frequency and percentage. Bar graphs are used to depict the overall as well as specific trends of dengue prevalence in the study period.

Results

Overall Dengue Burden and trend analysis: A three-year retrospective study was conducted in Father Muller Medical College Hospital at Mangalore, India. A total of 3,196 confirmed dengue cases were seen within the period from 2014 to 2016. The overall trend analysis showed that dengue was increasing every year (543 in 2014; 1232 in 2015 and 1421 in 2016) and that a peak was observed in 2016.

Sex and age groups: Dengue affected both males and females accounting for 1330 females and 1866 males within the three years' period from 2014 to 2016. The results clearly showed that when compared to the females, more men were affected in all the three years and is represented in Figure 1. With regard to the age group afflicted, the data indicated that majority of reported cases were in the age group of 21 to 40 years, and this is also consistent across the three year time point of study (Fig 2)

Seasonal variation: Although dengue occurred in all months, the incidence had shown uniform trend across months in all the three years (Figure 3, 4). The peak season was in the rainy season (June to September) and least in summer (March to May) (Figure 3). However exception was 2014 where the incidence of dengue was also seen in the early winter period (Figure 4).

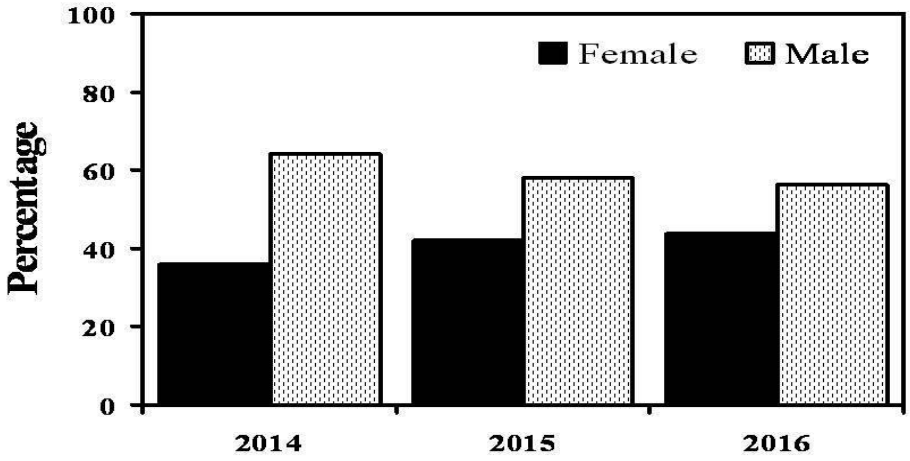

Figure 1. Gender wise distribution of the Dengue cases during the study period (2014-16).

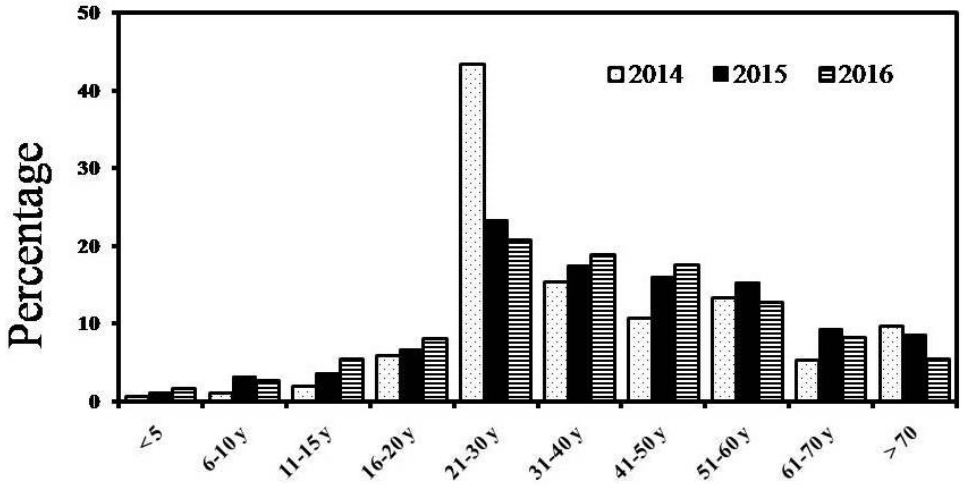

Figure 2. Age wise distribution of the Dengue cases during the study period (2014-16).

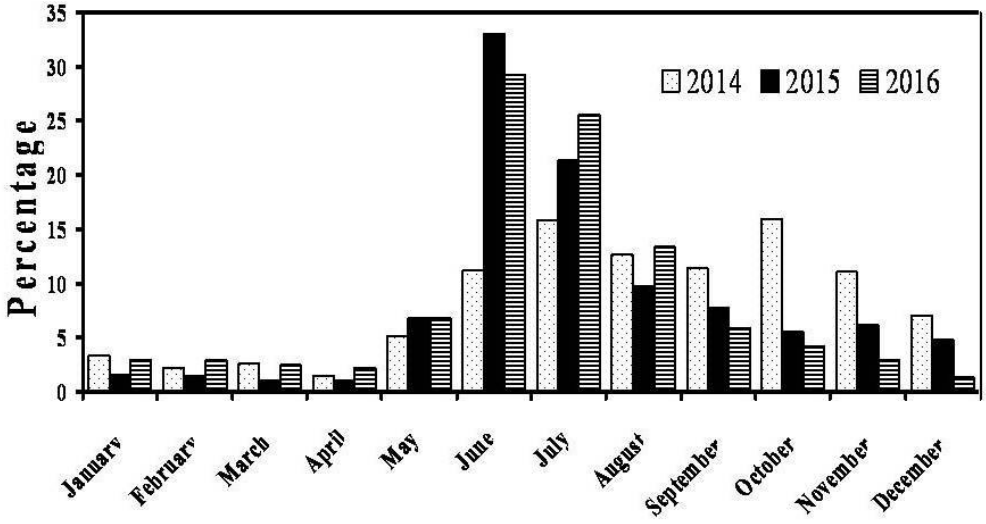

Figure 3: Month wise Distribution of the Dengue positive cases from 2014–16

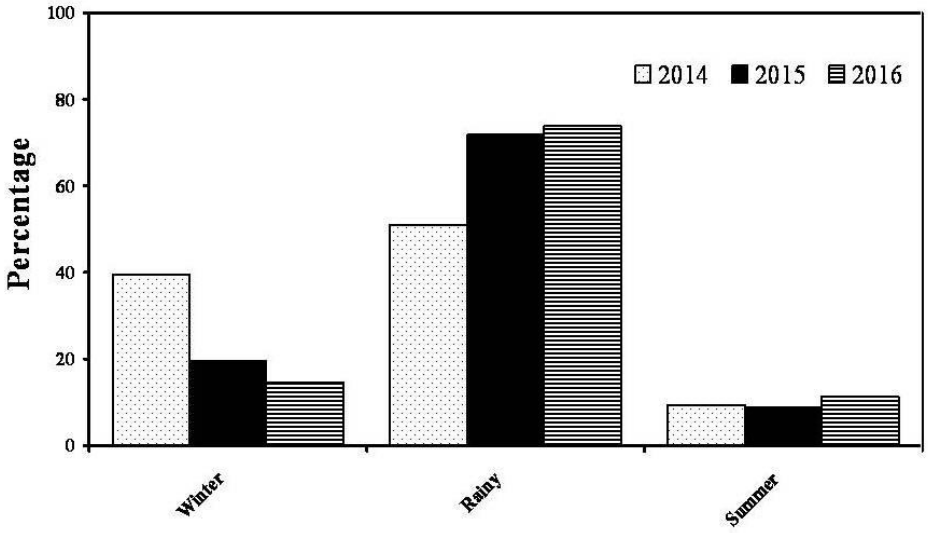

Figure 4: Seasonal Distribution of the Dengue positive cases.

Discussion

Dengue has been on a rise in India and has been associated with periodic surges in the number of cases. In the last decade, outbreaks and deaths have been reported from across the India and that the incidence was high in states like Delhi, Haryana, Punjab, Uttar Pradesh, Andhra Pradesh, Tamil Nadu Karnataka, Gujarat, Rajasthan and West Bengal [2]. Historically, dengue was considered an urban disease. However, with the rapid urbanization and unplanned constructions, the incidence of dengue has increased in both towns and villages. This has resulted in the transition of dengue from a primarily urban problem to a pan-India health concern. The main reason for the increase in rural areas is due to rapid unplanned urbanization, with unchecked construction activities and poor sanitation facilities that contribute to the proliferation of the mosquitoes and the virus. This retrospective study was carried out to assess the seasonal variation in dengue cases in a tertiary care hospital catering to the medical needs of Mangalore and the surrounding towns and villages of both Karnataka and Kerala.

This results of the study demonstrated that the incidence of dengue was higher in the rainy season than in the winter and summer seasons. The association between occurrence of dengue and the monsoon season is further supported by similar findings from other places of India and tropical regions [2, 15-23]. This seasonal outbreak of disease transmission is very important at a local level, for effective control measures, and emphasizes that preventive measures against dengue infection should come into full swing during water stagnation periods after the initial bouts of rainfall and at the end of the monsoon period.

In our study, the percentage of dengue cases for the age group 21–30 years was highest and in agreement to previous studies [21, 24]. Dengue infection occurred in the most active age groups of working adults, who were out of the house most of the time for study, playing or at work [21, 25-27]. The trend for increased incidence among young working adults has important implications for control and prevention as the work/job loss and the financial impact can be significant to the individuals, their family and country at large. From a paediatric perspective, in Southeast Asia, dengue infection is predominantly a childhood disease and is an important cause of paediatric hospitalization [26, 28]. However, when

compared to other international studies [26, 28], the incidence of dengue in children was less in our study population.

From a disease perspective, understanding male –female differences in the infection rates and severity of disease is important. In the present study, the proportions of males were higher than females and are in agreement to earlier reports [25, 29-32]. The reason for this observations can be attributed to the fact that male are more likely to be exposed to the bite of dengue carrying mosquitoes during daytime hours either at the work place or while travelling to and from work or for studies [33].

Conclusion

In the study area of greater Mangalore dengue remains as a public health problem with increasing incidence rate every year. The peak period of incidence is in the monsoon season and across the years. The results suggest that the Mangalore area needs attention, and that emphasis should be on education of the public and prevention in line with achieving the national objectives of reducing dengue burden. The highest incidence was observed in the age group of 21-40 years. Based on our study findings, we strongly propose that efforts should be on preventing and control dengue at eliminating the breeding grounds for mosquitoes. Seasonal variations should be considered and greater emphasis should be given on preventing dengue transmissions and potential outbreaks. As there is no specific treatment or vaccine for dengue, prevention and control of the disease mainly depend upon epidemiological surveillance that provides reliable estimates of the disease, thereby helping implementation of effective vector-control measures. Considering this attempts should also be towards increasing the public awareness through strong health extension activities and through social and as per media especially in the highly dengue prevalent areas as without the public support dengue control cannot be achieved.

Acknowledgements

He authors are grateful to Indian Council for Medical Research (ICMR) for supporting Mr Thomas George to carry out this study in the form of Short Term Studentship (STS) in the year 2017.

References

1. Beatty ME, Beutels P, Meltzer MI, Shepard DS, Hombach J, Hutubessy R *et al*. Health economics of dengue: a systematic literature review and expert panel's assessment. Am J Trop Med Hyg. 2011; 84:473-488.
2. Mutheneni SR, Morse AP, Caminade C, Upadhyayula SM. Dengue burden in India: recent trends and importance of climatic parameters. Emerging Microbes & Infections. 2017; 6(8):e70. doi:10.1038/emi.2017.57.
3. Halstead SB. Dengue (Tropical Medicine: Science and Practice). River Edge, N.J: Imperial College Press. 2008, 1-10.
4. Bhatt S, Gething PW, Brady OJ, Messina JP, Farlow AW, Moyes CL *et al*. The global distribution and burden of dengue. Nature. 2013; 496:504-507.
5. Gubler DJ. Epidemic dengue/dengue hemorrhagic fever as a public health, socialand economic problem in the 21st century. Trends Microbiol. 2002; 10:100-3.
6. Murray NE, Quam MB, Wilder-Smith A. Epidemiology of dengue: past, present and future prospects. Clin Epidemiol. 2013; 5:299-309.
7. World Health Organization. Dengue: Guidelines for diagnosis, treatment, prevention and control, 2009.
8. Halasa YA, Dogra V, Arora N, Tyagi BK, Nanda D, Shepard DS. Overcoming data limitations: design of a multi-componentstudy for estimating the economic burden of dengue in India. Dengue Bull. 2011; 35:1-14.
9. Gupta B, Reddy BP. Fight against dengue in India: progresses and challenges. Parasitol Res. 2013; 112:1367-1378.
10. Anonymous. Provision Population Totals, Census of India. Census Commission of India, 2011.
11. Padbidri VS, Adhikari P, Thakare JP, Ilkal MA, Joshi GD, Pereira P *et al*. The 1993 epidemic of dengue fever in Mangalore, Karnataka state, India. Southeast Asian J Trop Med Public Health. 1995; 26(4):699-704.
12. Baruah J, Ananda S, Arun Kumar G. Incidence of dengue in a tertiary care centre--Kasturba Hospital, Manipal. Indian J Pathol Microbiol. 2006; 49(3):462-3.
13. Pai Jakribettu R, Boloor R, Thaliath A, Yesudasan George S, George T, Ponadka Rai M *et al*. Correlation of Clinicohaematological Parameters in Paediatric Dengue: A Retrospective Study. J Trop Med. 2015, 647162.
14. Damodar T, Dias M, Mani R, Shilpa KA, Anand AM, Ravi V *et al*. Clinical and laboratory profile of dengue viral infections in and around Mangalore, India. Indian J Med Microbiol. 2017; 35(2):256-261.
15. Tewari SC, Thenmozhi, V, Katholi CR, Manavalan R, Munirathinam A, Gajanana, A. Dengue vector prevalence and virus infection in a rural area in south India. Trop Med Int Health, 2004; 9:499-507.
16. Guindo-Coulibaly N, Adja AM, Koudou BG, Konan YL, Diallo M, Koné AB *et al*. Distribution and seasonal variation of *Aedes aegypti* in the Health District of Abidjan (Côte d'Ivoire). Eur J Sci Res. 2010; 40:522-30.
17. Wongkoon S, Jaroensutasinee M, Jaroensutasinee K. Distribution, seasonal variation & dengue transmission prediction in Sisaket, Thailand. Indian J Med Res. 138, September, 2013, 347-353.
18. Kavitha R. Dengue fever: the rise and the establishment of a new disease in Kerala, India with special references to the capital, Thiruvananthapuram. J Acad Clin Microbiol. 2007; 9:65-70.
19. Lal M, Aggarwal A, Oberoi A. Dengue fever: an emerging viral fever in Ludhiana, North India. Indian J Public Health. 2007; 51:198-9.
20. Khan E, Siddiqui J, Shakoor S, Mehraj V, Jamil B, Hasan R. Dengue outbreak in Karachi, Pakistan, 2006: experience at atertiary care center. Trans R Soc Trop Med Hyg. 2007; 101:1114-9.
21. Mehta KD, Gelotar PS, Vachhani SC, Makwana N, Sinha M. Profile of dengue infection in Jamnagar city and district, west India. WHO South-East Asia J Public Health. 2014; 3(1):72-74.
22. Kaup S, Sankarankutty Seroprevalence J. Seasonal Trend of Dengue Virus Infection at a Teaching Hospital in Tumkur, India Sch. J App. Med. Sci. 2014; 2(3A):922-26.
23. Nema S, Deol A, Tripathi K, Ramnani VK. Seroepidemiology and Gender Related Differences in

Laboratory Characteristics of Dengue Virus Infection: A Hospital Based Study, Bhopal. OSR Journal of Dental and Medical Sciences. 2017; 16:95-99.
24. Kumar A, Rao CR, Pandit V, Shetty S, Bammigatti C, Samarasinghe CM. Clinical manifestations and trend of dengue cases admitted in a tertiary care hospital, Udupi district, Karnataka. Indian J Community Med. 2010; 35:386-90.
25. Wali JP, Biswas A, Handa R, Aggarwal P, Wig N, Dwivedi SN. Dengue haemorrhagic fever in adults: A prospective study of 110 cases. Trop Doct. 1999; 29:27-30.
26. Anderson KB, Chunsutiwwat S, Nisalak A, Mameen P, Libarty D, Rothman AL. Burden of symptomatic dengue infection in children at primary school in Thailand: a prospective study. Lancet. 2007; 369:1452-59.
27. Yew YW *et al*. Seroepidemiology of dengue virus infection among adults in Singapore. Annals of the Academy of Medicine, Singapore. 2009; 38:667-275.
28. Shah GS, Islam S, Das BK. Clinical and laboratory profile of dengue infection in children. Kathmandu University Med. J. 2006; 13:40-4.
29. Ray G, Kumar V, Kapoor AK, Dutta AK, Batra S. Status of antioxidants and other biochemical abnormalities in children with dengue fever. J Trop Pediatr, 1999; 45:4-7.
30. Agarwal R, Kapoor S, Nagar R, Misra A, Tandon R, Mathur A *et al*. A clinical study of the patients with dengue hemorrhagic fever during the epidemic of 1996 at Lucknow, India. Southeast Asian J Trop Med Public Health. 1999; 30:735-40.
31. Go KT, Ng SK, Chan YC, Lim SJ, Chua EC. Epidemiological aspects of an outbreak of dengue fever/dengue haemorrhagic fever in Singapore. South east Asian J Trop Med Public Health. 1987; 18:295-302.
32. Aamir M, Masood G, Aamir W, Rasheed A, Ejaz A, Syed S. Gender Difference in patients with Dengue Fever admitted in a Teaching Hospital, Lahore. PJMHS. 2014; 8:12-15.
33. Eong OE. Changing pattern of dengue transmission in Singapore. Dengue Bulletin. 2001; 25:40-44.