



A STUDY OF SEASONAL VARIATION IN DENGUE FEVER IN AJMER REGION

Pathology

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ABSTRACT

Indian Subcontinent has emerged as a scene for mosquito-borne infectious diseases like Dengue fever. Maximum transmission and disease incidence is seen during the months of rainfall. This study aim to determine the seasonal variation of dengue infection. The present study was conducted retrospectively for a period of 1 year in JLN Medical College, Ajmer. All patients with clinical features and serologically positive dengue infections were included. Blood samples were collected from 473 patients suffering from febrile illness. Serological confirmation of Dengue Infection was done by NS1, IgM and IgG (Rapid strip test) which was serologically confirmed by the IgM ELISA. Out of 473 suspected cases, 194 cases (41 %) were confirmed as serologically positive. Maximum cases were seen during monsoon and post monsoon period. Rain, temperature and relative humidity as the important climatic factors, which could be responsible for Dengue infection.

KEYWORDS

Dengue Fever; Platelet Count; Rainfall; Temperature; Relative Humidity

INTRODUCTION

Dengue including Dengue hemorrhagic fever (DHF) and Dengue shock syndrome (DSS) is a great problem in the Indian subcontinent for at least the past 50 years.⁽¹⁾ Classical Dengue fever (DF) is caused by infection with any one serotype of Dengue Virus (DENV) while DHF and DSS are caused in persons with secondary infections who had prior infection with one or more DENV serotypes.⁽²⁾

Principle vectors of transmission for Dengue infection are arthropods of the Aedes genre, especially Aedes aegypti and Aedes albopictus.⁽³⁾

In tropical areas, maximum transmission and disease incidence is seen during the months of rainfall. Rainy season or post rainy season favors the collection of water in various sites like old tires, coolers, old earthenware pots, coconut shells etc. This acts as a good site for mosquito breeding. Hence, the vector thrives and disease incidence increases.⁽⁴⁾ During the rain fall the mosquito population is high (3-4 female mosquitoes per house) as compared to the density during the dry season (1-2 female mosquitoes per house).⁽⁵⁾

According to intensity of rainfall, weather data are divided in three periods, namely; pre monsoon period: from February-May, monsoon period: from June-September and post monsoon period: from October-January.

Since there is no specific treatment or vaccine for dengue till date, prevention and control of the disease mainly depend upon epidemiological surveillance that provides reliable estimates of the disease, thereby guiding in implementation of effective vector-control measures. With this background, the present study was carried out to determine the epidemiological determinants and seasonal variation in dengue infection which could help in rendering adequate control measures.

This study aims to determine seroprevalence and seasonal variation of dengue infection in the study setting.

MATERIAL AND METHODS

The present study was conducted retrospectively for a period of 1 year from 1st Jan 2016 to 31st Dec 2016 in JLN Medical College, Ajmer (Rajasthan). Approximately 5 ml of Blood samples were collected from 473 patients suffering with febrile illness as a part of the routine laboratory work and the sera were separated. Laboratory diagnosis of dengue was established by testing of NS1 (Non Structural protein 1), IgM and IgG by immune chromatographic Rapid strip test which was serologically confirmed by the IgM Enzyme Linked Immuno Sorbent

Assay (MAC-ELISA). Manufacturer's instructions were followed strictly while performing the ELISA. Values were calculated and results were interpreted as per manufacturer's guidelines.

RESULTS

The present study entitled "A study of seasonal variation in dengue fever in Ajmer region." was a retrospective study undertaken in the Department of Pathology, Jawahar Lal Nehru Medical College and attached group of hospitals, Ajmer. All admitted patients with clinical features (according to WHO criteria) and suspected cases for dengue infection included in the present study.

Table 1 – Sex Wise Distribution Of Serologically Positive Dengue Cases

S.No.	Sex	Suspected cases	Positive cases
1.	Male	283	120 (42.40 %)
2.	Female	190	74 (38.94 %)
Total		473	194 (41 %)

In present study Males were higher in proportion as compared to females in Dengue (1.6:1).

Table 2 – Age Wise Distribution Of Serologically Positive Dengue Cases

S. No.	Age	Suspected cases	Positive cases
1.	<20	102	33 (32.35 %)
2.	20to40	184	99 (54.80 %)
3.	40to60	88	36 (40.90 %)
4.	>60	99	26 (26.26 %)
Total		473	194 (41 %)

In present study dengue positive cases were highest (54.80 %) in 20 to 40 age groups. Proportion of cases decreased as age increased. Dengue cases were more in younger age groups as compared to older age groups.

Table 3- Month Wise Distribution Of Suspected And Serologically Positive Cases.

Month	Suspected cases	Positive cases
Jan. 2016	34	06 (17.64 %)
Feb. 2016	03	Nil
Mar. 2016	12	05 (41.66 %)
April 2016	11	01 (0.09 %)
May 2016	14	Nil
June 2016	06	Nil

July 2016	07	02 (28.57 %)
Aug. 2016	11	02 (18.18 %)
Sept. 2016	111	52 (46.84 %)
Oct. 2016	141	79 (56.02 %)
Nov. 2016	104	41 (39.82 %)
Dec. 2016	19	06 (31.57 %)
Total	473	194 (41.01)

In present study cases of dengue were highest (56.02 %) in month october (56.02 %) followed by September (46.84 %) and November (39.82 %).

DISCUSSION

The expansion of dengue in India has been related to unplanned urbanization, changes in environmental factors, host-pathogen interactions and population immunological factors.⁽⁶⁾ Inadequate vector control measures have also created favorable conditions for dengue virus transmission and its mosquito vectors.

In the present study out of 473 clinically suspected cases, 194 (41 %) were found to be positive for dengue infection either by immunochromatographic strip test or by IgM ELISA.

Table 4- Gender Wise Distribution

S. No.	Study and year	Male: Female
1	Carlos et al., 2005 ⁽⁸⁾	Males preponderance
2	Ukey et al., 2010 ⁽⁹⁾	Males preponderance
3	Kumar et al., 2010 ⁽¹⁰⁾	Males preponderance
4	Jain et al., 2011 ⁽¹¹⁾	Males preponderance
5	Our study	1.6:1 (Male preponderance)

This observation was similar with studies conducted by Carlos et al., 2005⁽⁷⁾, Ukey et al., 2010⁽⁸⁾, Kumar et al., 2010⁽⁹⁾ and Jain et al., 2011⁽¹⁰⁾ observed a high prevalence of dengue infection among males.

Table 5- Sex Wise Distribution

S. No.	Study and year	Mean Age ±SD
1.	Khanna et al., 2004 ⁽¹²⁾	35.5 years
2.	Daniel et al., 2005 ⁽¹³⁾	42.6 ± 20 years
3.	Itoda et al., 2006 ⁽¹⁴⁾	31.5±10.5 years
4.	Ahmed et al., 2010 ⁽¹⁵⁾	31 ± 18.1 years
5.	Our study	30.4± 10 years

Dengue cases were more in younger age groups as compared to older age. The mean age of the study group was 30.4± 10 years with range 20 to 70 years. Similar study were seen in Itoda et al., 2006⁽¹³⁾, Ahmed et al., 2010⁽¹⁴⁾ and contrary to study of Khanna et al., 2004⁽¹¹⁾ and Daniel et al., 2005⁽¹²⁾.

Season Wise Distribution

A seasonal trend of dengue over one year period was assessed. According to intensity of rainfall, weather data was divided in three periods, namely; pre monsoon period: from February-May, monsoon period: from June-September and post monsoon period: from October-January. In the present study dengue cases were found to be maximum i.e. 172 (88.90%) during monsoon and post monsoon season. Similar pattern is reported by Kauser MM et al. in Central India,⁽¹⁵⁾ Madhumati R et al. at Bangalore,⁽¹⁶⁾ Chakravarti A et al. in Myanmar.⁽¹⁷⁾ Certain studies showed highest number of cases during Aug-Nov (Maharashtra),⁽¹⁸⁾ Sept- Oct (Bidar),⁽¹⁹⁾ October (Delhi),⁽²⁰⁾ Oct-Nov (Northeast),⁽²¹⁾ September (Lucknow, Udupi).^{(22),(23)}

CONCLUSION

The present study found seroprevalence of dengue infection to be critical in the study setting and identifies adult age group being most vulnerable for infection and also identifies monsoon and post monsoon season as the most favourable season for transmission of disease. Need to strengthen integrated vector control measures during rainy season with special attention to personal protection measures among children.

REFERENCES:

- Carey, DE et al, The 1964 chikungunya epidemic at vellore, South India, including observations on concurrent dengue, Transactions of The Royal Society of Tropical Medicine and Hygiene, 1969, 63(4), 434-445.
- Holmes EC. Molecular epidemiology and evolution of emerging infectious diseases. Brit Med Bull. 1998;54:533-543.
- Whitehorn J, & Farrar J. Dengue. Br Med Bull 2010;95:161-73.
- Dash PK, Saxena P, Abhavankar A, Bhargava R and Jana AM. Emergence of dengue virus type 3 in Northern India. Southeast Asian J Trop Med Public Health 2005; 36:370-77

- Huber K, Loan LL, Hoang TH, Teen TK, Roahain F, and Failloux AB. Aedes aegypti in South Vietnam Ecology, genetic structure, vectorial competence and resistance to insecticides. Southeast Asian J Trop Med Public Health 2003; 34(1): 81-86.
- Randolph SE, Rogers DJ. The arrival, establishment and spread of exotic diseases: patterns and predictions. Nat Rev Microbiol 2010; 8: 361-371.
- Carlos CC et al., Comparison of clinical features and hematologic abnormalities between dengue fever and dengue hemorrhagic fever among children in the Philippines The American journal of tropical medicine and hygiene. 2005; 1;73(2):435-40.
- Ukey PM, et al., Study of seroprevalence of dengue fever in central India. Indian J. Comm. Med 2010. 35:517-9
- Kumar A, et al., Clinical manifestation and trend of dengue cases admitted in tertiary care hospital, Udupi, Karnataka. Ind. Jr. Comm. Med. 2010.35: 386.
- Jain P K, et al. A prospective clinical study of incidence of hepatorenal and hematological complications in dengue fever and management of symptomatic bleed in bundelkhand region of Northern India with fresh whole blood. Journal of Infectious Diseases and Immunity. 2011.3(7): 124-133.
- Khanna S, et al., 2004. Dengue fever is a differential diagnosis in patients with fever and abdominal pain in an endemic area. Annals of Tropical Medicine & Parasitology, 98 (7): 757-760.
- Daniel R, et al., A study of Clinical Profile of Dengue Fever in Kollam, Kerala, India. Dengue Bulletin. 2005; 29:197-202
- Itoda I, et al., Clinical features of 62 imported cases of dengue fever in Japan. Am J Trop Med Hyg. 2006;75:470-4.
- Ahmed M M., 2010. Clinical profile of dengue fever infection in King Abdul Aziz university hospital Saudi Arabia. J Infect Dev Ctries. 4(8): 503-510.
- Kauser MM, Kalavathi GP, Radadiya M, Karthik M, Afreen A, Kumaraswamy RC et al. "A study of clinical and laboratory profile of Dengue fever in tertiary care hospital in Central Karnataka, India". GJMR-B 2014;14(5).
- Madhumati R, Kavya ST, Amrutha A, et al. "Demographic profile of Dengue infections in Bangalore: An Observational Study". Internat J Clin Cases Invest 2014;5:6-14.
- Chakravarti A, Kumaria R. "Eco-epidemiological analysis of dengue infection during an outbreak of dengue fever, India". Virol J 2005;2:32.
- Deshkar ST, Raut SS, Khadse RK. "Dengue infection in central India: A 5 years study at a tertiary care hospital". Int J Res Med Sci. 2017;5:2483-9
- Garg A, Gangane R, Asharani S, Sharanabasava. "Seroprevalence of Dengue in North Karnataka". JMSCR 2015;3(6):6192-6198
- Gupta E, Dar L, Kapoor G, Broor S. "The changing epidemiology of dengue in Delhi, India". Virol J 2006;3:92.
- Mandal SK, Ganguly J, Sil K, et al. "Clinical profiles of Dengue fever in a teaching hospital of Eastern India". Nat J Med Res 2013;31:73-76.
- Singh J, Dinkar A, Atam V, Himanshu D, Gupta KK, Usman K, Misra R. "Awareness and outcome of changing trends in clinical profile of Dengue fever: A retrospective analysis of Dengue epidemic from January to December 2014 at a tertiary care hospital". Journal of the association of physicians of India. 2017;65:42-46.
- 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(3):386-90.