Research Article
PREVALENCE OF DENGUE IN KUTCH: A STUDY AT THE TERTIARY CARE HOSPITAL

CHAVDA S.*[1], PATEL D.A.[2], KINARIWALA D.M.[3] AND VEGAD M.[4]

[1]Gujarat University, Navrangpura, Ahmedabad, 380009, Gujarat, India; Department of Microbiology, Gujarat Adani Institute of Medical Science, Bhuj, Krantiguru Shyamji Krishna Verma Kachchh University, Bhuj, 370001, Gujarat, India

[2]Department of Microbiology, B.J. Medical College, Ahmedabad, 380016, Gujarat University, Navrangpura, Ahmedabad, 380009, Gujarat, India

[3]Department of Microbiology, B.J. Medical College, Ahmedabad, 380016, Gujarat University, Navrangpura, Ahmedabad, 380009, Gujarat, India

[4]Professor, Department of Microbiology, Dr M.K. Shah Medical College and Research Centre, Ahmedabad, Gujarat University, Ahmedabad, 380009, Gujarat, India

*Corresponding Author: Email - supekarshilpa66@gmail.com

Abstract- Background and Aim: Dengue is the most rapidly spreading mosquito borne viral disease of mankind, with a 30 folds increase in global incidence over the last five decades. It is a significant public health issue in the tropical and subtropical parts of the world. The present study was conducted with objective to study prevalence of dengue in during the year 2018 in Kutch region, Gujarat, India. Methods: This study was carried out from January 2018 to December 2018 at Department of Microbiology, Gujarat Adani Institute of Medical Sciences, G.K. General Hospital, Bhuj. The patients having suspected dengue fever was based on standard criteria like presentation of febrile illness of 2-7 days duration were included in this study. A total of 857 blood samples were collected during study period and serologically tested for dengue NS1 antigen and IgM antibody by capture ELISA testing method. Results: Total 857 blood samples from across the Kutch region were tested by ELISA for NS1 antigen and/or IgM antibody as per the protocols and personal, demographic and clinical details of each patient was recorded. Out of 857 cases 113 tested positive for dengue. Among all positive cases 74(12%) were tested positive for NS1 antigen which helped in early diagnosis of dengue. Rise of dengue cases started after the month of October and falls down by the end of December. Analysis of this data revealed that age group 00-10 years had maximum dengue cases. Male cases 68(60%) were more than females 45(40%). Dengue cases were high in urban area. Conclusion: According to the current study, dengue primarily impacted urban populations, men, and children. It was noted that the occurrence was perennial and increased seasonally during the monsoon and after the monsoon. The community's prevalence of dengue will decrease with the effective application of vector control measures through efforts to reduce vector breeding sources and with the adoption of individual preventive measures against mosquito bites.

Keywords- Dengue, IgM antibody, NS1 Antigen, Viral Disease

Academic Editor / Reviewer: Dr Moumita Sardar

Introduction

The dengue virus is widely distributed throughout the tropics and subtropics (in Swahili, Ki denga pepo means a sudden seizure by a demon). 'Break-bone fever' was first used to describe the outbreak that hit Philadelphia in 1780. Dengue virus is the most common arbovirus found in India. Four types of dengue virus exist: DEN 1 first isolated from Hawaii in 1944, DEN 2 from New Guinea in 1944 and DEN 3 and DEN 4 from the Philippines in 1956. A fifth serotype dengue 5(DEN 5) was discovered in 2013 from Bangkok, Thailand.

Dengue is characterized by fever of sudden onset, headache, retrobulbar pain, conjunctival infection, pain in the back and joints, lymphadenophathy and maculopapular rash. It is endemic and often epidemic in the tropics and subtropics, particularly in Asia, the Caribbean, the Pacific and some areas of West Africa. In India, dengue is common in the East coast.

Dengue has been increasing worldwide over the last few decades and today ranks as the most important vector-borne disease, with about 2.5 billion people in 200 countries at risk. Dengue in India has dramatically expanded over the last few decades, with rapidly changing epidemiology. The first confirmed outbreak occurred in Kolkata in 1963-1964.It took almost 30 years for dengue to eventually spread throughout the entire country, resulting in the first major nationwide outbreak of DHF in the year 1996. Following this, gradual dengue virus expansion started in the entire nation and northern parts of India faced yet another outbreak in 2003.

A dramatic increase in the number and frequency of followed, and at present, in most of the states of India, all four serotypes are prevalent. Kutch is the largest district of India which has a very special & diverse ecological system. Literature search suggests that there is scarcity of specific & exclusive data on prevalence of Dengue in Kutch region. The present study was carried out to find out data on Dengue specific serological markers like NS1 antigen, IgM antibody and epidemiological characteristics of dengue infections during the year 2018 in Kutch region of Gujarat State, India [1-8].

Material & Methods

The study was conducted at tertiary care teaching institute and hospital – Department of Microbiology, Gujarat Adani Institute of Medical Sciences and G.K. General hospital from January 2018 to December 2018 after taking the approval from IEC committee.

As a designated sentinel surveillance center by National Vector Borne Disease Control Program (NVBDCP), department is receiving serum samples from Primary and Community Health centers. Patients with acute onset of illness, high grade Clinically suspected cases of dengue virus infection were those with fever, severe headache, backache, musculoskeletal pain, or retro-bulbar discomfort with or without rashes. There was standard laboratory requisition form with personal, demographic and clinical details which were recorded in same forms.

Table-1 Dengue Prevalence Rate

Total No. of Suspected cases	Dengue Positive cases	Prevalence Rate (%)
857	113	13%

Table-2 Dengue NS1 antigen positive cases by ELISA

Total No. of Dengue NS1 antigen tested	Total No. of Dengue NS1 antigen positive	Percentage (%)
643	74	12%

Table-3 Dengue IgM antibody positive cases by ELISA

Total No.of Dengue IgM antibody Tested	Total No.Dengue IgM antibody Positive	Percentage (%)
364	45	12%

Table-4 Dengue NS1 & IgM positive cases by ELISA tests

Dengue NS1 antigen positive	Dengue NS1antigen & IgM antibody positive	Dengue IgM antibody positive	Total
68 (60%)	06 (05%)	39 (35%)	113

Table-5 Monthwise Distribution 2018

SN	Month	No of Total Serum Tested	Total NS1 Performed	Total IgM Performed	No.of NS1 Positive	No of IgM Positive
1	January	111	97	22	8	2
2	February	83	53	41	4	2
3	March	79	64	33	12	3
4	April	58	41	25	5	0
5	May	40	29	17	3	2
6	June	40	40	11	2	2
7	July	47	40	11	5	2
8	August	43	36	18	4	1
9	September	34	25	22	0	1
10	October	119	95	32	10	3
11	November	117	65	66	15	17
12	December	86	58	66	6	10
	Total	857	643	364	74	45

The date of onset of fever and the date of blood sample collection were also recorded in the data entry form [9-16]. Onset of fever was taken as Day 0 and accordingly sample age was defined as the gap between the date of onset of fever and the date of collection of blood sample. Serum was separated and then according to the gap between onset of fever and sample collection type of ELISA test was decided. If the gap was 0 to 4 days then Dengue NS1 Ag ELISA was performed and if it was more than 6 days then IgM capture ELISA was performed. For the samples having 5 to 6 days of fever both IgM & NS1 Ag ELISA were performed. The dengue IgM capture Kits were supplied from NIV, Pune under NVBDCP and for NS1 Ag detection Platelia dengue NS1 Ag(Bio-Rad) ELISA kits were used. If any of these test came positive by ELISA it was considered as confirmed case and notified to the concerned government authorities.

Table-6 Age-wise distribution of Dengue positive cases

Age (in years)	No. of Patients	Percentage (%)
00 - 10	34	30%
Nov-20	29	26%
21 - 30	26	23%
31 - 40	12	11%
41 - 50	6	5%
51 - 60	4	4%
61 -70	2	1%
71 - 80	0	0
Total	113	100%

Table-7 Gender-wise distribution of dengue positive cases

Gender	No.of Patients	Percentage (%)
Male	68	60%
Female	45	40%
Total	113	100%

Table-8 Demographic distribution of dengue positive cases

Region	No.of Patients	Percentage (%)
Urban	76	67%
Rural	37	33%
Total	113	100%

Results

Total 857 blood samples from across the Kutch region were received at our institute for serological diagnosis of Dengue fever during the year 2018.

Discussion

Dengue has been increasingly recognized as an emerging infectious disease. The high prevalence of dengue cases at Kutch in the recent years makes it necessary to evaluate the incidence of dengue and to find out the seropositivity and serotypes of dengue cases. The study was done with 857 serum samples from patients with clinical symptoms suggestive of dengue.

Application of research: Since no effective vaccine is currently available to prevent dengue, the only possible mode of prevention is vector control

Research Category: Clinical Microbiology

Abbreviations: DHF-dengue hemorrhagic fever
NVBDCP- National Vector Borne Disease Control Program

**Research Guide or Chairperson of research: Dr Mahendra Vegad
University: Gujarat University, Ahmedabad, 380009, Gujarat, India
Research project name or number: PhD Thesis

Author Contributions: All authors equally contributed

Author statement: All authors read, reviewed, agreed and approved the final manuscript. Note-All authors agreed that- Written informed consent was obtained from all participants prior to publish / enrolment

Study area / Sample Collection: Gujarat Adani Institute of Medical Science, Bhuj

Strain name: Dengue Virus

Conflict of Interest: None declared

Ethical approval: Ethical approval taken from Department of Microbiology, Gujarat Adani Institute of Medical Science, Bhuj, Krantiguru Shyamji Krishna Verma Kachchh University, Bhuj, 370001, Gujarat, India.
Ethical Committee Approval Number: Nil

References

[1] Ananthnaryan R. (2020) *Textbook of Microbiology by Ananthanaryan and Paiker's 8th edition, chapter no.57 Arbovirus, page no.*519.

[2] Baveja C.P., Complete Microbiology by C.P.Baveja, Chapter no.53, Arbovirus, Pg no.831.

[3] Ekta Gupta, Neha Ballan (2014) *Infection and Drug Resistance,* 7 337-342.

[4] Dengue Handbook (2009) World Health Organization, Dengue guidelines for diagnosis, treatment, prevention and control, New edition 2009.

[5] National Guidelines for Clinical Management of Dengue fever. National Vector Borne Disease Control Programme.

[6] Madhulika Mistry, Yogesh Goswami, Rajesh K, Chudasama & Dhara Thakkar (2015) *J vector Borne Dis.*, 52, 299-303.

[7] Madhulika Mistry, Rajesh K.Chudasama, Yogesh Goswami, Chintan Dalwadi, Aarohi Mitra, Garima Mehta (2017) *Journal of Family Medicine and Primary Care*, 8,2017.

[8] Panwala T., Mulla S. (2014) *Journal of Research in Medical and Dental Science*, 2(3), 69-73.

[9] Jigar Kiritkumar Gusani,Hitesh Jayprakash Assudani,Krupali Kothari and A.N.Ghosh. (2017) *Int.J.Curr.Microbiol.App.Sci.*, 6(5), 2100-2106.

[10] Pooja Rao, Achappa Basavaprabhu, Suchitra Shenoy, Nikhil Victor Dsouza, Basavaiah Sridevi Hanaganahalli and Vaman Kulkarni (2020) *International Journal of Microbiology*, Article ID 6658445, 6 pages.

[11] Biswajyoti Borkakoty, Mandakini Das, Kishore Sarma, Aniruddha Jakharia, Palash Kumar Das, Chandrakanta Bhattacharya, Basumoti Apum, Dipankar Biswas (2018) *Indian Journal of Medical Microbiology*, 36, 1.

[12] Rishi Gowtham Racherla, Madhavi Latha Pamireddy, Alladi Mohan, Nagaraja Mudhigeti, Padmalatha Anjaneyulu Mahalakshmi, Umapathi Nallapireddy, Usha Kalawat (2018) *Indian Journal of Medical Microbiology*, 36, 2.

[13] Shraddha Tiwari, Mohan K. Shukla, Gyan Chand, Lalit Sahare, Mahendra J. Ukey, Piyush Joshi, Rameshwar Khedekar, Neeru Singh† & Pradip V. Barde (2019) *Indian J Med Res*, 150, 492-497.

[14] Siripen Kalayanarooj and Suchitra Nimmannitya, Clinical and Laboratory Presentations of Dengue Patients with Different Serotypes, Dengue Bulletin, 24, 2000.

[15] Meng Ling Moi, Tsutomu Omatsu, Shigeru Tajima, Chang-Kweng Lim, Akira Kotaki, Makiko Ikeda, Fumiue Harada, Mikako ItoMasayuki Saijo Ichiro Kurane and Tomohiko Takasaki (2013) *J Travel Med*, 20, 185-19.

[16] Alagarasua K., Patil J.A., Kakadea M.B., Morea A.M., Yogesha B., Newasea P., Jadhava S.M., Parashar D., Kaur H., Gupta N., Vijay N., Narayanb J., Shaha P.S. (2021) *International Journal of Infectious Diseases*, 111, 242-252.