



A STUDY ON PREVALENCE OF DENGUE NS1 IN TERTIARY CARE HOSPITAL, JAMNAGAR(INDIA)

Microbiology

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ABSTRACT

OBJECTIVES: To find out sero-prevalence of dengue NS-1 in and around Jamnagar by presence of virus specific NS-1 antigen from serum samples taken from patients with clinical features suggestive of Dengue.

MATERIAL AND METHODS: Patients attending outpatient department or admitted in G.G.Hospital, Jamnagar with fever, headache, body ache, myalgia or signs and symptoms suggestive of Dengue were included in the study. Blood samples were screened for dengue NS-1 antigen by ELISA

RESULT: Out of 2195 samples, total 583 (26.56%) were Positive for Dengue NS1 Ag among this: 420 (72.04%) male and 163 (27.96%) female. And 206 (35.33%) were 0-20 of age, 317 (54.37%) were 20-40 of age and 60(10.29%) were >40 of age.

CONCLUSION: Study shows that Dengue fever is more seen in 20-40 years of age. In this present study Dengue NS-1 is more common in male compare to female.

KEYWORDS

Dengue, NS1, ELISA, Seroprevalance, Age, Sex, Jamnagar

INTRODUCTION:

In recent years, dengue has become a major global public health concern. Approximately 2.5 billion people, living mainly in urban areas of tropical and sub tropical regions, are estimated to be at risk of acquiring dengue infection.⁽¹⁾ Dengue is an endemic disease affecting tropical and subtropical regions around the world. Dengue infections are currently one of the most rapidly emerging arboviral infections in the world, which result in 390 million infections every year. The geographic area is characterized by the presence of Dengue vector *Aedes Albopictus* with a high risk of autochthonous case. Dengue virus is a single stranded positive RNA virus belongs to family flaviridae, under genus flavivirus. Five serotypes of Dengue virus (DENV-1, DENV-2, DENV-3, DENV-4) have been found(5th serotypes DENV-5 was reported in October 2013, detected during screening of viral samples taken from a farmer admitted in hospital Sarawak state of Malaysia⁽²⁾ . Dengue is afebrile illness caused by infection with one of the four dengue viruses (DENV) transmitted by *Aedes aegypti* or *Aedes albopictus* mosquitoes during taking meal. Infection may be asymptomatic or present with a broad range of clinical manifestations including a mild febrile illness to a life-threatening shock syndrome. It is an acute illness of sudden onset that usually follows a benign course with symptoms such as headache, fever, exhaustion, severe muscle and joint pain, swollen lymph nodes, and rash. The presence of fever, itchy rash, and headache (“the Dengue triad”) is characteristic of dengue⁽³⁾. Other signs of dengue fever include bleeding gums, severe pain behind the eyes, and red palms and soles. Dengue goes by other names, including “breakbone fever” or “dandy fever”. Dengue hemorrhagic fever is a more severe form of the viral illness. Symptoms include headache, fever, rash, and evidence of bleeding in the body. Petechiae, bleeding in the nose or gums, black stools, or easy bruising are the possible signs of hemorrhage⁽⁴⁾. *Aedes aegypti* breeds and develops in artificial containers of small volume such as flasks, bottles, flower vases, tin cans, jars, discarded automobiles tyres, unused water closets, cisterns, rain barrels, sagging roof gutters and in natural sites such as coconut shells, snail shells, leaf axils and tree holes (christophers, 1960⁽⁵⁾). *Aedes aegypti* is a day biting mosquito, most active during daylight, for approximately two hours before sunset. Dengue NS -1 antigen, a highly conserved glycoproteins, produced in both membrane-associated and secretion forms, is abundant in serum of patients during early stages of DENV infection⁽⁶⁾.

MATERIALS AND METHODS:

STUDY DESIGN

This is retrospective study was conducted from July 2016 to June 2017

at Guru Gobindsingh government, the principal tertiary care centre in Jamnagar District, Gujarat state. Sample received to tertiary care hospital Jamnagar from indoor patient who admitted in hospital, outdoor patients, community and primary health center, of suspected cases of dengue fever is characterized by fever lasting for 0-5 days. A total 2195 samples were collected and processed for detection of dengue virus NS-1 antigen in patient's serum by Dengue NS-1 antigen enzyme linked immunosorbent assay(ELISA) method.

SELECTION CRITERIA: Patient suspected of dengue fever who comes to hospital properly examined by physician at OPD (out patients department) or emergency unit. All cases of fever which the individual shows 2-3 of the following dengue like signs and symptoms i.e. Fever, severe headache, retro-orbital pain, muscle and joint pain, vomiting, diarrhea and abdominal pain with history of 0-5 days which gives strong evidence of Dengue infection. Blood investigation show leukopenia and thrombocytopenia in complete blood count.

EXCLUSION CRITERIA: The patient's serum samples with fever and others sign symptoms which mentioned above but with history of more than 5 days sent for Dengue IgM antibody testing.

SAMPLE COLLECTION AND STORAGE: A single blood sample (approximately 2-3 ml) was collected from each patient which come under inclusion criteria of study. Sample collected by strict antiseptic precautions and separation of serum by centrifuge by standard method. Serum samples for ELISA were prepared and store at 2-8 c until tested.

DETECTION OF DENGUE NS-1 ANTIGEN BY ELISA METHOD: Serum samples were screened for dengue NS-1 antigen at Department of microbiology of Shri M.P.Shah Medical College, Jamnagar by PLATELIA tm DENGUE NS 1 ELISA kit manufactured by BIO-RAD was used.

PLATELIA tm DENGUE NS -1 Ag is one step sandwich format microplate enzyme immunoassay for the qualitative detection of dengue virus NS 1 antigen in human serum. The test uses murine monoclonal antibodies (MAB) for capture and revelation. Samples directly incubated with conjugate in ELISA microplate wells sensitized with MAB. If antigen is present in sample, an immune-complex MAB-NS 1-MAB/peroxidase formed. After a washing step, the presence of immune-complex is demonstrated by distribution in well of a chromogenic solution initiating a color development reaction, then enzymatic reaction by an acid solution⁽⁷⁾. And the optical density(OD) measured by ELISA reader at 450/620nm.

INTERPRETATION

1. If sample ratio (OD/cut off) is <0.50 considered non reactive for Dengue NS-1 antigen.
2. If sample ratio (OD/cut off) is ≥1.0 considered reactive for Dengue NS 1 antigen.

RESULTS:

Table-1: Seroprevalence of Dengue NS1 Antigen

Total	Positive	Seroprevalence
2195	583	26.56%

Table 1: From 2195 suspected cases of dengue NS1, total numbers of positive cases for Dengue NS1 antigen were 583. So, sero prevalence of the present study is 26.56%.

Table-2: Age wise distribution of Dengue NS1 Ag Cases

Age (in Years)	Tested	Positive	Chi-square	P-value
0-20	831	206 (35.33%)	17.84	<0.01
21-40	1011	317 (54.37%)		
>40	353	60 (10.29%)		
Total	2195	583		

Table 2: Among the total positive case, 206(35.33%) were between 0-20 years of age groups, 317(54.37%) were between 21-40 years of age groups, 60(10.29%) were from >40 years of age groups. The chi-square statistic is 17.84.P-value is 0.00013, this show age groups wise distribution of dengue NS 1 is statistically significant (P-value<0.01).

Table-3: Gender wise distribution of Dengue NS1 Ag Cases

Sex	Tested	Positive	Chi- square	P-value
Male	1399	420 (72.04%)	14.057	<0.01
Female	796	163 (27.96%)		
Total	2195	583		

Table:3 among the total 583 positive cases of dengue NS1, 420 (72.04%) male, and 163(27.96%) female. The chi-square statistic is 14.057. P-value is 0.00017 ,this show male to female ratio was statistically significant(P-value<0.01)

MONTHLY DISTRIBUTION OF POSITIVE CASES:

Table-4: Monthly distribution of positive cases:

Month	Total(n=2195)	Positive(n=583)
July-2016	96	06(1.03%)
august-2016	127	19(3.26%)
September-2016	320	121(20.75%)
October-2016	598	179(30.70%)
November-2016	539	163(27.96%)
December-2016	175	51(8.75%)
January-2017	72	08(1.37%)
February-2017	26	01(0.17%)
March-2017	34	04(0.68%)
April-2017	44	11(1.89%)
May-2017	64	10(1.71%)
June-2017	100	10(1.71%)
Total	2195	583

Table 4: Monthly percentage detection of confirmed positive dengue cases between July 2016 to June-2017 n clinically suspected patients presenting at tertiary care hospital, Jamnagar, Gujarat state.

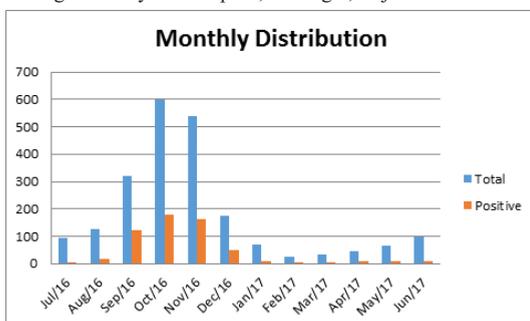


Fig-1: Monthly distribution of Dengue NS1 Cases

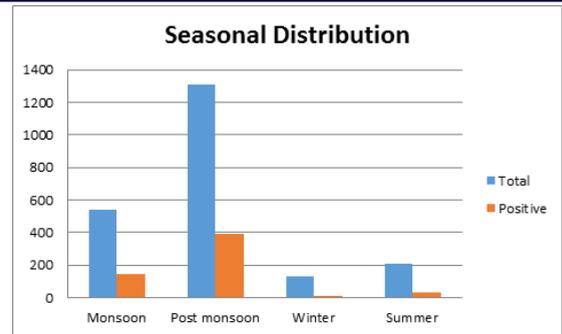


Fig-2: Seasonal distribution of Dengue NS1 Cases

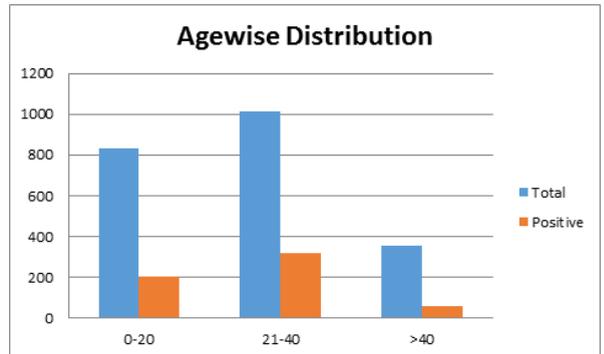


Fig-3: Age wise distribution of Dengue NS1 Cases

DISCUSSION:

Dengue fever is a dangerous and depilating disease, and it's growing threat to global health. Dengue is the second most widespread in the world (8). The world health organizations have estimated that between 50 to 100 million people suffer from dengue fever. The biggest issue is that dengue fever is spreading fast. In the present study, 26.56 % patients were serologically positive for dengue infection. This higher prevalence rate may be due to endemic nature in the country. The age wise distribution of sero positive cases was also statistically significant towards males over females. This difference is probably due to a gender related variance in lifestyle, farming, and other occupations.

Table-5: Comparison of Seroprevalence of Dengue NS1 Antigen

Study	Seroprevalence	Male	Female	0-20 year	21-40 year	>40 year
Mehta KD et al ⁽⁹⁾	28%	72%	28%	32%	63.63%	4.34%
Mistry et al ⁽¹⁰⁾	41.3%	67.9%	32.1%	22.64%	68.31%	9.04%
Muralimohan et al ⁽¹¹⁾	3.99%	64.28%	35.12%	19.04%	57.14%	23.8%
Present Study	26.56%	72.04%	27.96%	35.33%	54.37%	10.29%

CONCLUSION & SUMMARY:

Study shows that Dengue fever is more seen in 21-40 years of age. In this present study Dengue NS 1 antigen is more common in male compare to female. Timely preventive and control measures are essential for early detection of an impending outbreak and to reduce the prevalence rate. Dengue cases were more during September to November in the postmonsoon season which is useful to plan special preventive strategies. The study draws attention toward the male, young adult age group. Dengue infection is no more an urban area infection but it has penetrated in rural areas also.

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REFERENCES

1. Halstead SB. Dengue. Lancet. 2007 Nov 10;370(9599):1644-52

2. Discovery of fifth serotypes of dengue virus (DENV-5): A new public health dilemma in dengue control *Med J Armed Forces India*. 2015 Jan; 71(1):67-70. Published online 2014 Nov 24. doi: 10.1016/j.mjafi.2014.09.011 PMID: PMC4297835.
3. PM Ukey, SA Bondade, PV Paunipagar, RM Powar, and SL Akulwar. *Indian J Community Med*. 2010 Oct-Dec; 35(4):doi:10.4103/0970-0218. 74366. PMID: PMC3026133
4. World Health Organization (1997) Dengue hemorrhagic fever: diagnosis, treatment, prevention and control. Geneva, Switzerland.
5. Anitha Philbert¹ and Jasper. N. Ijumba^{2,1} Mkwawa University college of education, Department of Life Sciences, private Bag, Iringa-Tanzania, ²Mandala African institute of Science and Technology, Department of Water and Environmental Science and Engineering, P.O. Box 447, Arusha-Tanzania.
6. Fauziah Md Kassim, M Nur Izati, Tar TgRogayah, Y Mohd Apanidi and Zainah Saat, Virology Unit, Institute for Medical research, Kuala Lumpur, Malaysia.
7. Kit literature of PLATELIA™ DENGUE NS1 Ag BIO RAD. www.bio-rad.com
8. World Health Organization (2009) Dengue guidelines for diagnosis, treatment, prevention and control. Geneva, Switzerland.
9. 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.
10. Madhulika Mistry, Yogesh Goswami, Rajesh Chudasma, Dhara Thakkar epidemiological and demographic characteristic of Dengue. Disease at tertiary care centre in Saurashtra region J vector borne dis 52, Dec-2015, pp.299-30.
11. Murlimohan KK, Rao BB, Raghuram C, Gunnam S, Dharmteja D, Gopidi A.A. clinical study of dengue fever cases; NRI Medical College, Chinnakakani, Andhra Pradesh, South India. *Int J Med Public Health* 2015; 5:367-71.