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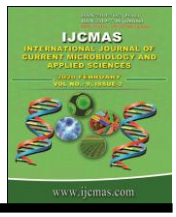

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Sero-Prevalence of Dengue at Laboratory Practice in Hyderabad

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A B S T R A C T

Dengue is a mosquito-borne viral disease of global public health concern. As per national records there has been steady increase in cases every passing year Gupta N *et al.*, 2012[3] An intense dengue infection swept hyderabad in 2019.Early diagnosis of dengue is important and canbe established with commercially available serological assays Chaturvedi UC *et al.*, 2004 [1].A total of 733 serum samples from suspected dengue cases were collected. Serological tests(ELISA)specific for dengue were performed. Of the 733 persons 299(40%) were confirmed as having dengue infection either for NS1 antigen or for IgM, ig G antibody. Higher incidence of cases in males and in the age group of 20-30 years was seen. Dengue has traditionally been held to be a disease of high population density tropical urban areas Pavri KM *et al.*, 1978, Teixeira MG *et al.*, 2002 [10,14]. This is an effort to find out the prevalence of dengue among the patients attending ELBIT Medical Diagnostics, Banjara hills, Hyderabad. National level comprehensive studies to estimate the true burden of dengue in India and its geographical mapping are lacking. Such information would prove to be very critical in planning appropriate dengue prevention and control strategies

Introduction

Dengue is a mosquito-borne viral disease of global public health concern. The disease poses a threat to more than 1.8 billion people in the tropics and subtropical region infecting about 100 million people every year WHO 2009[17]. As per national records there has been steady increase in cases every passing year Gupta N *et al.*, 2012 [3]. The dengue viruses(DEN) that cause these clinical illnesses consist of four serotypes, DEN-1, -2, -3, and -4 Innis, B *et al.*, 1989, kevin r *et al.*, 1999[5,6] . The presence of four serotypes has become one of the complex challenges presented by dengue.

It may be asymptomatic or may lead to undifferentiated dengue fever (DF) or dengue hemorrhagic fever (DHF) and dengue shock syndrome WHO 1997[16]. DHF and dengue shock syndrome (DSS) are causes of

hospitalization and death especially among children Lanciotti RS *et al.,* 1992. Narayanan M *et al.,* 2003[7,9]. Early diagnosis of dengue is important and can be established with commercially available serological assays Chaturvedi UC etal 2004 [1]. Early case detection and management reduce morbidity and mortality due to DHF and DSS

An intense dengue infection swept Hyderabad in 2019. Many suspected persons were referred by the local physicians to our laboratory (ELBIT Medical Diagnostics, Banjara hills, Hyderabad) for serological diagnosis of dengue. An opportunity was obtained to investigate, analyze and categorize the cases who were actually suffering from dengue. The main objective of present study was to create an impact, so that necessary measures be taken to further prevent dengue infection.

Materials and Methods

During the period between August and October 2019, A total of 733 serum samples from suspected dengue cases were collected. Serological tests requested by the physicians to diagnose dengue were dengue specific NS1 antigen and IgM and IgG antibodies by, ELISA (Pan Bio diagnostics). Either alone or in various combinations as stated below:

- Category 1 only NS1 antigen
- Category 2 only IgM antibody
- Category 3 NS1 antigen + IgM and IgG antibodies
- Category 4 only IgM and IgG antibodies
- Category 5 NS1 antigen and IgM antibodies
- Category 6 NS1 antigen and IgG antibodies
- Category 7 only IgG antibodies.

A primary infection is indicated when the IgM to IgG index value ratio is 1.78 and secondary infection is indicated when the IgM to IgG ratio is less than 1.78, M Neeraja *et al.,* 2006, Porter KR 1999, Cuzzubbo AJ *et al.,* 1999 [8,11.2).]

Results and Discussion

A total of 733 persons, suspected to be suffering from dengue were investigated, of whom 299(40%) were confirmed as having dengue infection either for NS1 antigen or for IgM, Ig G antibody (Table 1). These comprised all age groups of both sexes with higher incidence of cases in males(chart 2) and in the age group of 20-30 years (Table 3). 78 (63.9%), 82 (3.4%), 5 (18.7%), 30(11.7%), 28 (2%), 5 (0.3%)and 59 (0.05%) were in Category 1, 2, 3, 4, 5, 6 and 7,respectively(Table 2).

Effective and accurate diagnosis of dengue is of primary importance for clinical care, early detection of severe cases, case confirmation and differential diagnosis WHO 2009 [17]. To diagnose dengue, serological tests, such as dengue specific NS1 antigen and IgM and IgG antibodies are now often performed.

According to WHO 2009[17] NS1 antigen can be detected up to 9 days after the onset of illness. IgM antibodies are detectable in 50% of patients by days 3-5 after the onset of illness, increasing to 80% by day 5 and 99% by day 10. IgM levels peak about 2 weeks after the onset of symptoms and then decline generally to undetectable level after 2-3 months WHO 2009[17]. To know the actual picture of the disease in a large scale, it is important to study the incidence of a particular disease in a region wise manner.

Laboratory criteria for confirmation of dengue fever are isolation of dengue virus from serum and detection of dengue and dengue hemorrhagic fever, virus genomic sequences by polymerase chain reaction WHO 1997[16].

Table.1 Prevalence of dengue

Total specimens tested	**733**
Positive for dengue	299(40%)
Negative for dengue	437(60%)

Table.2 Morbidity due to dengue

Category	ELISA	Remarks
1 (only NS1 antigen)	88(29.4%)	early primary cases
2 (only IgM antibody)	84(28%)	Late primary cases
3 (NS1 antigen + IgM and IgG antibodies)	5(1.6%)	late secondary cases
4 (IgM and IgG antibodies)	30(10%)	late secondary cases
5 (NS1 antigen and IgM antibodies)	28(9.3%)	Late primary cases
6 (NS1 antigen and IgG antibodies)	5(1.6%)	Early secondary cases
7 (only IgG antibodies)	59(19.7%)	Old cases suffered from dengue previously

Table.3 Age wise distribution of dengue cases

Age group(years)	Total cases	Positive
0-10	140(19%)	51(17)
11-20	80(10%)	32(10.7%)
21-30	198(27%)	105(35%)
31-40	141(19%)	57(19%)
41-50	66(9%)	26(8.6%)
51-60	44(6%)	10(3.3%)
>61	64(8.7%)	18(6%)
total	733	299

Table.4 Secondary dengue cases

Total ig M and ig G positives	Ratio less than 1.78 (secondary cases)
30	15(50%)

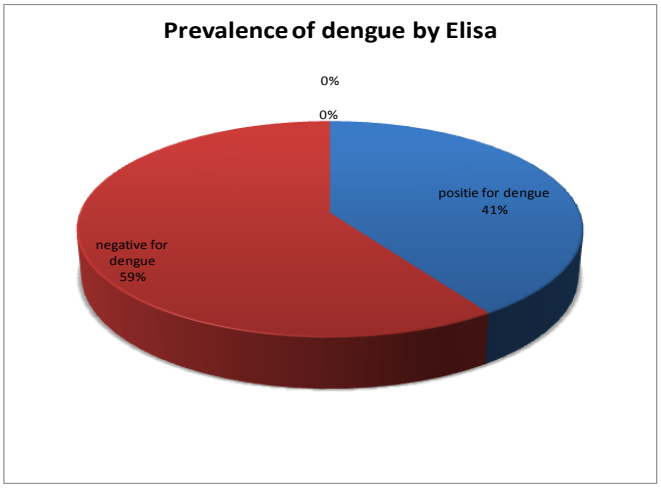

Chart.1 Prevalence of dengue

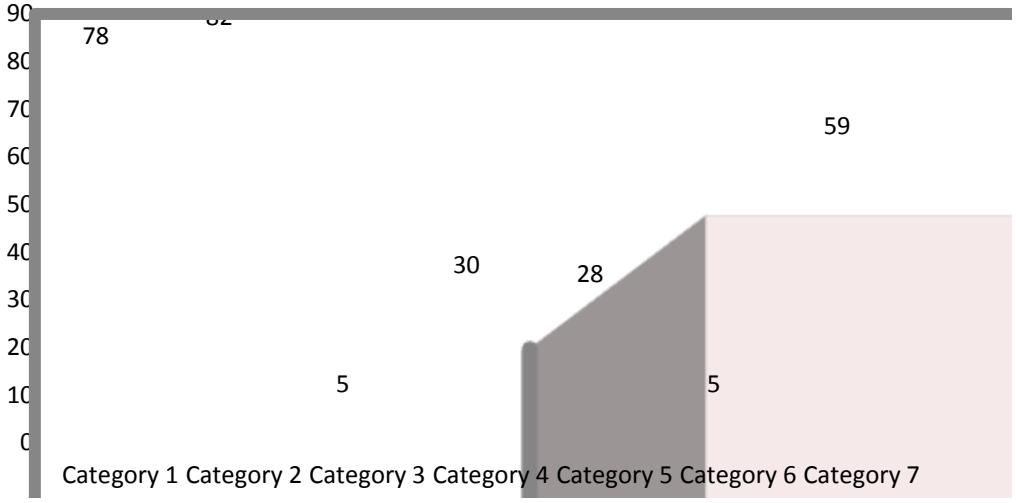

Chart.2 Morbidity due to dengue

However, these tests are available only in reference laboratories and not available routinely. Hence, serological tests that demonstrate a fourfold or greater rise in reciprocal IgG or IgM antibody titre to one or more dengue virus antigens in the serum have greatly enhanced our ability to effectively and efficiently diagnose dengue infection

The serological tests using IgM capture and IgG capture ELISA in which the cut off value of the Ig G is set to discriminate between high levels of IgG (characteristic of secondary dengue infections) and lower levels ig g (primary /past dengue) Cuzzubbo AJ 1999[(2)] .

Dengue has traditionally been held to be a disease of high population density tropical urban areas [(10, 14)]. This is an effort to find out the prevalence of dengue among the patients attending ELBIT Medical Diagnostics, Banjara hills, Hyderabad. During the period from Aug 19 to Oct 19, 733 suspected cases of dengue were tested for dengue NS1 antigen or Dengue IgM, Ig G antibody. OF them, 40% were laboratory confirmed dengue cases.

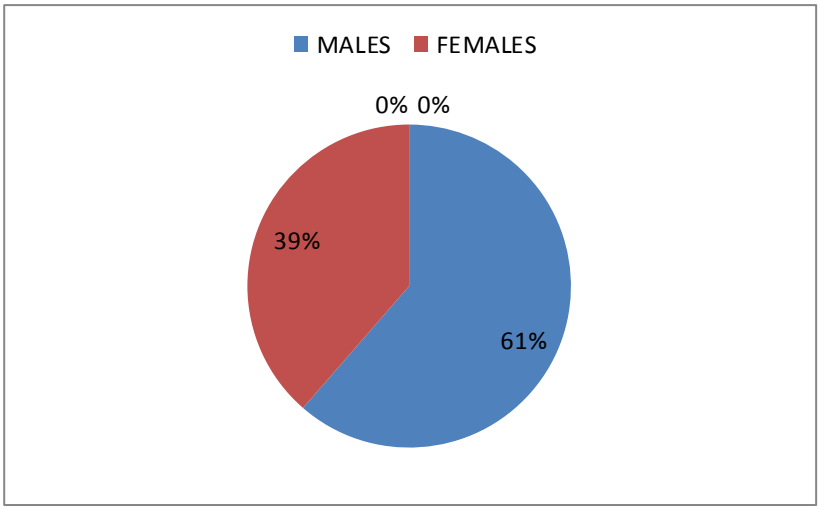

Chart.3 Gender wise distributions of cases

Amongst cases, 61% (450/733) were male and 39% (283/733) belonged to female sex .of them 209/450 (70%)among males are positive and 90/283(30%) are positive for dengue .It has proven that males are found to be mostly affected as compared to female Several previous studies also supported that males are mostly at risk for carrying dengue infection as they are commonly engaged in outdoor activities.(Sharma J *et al.,* 2013, 2017)[12,13]

A total of 27% (198/733) cases having suspected of dengue infection belonged to 21–30 years of age groups, of which 105/299 (35%) are positives. This finding is in accordance with many previous studies (NVBDCP 2016, Sharma J *et al.,* 2013, 2017, M Neeraja *et al.,* 2006)[8,4,12,13].

Dengue in India has established its roots. Now it is endemic and almost hyperendemic in our population. National level comprehensive studies to estimate the true burden of dengue in India and its geographical mapping are lacking. Such information would prove to be very critical in planning appropriate dengue prevention and control strategies and also help in making decisions regarding suitable sites to undertake dengue vaccine clinical trials in future.

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