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DENGUE AND CHIKUNGUNYA OUTBREAKS IN TERTIARY CARE HOSPITALS A RETROSPECTIVE STUDY

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Abstract :

Dengue and chikungunya are two arboviral infections that are common in tropical countries and are spread by aedes mosquitoes. A retrospective study was conducted from June 21 to June 22 to determine the prevalence of these diseases at Gandhi Hospital Secunderabad, Telangana. NIV's IgM antibody capture ELISA kits were used to test for chikungunya.SDdiagnostics performed dengue NS1 antigen testing using ELISA. There were 2981 samples for dengue NS1 antigen, of which 114 (3.8 percent) were positive, and 4822 samples for IgM, of which 618 (12.8 percent) were positive.The number of chikungunya samples received was 4711, with 376 (7.9%) being positive. The age group most commonly affected by dengue was 40–60 years old (37.7 percent) and for chikungunya, 21–40 years (58.7 percent). In terms of gender distribution, males accounted for 58.7 percent of dengue infections and females for 55.7 percent of chikungunya infections, respectively. Dengue infectivity increased the most in September (17.4%) and October (17.11%), while chikungunya infectivity increased the most in September (9.5%) and November (10%). But early detection and treatment, as well as controlling vectors toprevent the spread of disease, would be good for the community and society as a whole.

Keywords:*Dengue fever, NS1 antigen, IgM antibody, Seasonal, Platelet count*

INTRODUCTION :

Dengue and Chikungunya fever is arboviral infections found in tropical and subtropical areas. The clinical symptoms of these two viral infections are similar. Because these infections are spread by a common mosquito vector, these viruses co-circulate in many geographical areas. Several clinical studies, particularly from India and Africa, have documented dual infection with these viruses. However, because most of these studies involved a smaller patient group, the true disease burden of Dengue and Chikungunya dual viral infections is still uncertain. In determining

the comprehensive pathogenicity and severity of the dual viral infections, larger patient groups must be extensively researched [1]. Primary infection occurs when a person becomes infected with any one serotype for the first time. Infection with one of the dengue virus serotypes results in lifelong immunity to that serotype only. Secondary dengue infection occurs when a person is infected with a different serotype than the first and develops a severe form of illness, such as DHF, as a consequence of immune enhancement. [2,3]. Dengue and Chikungunya viral infections share many disease manifestations, including high fever, headache, nausea, rashes, and body pain. In the case of a mild infection, the viral titer drops in about 10 days, and the symptoms go away because these are self-limiting infections. However, when a dengue infection is severe, it causes bleeding in DHF (dengue hemorrhagic fever) and/or shock caused by plasma leakage in DSS (dengue shock syndrome)[4-7]. The most noticeable symptom of Chikungunya infection is severe joint pain, which can last from a few months to a year. A severe Chikungunya virus infection can result in neurological and optical symptoms. As a result, while Chikungunya virus infection is usually not fatal, Dengue fever can cause serious complications, including death. As a result, co-infection with both viruses may cause disease with overlapping symptoms [9-11]. As a result, diagnosing and treating such patients becomes difficult. As a result, the issue of clinical manifestations in cases of dual infection with both viruses should be addressed thoroughly. As a result, early detection of dual infections is critical for better patient management.Dengue and chikungunya diagnosis is difficult based on clinical presentation. Although the vast majority of dengue infections are self-limiting, timely diagnosis aids in appropriate management in severe cases. These infections can be diagnosed using enzyme-linked immunosorbent assays (ELISAs), real-time polymerase chain reaction (RT-PCR), and virus isolation. ELISA analyses samples for immunoglobulin (Ig) M and IgG antibodies [4,6].The presence of IgM anti-DENV antibodies is associated with initial dengue. An IgM antibody becomes detectable 5-7 days after the onset of illness and remains detectable for 2-3 months. Secondary infection is characterized by the presence of IgG antibodies in the serum and a poor IgM response [12,15].Early diagnosis is essential for timely and appropriate treatment, as well as the deployment of control measures. The presentretrospective study is being done to determine the prevalence of dengue and chikungunya

Materials and methods :

A retrospective study was conducted at the microbiology laboratory in the serology department at Gandhi hospital Secunderabad Telangana for a duration of one year from June 2021 to June 2022. Samples were collected from clinically suspected cases of dengue and chikungunya and the sera subjected to the tests performed .related data like age, gender, and results were noted from lab registers. Related data like age, gender, and results are collected from Laboratory registers. Serum samples from these cases were collected. A total of 114 samples were received for dengue NS1 Ag testing, 618 samples for dengue IgM antibody, and 376 samples for chikungunya test.

Diagnosis of Dengue (fever lasting less than five days) and Chikungunya was carried out using Ig M antibody capture ELISA kits developed and manufactured by NIV pune. Dengue samples were put through an NS1 antigen detection test using a microwell enzyme linked immunosorbent assay (ELISA). The test was carried out in accordance with the instructions provided by the NIV manufacturer. Microsoft Excel was utilised in order to carry out the analysis of the data.

The tests were carried out following the manufacturer's instructions. Data analysis was done using MS Excel. Ethical clearance was obtained from the Institutional Ethical clearance committee of Gandhi hospital Secunderabad Telangana.

Result :

Sera samples were received for dengue, IgM antibodies, and chikungunya throughout the past year of June 21-June 22. The total number of samples tested for dengue NS1Ag was 2981, and 114 of those samples tested positive for the virus, which is equivalent to 3.8 percent (Table-1).

Samples received for IgM were 4822, out of which 618 samples indicated a positivity of 12.8 percent. Chikungunya virus strain 4711 was found in 376 of the 1,711 samples that were tested throughout the year. This means that 7.9% of the samples were positive. Infection with the dengue and chikungunya viruses in people is dependent on immunological levels, which are in turn affected by age and gender characteristics. Despite this fact, diseases can strike people at any age. The majority of dengue patients were in the age category of 21–40 years old (32.4 percent), while the majority of chikungunya patients were in the age group of 40–60 years old (37.7 percent) (55.3 percent). Males were more likely to experience symptoms of dengue fever. (58.7 percent). Females are affected at a higher rate (58.2 percent) than males (Table 2).

According to the results of our research, the months of September (17.4 percent) and October had the highest number of dengue cases (17.11 percent). In terms of the NSI antigen and IgM antibody, the percentages come in at 13.56 and 11.9%, respectively (table-3). Chikungunya had its highest incidence in September (9.5 percent), followed by November (10 percent) (Table-4).

Discussion:

The Chikungunya virus is an alphavirus, whereas the dengue virus is a member of the flavivirus genus. There is significant cause for concern regarding the arboviral infections that are spread by the Aedes aegypti mosquito. These two viruses may coexist and can be passed from one person to another simultaneously. [1].Both the dengue and chikungunya viruses have been found to contain mutations across their genomes as well as changes in their genotypes. The patient has to have an accurate diagnosis of infection made as soon as possible for the appropriate treatment to be administered [1,2].

Shanmugan*et al.* conclude that during the period of the study, there was an overall prevalence of dengue in Kelambakkam that was 38.5 percent. The monthly prevalence of dengue fever ranged from as low as four percent in April 2014 to as high as five-nine percent in June 2015, with an average monthly prevalence of twenty-seven percent. During August, September, and October, there was a significantly high prevalence rate (2014) [2]. According to the findings of a study performed by Dinkar et al., dengue suspected cases totaling n = 900 were investigated over six years, from 2012 to 2017; of these, 461 (51.22%) cases tested positive for the presence of seropositive dengue antibodies. When compared to 2013 and 2015, the years 2012, 2014, 2016, and 2017 saw a higher proportion of cases in the age range of 20–30 years, while 2013 and 2015 saw the highest proportion of cases in the age range of 40–60 years [5].

According to the Sathish et al. study, dengue prevalence was detected at 11% by NS1 antigen detection, which is similar to the study done by Nissi Mathew et al. [4, 9], which indicated an 11.6% prevalence. In the present retrospective study, the prevalence of dengue infection was determined by the detection of IgM antibodies at 7.3 percent, but a study conducted by Nepal H.P et al. found an 8.5 percent prevalence. [10]. A study conducted by Sathish et al. showed that the prevalence of chikungunya was 12.7 percent, and another study conducted by Ms. AkankshaTomar et al. showed that it was 16 percent [5]. The detection of the NS1 antigen is important for the early and rapid detection of infection because it takes place before antibodies develop [1,5].

In the study by Birder et al., there were 284 samples, and 58 of them (20.42%) were positive for one or more dengue serological markers.The youngest patients, those aged 0 to 15, made up the lion's share of the total (48.27 percent) [3]. In the present study, the prevalence of dengue was 114 (3.8 percent), and there were 2867 positive and negative samples (96.17 percent). Those between the ages of 0 and 20 had a prevalence of 25.4 percent, while those between the ages of 41 and 60 had a prevalence of 37.7 percent. Those aged over 65 had a prevalence of 5 percent (44.38 percent).

Conclusion:

India is a high-risk area for arboviruses such as dengue and chikungunya, which share a mosquito vector. The presence of both the vector and a large population at risk are major contributors to the country’s frequent outbreaks of these viral illnesses, particularly in Secunderabad, Telangana. Heavy rains have caused stagnant water, which is a favourite breeding ground for the ‘Aedes’ mosquito, which causes dengue and chikungunya. Both exhibit fever, fatigue, muscle pains, and body aches. The post-monsoon and early winter seasons favour mosquito breeding, and the simultaneous circulation of both viruses has led to an increase in the incidences of dual infection.Dengue and chikungunya infections exist in our areas, and the detection of NS 1 antigen and Ig-M antibodies helps to determine the prevalence of the viruses in

our communities and aids in the early detection of appropriate treatment. Control measures, as well as public awareness, can be implemented.

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Table : 1Table-1.Prevalence of dengue and chikungunya infection

Samples	NS1 Ag -Dengue	IgM Ab	chikungunya
Positive samples	114(3.8%)	618(12.8%)	376(7.9%)
Negative samples	2867(96.17%)	4204(87.8%)	4335(92%)
total	2981(100)	4822(100)	4711(100)

Table 2 age group distribution

Age group	Dengue NS1 Ag	igM	chikungunya
0-20 yrs	29(25.4%)	107(17.3%)	53(14.8%)
21-40 yrs	37(32.48%)	369(59.7%)	208(55.3%)
41-60 yrs	48(37.7%)	137(22.1%)	102(27.1%)
>60yrs	5(4.38%)	5(0.8%)	12(3.1%)
	114	618	376

TABLE-3.Gender-wise distribution of dengue and chikungunya cases

MONTH	igM Ab	Dengue NS1 Ag	chikungunya
MONTH	igM Ab	Dengue NS1 Ag	chikungunya
June	1(7.69%)	1(14.2%)	1(7.6%)
July	0	0	0
august	32(15.1%)	1(8.3%)	15(7.1%)
September	157(14.8%)	26(13.5%)	87(9.5%)
October	123(17.11%)	8(10.9%)	54(7.5%)
November	110(17.11%)	27(5.3%)	66(10%)
December	50(10.35%)	8(1.6%)	36(7.4%)
January	41(14.4%)	0	11(3.7%)
February	23(8.8%)	1(0.3%)	13(5%)
march	15(3.3%)	9(1.9%)	21(4.6%)
April	17(5%)	1(0.2%)	15(4.4%)
may	27(7.04%)	10(2.6%)	31(8%)
June	22(5.6%)	22(5.6%)	26(6.6%)
total	618	114	376

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Positive samples	114(3.8%)	618(12.8%)	376(7.9%)
Negative samples	2867(96.17%)	4204(87.8%)	4335(92%)
total	2981(100)	4822(100)	4711(100)

TABLE-4Monthly distribution of dengue and chikungunya cases from June 2021 to June 2022