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Original Research Article

Clinico Microbiological Profile of Dengue and Chikungunya Co-Infections in Patients Attending A Tertiary Care Hospital, Siddipet

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Abstract:

Introduction: Aedes aegypti mosquitoes are common carriers of dengue virus (DENV) and CHIK virus (CHIKV). At times where both viruses coexist, they can spread simultaneously. There are extremely few investigations on the dengue-chikungunya coinfection,which results in the difficulty in treatment aspects.

Methodology: In the present study 200 suspected samples were subjected to the presence of antibodies sensitive to DENV for detection of NS1 antigen and Dengue IgM and the Chikungunya IgM was used for diagnosis of chikungunya.

Results: A total of 200 samples from suspected patients for dengue infection, 29 (14.5%) samples were positive for DENV NS1. While 21 (10.5%) were tested positive for DENV IgM, 11 (5.5%) samples were positive for CHIK IgM antibodies. A total of 7 (3.5%) patients showed dengue chikungunya coinfection.

Conclusion: The rise in the rate of Dengue and Chikungunya illnesses, as well as their cocirculation, is an important health issue that necessitates intensive prevention and control strategies.

Keywords: DENV and CHIKV, Coinfection, Diagnosis, Treatment Strategies.

Introduction

Arthropod-borne infectious diseases such as Malaria, Dengue, Chikungunya, and Scrub typhus are significant etiologies of acute febrile illness in India [1]. According to the National Vector Borne Disease Control Program (NVBDCP), the Government of India reports over 100,000 instances of dengue virus (DENV) and chikungunya virus (CHIKV) infections in a year, causing a self-limiting fever with symptoms comparable to febrile sickness.

In Asia, CHIKV-affected areas overlap with DENV-endemic areas [2], allowing mosquitos to get infected with both viruses. Both conditions have identical signs and symptoms, such as fever and chills, swelling of major and minor joints with discomfort, trouble moving limbs, nausea, headache, and vomiting, and the formation of rashes [3]. Since 1964, many states in India have reported concurrent isolations of CHIKV and DENV [4&5]. CHIKV and DENV are now co-circulating in India and other countries [5, 6, 7&8], because both viruses are spread by the same Aedes spp. mosquitos, it is fair to assume that the epidemiology of Chikungunya and Dengue illnesses is temporally and geographically linked. Furthermore, because the symptoms exhibited by infected patients are similar and the diagnosis of both viruses is mostly symptom-based, there will unavoidably be ambiguity in disease detection among residents of endemic/epidemic regions and returning travelers.

Therefore, in the present study clinical profile evaluation and serological tests specific for both DENVs and CHIKVs will be carried out on samples from patients in whom either or both infections were suspected.

Materials and Methodology

The study was conducted in Government General Hospital (GGH), Siddipet, Telangana State, India, during October to December 2023. Blood samples (n=200) received from suspected dengue and chikungunya patients attending GGH, Siddipet of all age groups from both outpatient and inpatients.

Patients suffering from acute febrile illness, joint pains and rash for less than 2 weeks were included whereas proven cases of malaria, enteric fever and patients presenting with fever for more than 2 weeks were excluded. All the samples are subjected to detect the presence of antibodies sensitive to DENV by the Panbio Early ELISA kit for detection of NS1 antigen (Alere Medical, India), and the Panbio Dengue IgM Capture ELISA (Alere Medical, India), and the Chikungunya IgM ELISA kit (SD Bioline) was used for diagnosis of chikungunya.

Results:

Out of the 200 samples received from suspected cases of Dengue and chikungunya, 122 were males and 78 were females.

Age Distribution

The patients' median age was thirty years. There were 28 youngsters (up to 16 years old) and 172 adults. There were 133 young people (17-30 years old) among the adult patients.

The largest frequency of dengue patients (46%) was reported between the ages of 16 to 30, followed by 29.9% between the ages of 31 to 45.

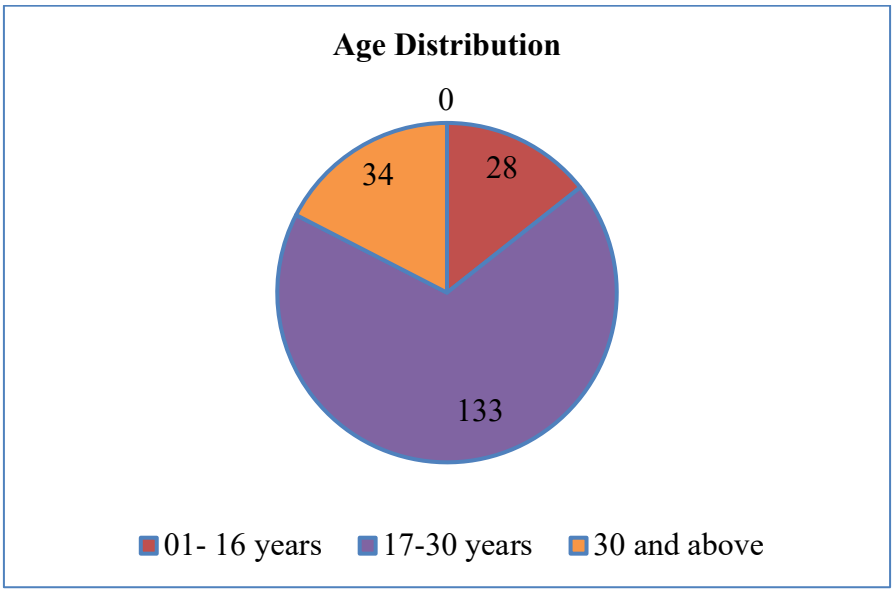

Figure 1: age wise distribution of DENV fever

Distribution of signs and symptoms: All the patients presented to GGH Siddipet with complaints of fever. Among them headache was the most prevalent symptom reported in 102 individuals, followed by myalgia/arthralgia in 99, vomiting in 62, cough in 58, sore throat in 47, retro-orbital annoyancein 26, diarrhea in 20, and rash in 24 persons (Table 1).

Table 1: Distribution of signs and symptoms among the patients

Symptoms	No: of patients presented
Headache	102
Arthralgia	99
Vomiting	62
Cough	58
Sore throat	47
Retro orbital pain	26
Diarrhea	20
Rash	24

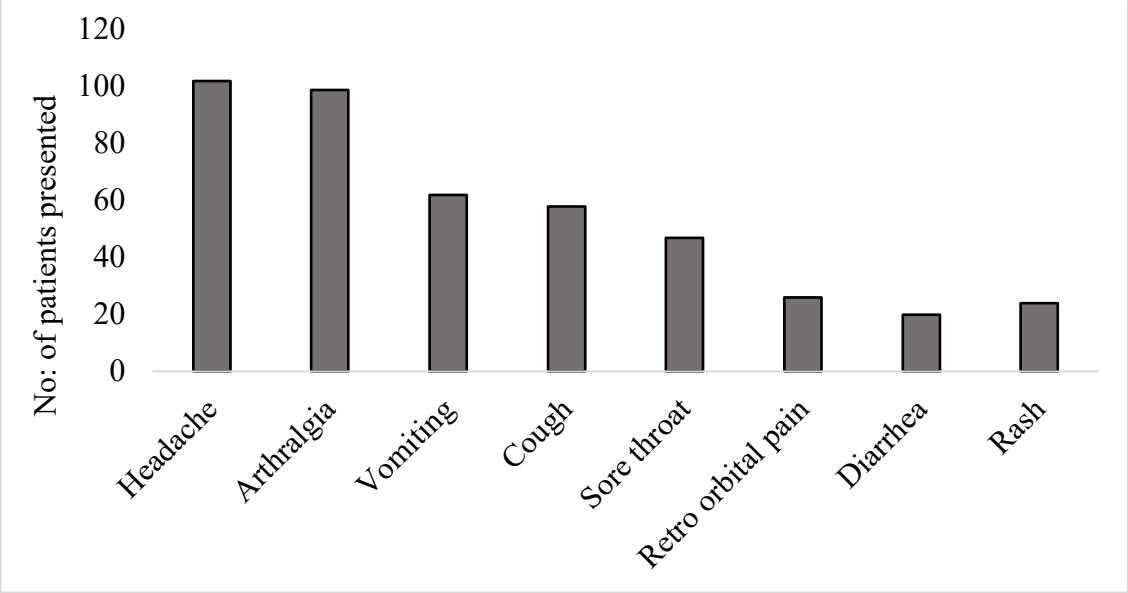

Figure 2: Graphical representation of signs and symptoms among the patients

Complete blood picture examination: Complete blood picture examination of participants revealed thrombocytopenia with a plateletscount <150000 in all the 200 participants, platelet count less than 100000 were seen in 98 patients, severe thrombocytopenia condition with a count <25000 were seen in 12 patients.

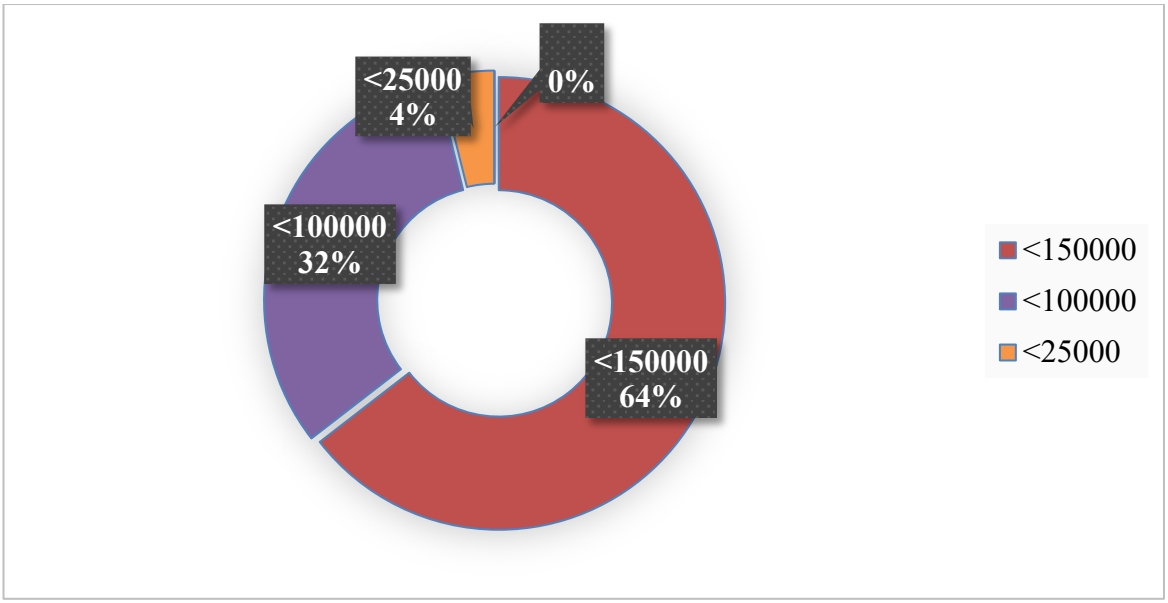

Figure 2: percentage of platelet count in patients with DENV and CHIKV fever

Out of the 200 samples received from suspected patients of dengue infection, 29 (14.5%) samples were positive for DENV NS1. While 21 (10.5%) were tested positive for DENVI IgM. Out of the 200 samples tested for IgM Chikungunya, 11 (5.5%) samples showed positive result. Out of the 200 samples tested for both dengue IgM and Chikungunya IgM, a totalof 7 (3.5%) patients showed dengue chikungunya coinfection [Table 2].

Table 2: Percentage distribution of samples

S. No.		Total samplestested	Positives N=(%)	Total positives
1	DENV NS1	200	29 (14.5%)	50 (25%)
	DENV IgM	200	21 (10.5%)	
2	CHIKV IgM	200	11 (5.5%)	11 (5.5%)
3	DENV + CHIKV	200	7 (3.5%)	7 (3.5%)

Discussion

Chikungunya fever and dengue fever are two significant arboviral illnesses in the world. Numerous studies conducted in the last few years have documented dengue and chikungunya infections in various regions of India [9].

The infections are spread by two separate species of mosquitoes: Aedes aegypti which is the primary vector, and Aedes albopictus, that serves as the secondary vector [10]. It can be challenging to distinguish between the two illnesses clinically since they share many common clinical symptoms, including high-grade fever, rashes, nausea, headaches, and bodily discomfort. A dengue viral infection is sometimes mistaken as chikungunya fever.

Due to the high prevalence and mortality rate of DENV, symptomatic persons are tested for DENV and, in rare cases, chikungunya infections. This is a significant reason why chikungunya patients remain untreated in dengue-endemic areas, and the true impact of the chikungunya virus illness has been overlooked. Thus, both illnesses should be investigated, particularly in endemic areas. Exact and timely detection of co-infections would aid in dishonorable administration. [11].

All of the cases examined at our institute were from patients who visited GGH, Siddipet, between October and December. The biggest number of suspected cases was recorded in October, although reports indicated an increase in dengue cases in November [5]. The frequency of cases increases during and after the monsoon season because higher humidity extends mosquito life spans and warmer temperatures decrease extrinsic incubation periods.

In the current investigation, we found 25% of patients to be positive for dengue NS1 and IgM. Thyagraj et al showed similar results [12]. Previous investigations utilizing serological techniques indicated co-infection rates ranging from 0.9% to 19% in North-west, North, North-East, and central India [13, 6], but the current study found a frequency of 3.5%. The current study found that males aged 20 to 30 years were more impacted than females.

Although it happened in every group, thrombocytopenia dominated in the dengue and co-infection groups. Reduced platelets in Dengue fever result from (i) disseminated intravascular coagulation, (ii) bone marrow suppression in the early stages, (iv) peripheral sequestration of platelets, and (iii) platelet destruction caused by anti-platelet antibodies [14,5].

It is important to note that chikungunya-specific IgM is usually detected in the plasma from day 4–7 following the onset of symptoms. CHIKV shares similar clinical presentations with dengue which develops new degrees of complication in the presence of co-infection, so most of the time, CHIKV may be ignored with DENV by medical professionals. Screening the suspected samples for CHIKV during dengue time can help establish this disease's actual burden.

There isn't a particular antiviral drug for dengue or chikungunya. Nonsteroidal anti-inflammatory drugs (NSAIDs), steroids, and antivirals are not advised for fever and severe body aches; only paracetamol and/or tramadol are permitted. Implementing intravascular volume replacement can prevent severe dengue and lower the risk of hospitalization [6].

In order to treat and manage the patient more effectively and to take early preventative actions to stop the infection from spreading, identifying the source of the illness that is making the patient ill is more important. The Centres for Disease Control & Prevention (CDC) highly recommend testing for dengue infection before starting aspirin or nonsteroidal anti-inflammatory drug (NSAID) treatment for individuals who test positive for chikungunya [15] further it allows the physician to properly treat and manage the patient's problems such as renal failure, ARDS, hemorrhages and arthritis.

Conclusion

There are repeated outbreaks of DENV and CHIKV co infections all over the world, in the present study the sample size was less and the rate of coinfection was also less. Coinfection with chikungunya does not increase severity of dengue. However, clinically suspected cases should be tested for both viruses in endemic areas, especially in the monsoon season, so that timely diagnosis and appropriate treatment can help in better prognosis and control outbreaks. This would also help to calculate the true burden of dengue and chikungunya co-infection.

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