VOLUME-7, ISSUE-7, JULY-2018 • PRINT ISSN No 2277 - 8160

Original Research Paper

Microbiology

# CO-PREVALENCE OF DENGUE AND CHIKUNGUNYA VIRUS IN SOUTH EAST RAJASTHAN

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## ABSTRACT

**Background:** Dengue and chikungunya infections appear to be increasing in India. While Aedies aegypti is the transmitting vector for both viruses and co-infection occurs in the same communities, studies on the clinical significance of co-infection are limited.

**Aims & objective:** 1. To study incidence of Dengue and Chikungunya coinfection in South east Rajasthan.
2.To identify Dengue infection & Chikungunya infection in early phase of disease and prevent further complications.

Materials and Methods: We conducted a prospective study of patients with complaint of febrile illness with arthralgia ,in Govt. Medical College & attached hospitals Kota, Rajasthan, who were screened for serologic evidence of dengue and chikungunya infection

**Result & discussion :** out of 200 patients, suspected of dengue and chikungunya,78 (39%) were positive for dengue IgM antibody, Males (52.56%), 11-20 years was the most commonly affected age group (38%). Only 1 (0.5%) patient was positive for chikungunya antibody (IgM), 41-50 years age group. No patients was positive for antibody against both dengue and chikungunya, suggesting coinfection.. However this study has the limitation with regards to small sample size to derive a fruitful conclusion and to overcome this, study on larger scale are needed.

**KEYWORDS :** Dengue, chikungunya , co-infection, Dengue Haemorrhagic Fever (DHF) or Dengue Shock Syndrome(DSS).

## INTRODUCTION

In recent years Mosquito borne viral disease like Dengue & Chikungunya have been causing large and wide spread epidemics .Dengue is presenting as more frequent and explosive outbreaks and covering new areas every year. Chikungunya re-emerged in 2005 and had affected many states. Dengue is caused by an RNA virus of family *Flaviviridae* having five antigenically distinct serotypes, Dengue Virus DENV-1, DENV-2, DENV-3,DENV-4 & DENV-5. They cause fatal hemorrhagic fever and shock. If these are not treated in time, they may lead to metabolic acidosis, disseminated intravascular coagulation (DIC) and multiple organ failure culminating into the death within 24 hours. Chikungunya fever is caused by an RNA virus of genus *Alphavirus* (*Togaviridae* family). It is transmitted by the same vector *Aedes aegyptii* mosquito. In the last few years, the disease has produced epidemics in the several parts of world including India. It usually presents with fever, rash and arthralgia/ arthritis.[1] In India, the areas affected by dengue and chikungunya overlap each other and *Aedes aegyptii* is the common vector for both the viruses. So co-infections by these two viruses in human beings are quite common. Also the clinical features of these diseases are similar; so the clinically suspected cases should be tested for the presence of both these viruses.[2]

Very scanty literature is available regarding the dual infections by Dengue and Chikungunya (CHIK) in Rajasthan, so the present study has been planned to find out the incidence of these two diseases as well as the presence of dual infections if any in South east Rajasthan.

## AIMS AND OBJECTIVES

- To study incidence of Dengue and Chikungunya coinfection in South east Rajasthan.
- To identify Dengue infection & Chikungunya infection in early phase of disease and prevent further complications.

## MATERIAL AND METHODS

**Study Population & sample size :** 200 patients of all age groups, attending the outpatient and inpatient departments of GMC Kota, presenting with clinical features suggestive of Dengue and/or Chikungunya were included. The standard criteria for case definitions given by WHO were followed.

**Period of study :** From November 2016 to October 2017

**Inclusion criteria: Suspected case of Dengue Fever/ Dengue Haemorrhagic Fever (DHF) or Dengue Shock Syndrome(DSS).**[3]

- Fever ≥ 100°F for ≤ 2 to 7 days **with** two or more of the following criteria-
- Maculopapular or mobilliform rash involve
- ing chest, trunk and extremities.
- Retro-orbital pain, headache,bone pain.
- Hemorrhagic manifestations such as mucosal bleeding in oral cavity, epistaxis, menorrhagia, gastric-intestinal bleed.
- Arthralgia involving joints such as wrist, elbow, shoulder, ankle etc
- Thrombocytopenia < 1 lakh/ml
- Increased Hematocrit > 20%
- Shock with Pulse pressure < 20mmHg, BP <80/60 mmHg, Cold and Clammy skin.

**Suspected cases of Chikungunya:**[4]

An acute onset of illness characterized by sudden occurrence of fever with few or many of the following symptoms: arthralgia, headache, backache, photophobia and rash.

**Exclusion criteria:**

- Rash involving only face& ears
- Lymphadenopathy: Post auricular, cervical
- Abdominal symptoms:- Pain, diarrhea.
- Neurological symptoms such as neck stiffness, altered sensorium.
- Episodic fever

Ten ml of blood was collected in a sterile plain bulb from every suspected patient of dengue and chikungunya. These bulbs were kept at room temperature for 30 minutes allowing the blood to clot. Sera were separated by centrifugation at 2500 rpm for 10 min. Clear serum was pipetted out & the sera were tested for presence of dengue IgM antibodies by using NIV Dengue IgM Capture ELISA Kit

& presence of chikungunya IgM antibodies by NIV Chikungunya IgM Capture ELISA Kit

## RESULT

78 (39%) were positive for dengue IgM antibody & only 1 (0.5%) patient was positive for chikungunya antibody (IgM).

No patients was positive for antibody against both dengue and chikungunya, suggesting coinfection (Figure1) **.** Demographic profile of patients of dengue showed, 11-20 years was the most commonly affected age group (38%). Males (52.56%) were more commonly affected than females (47.44%). Fever was most consistant feature,followed by headache (93.59%), myalgia (91.03%), arthralgia (78.20%), nausea/vomiting (73.08%), pain abdomen (69.33%), rash (48.72%), hemorrhagic manifestation (29.49%), shock (17.95%) and altered consciousness (16.67%). Haematocrit >20% (74.36%),deranged liverenzymes (64.10%), thrombocytopenia (69.23%) were found in DF. Only one female patient suffering from chikungunya was found , 41-50 years age group with feature of fever, headache, arthralgia, myalgia and nausea/vomiting.(Table 1 & 2)

## DISCUSSION

39% patients in present study were positive for dengue IgM antibodies & Only 0.5% patients had IgM antibodies against chikungunya. Different workers recorded grossly variable results for the seropositivity of dengue, chikungunya This is because of different methodologies adopted by all these workers and variable endemicity zones.No patient was reported with dual infection. **Yergolkar et al** [5] Maharashtra (0.4%) reported very low incidence of co-infection, which were quite similar to present study while higher rates were also reported by **Taraphdar et al** [6] (12.4%), & **Arora et al** [7] (15.33% ). Regional variations in the disease prevalence, density of mosquito population, sanitation facilities and the control measures would be the factors that have led to such a variable incidence of coinfection.

Most of the patients in present study belonged to the age group of 11-20 years (40.5%) followed by 21-30 years (25.5%).

There is wide variation in results of different study which may be due to their selection of patients suffering from all types of pyrexia.

Majority of the patients were males (56%) as compared to females (44%). Similar findings were recorded by **M. Anowar Hossain et al** [8] and **Syed Irfan Ahemad et al** [9] in their studies(54.71% and 55.30% were males and 45.29% and 44.67% were females respectively). The overall male predominance is probably because of more exposure of males to the environmental conditions when they are at the work during day time.Fever and headache was the universal symptom. All other workers reported similar finding in their studies. myalgia and arthalgia were the other common symptoms and were present in 91.03% and 78.20% of patients respectively. Lower rates were seen by **M. Emmanuel Bhaskar et al** [10] This might be because of selection of only severe cases of dengue hemorrhagic fever (DHF) for their study .While **Shah et al** [(11)] and **Hovarth et al** [12] recorded a very high percentage of myalgia & arthalgia. The reason for these higher percentages might be due to selection of only dengue seropositive patients (as in **Shah et al** [11]) or the study being carried out during an acute epidemic (as in **Hovarth et al** [(12)]).

## CONCLUSION

Considering the common vector for dengue and chikungunya both, present study searched for the possibility of coinfection. However this study has the limitation with regards to small sample size to derive a fruitful conclusion and to overcome this, study on larger scale are needed. Neither an effective vaccine nor a specific treatment is available for dengue and chikungunya infection. The treatment is mainly symptomatic and supportive so the control measures largely depend on prevention of contact between man and the vector. These include: environmental, biological and chemical control of the mosquitoes, as well as active case surveillance. Successful control programmes should incorporate all these methods.

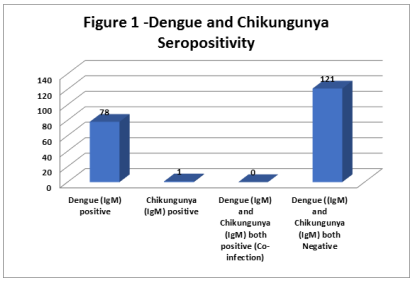


**Table 2: Symptoms wise distribution:**

| Symptoms | Study Group (n=200) | Dengue (n=78) | Chikungunya (n=1) | Coinfection (n=0) |
|---|---|---|---|---|
| Fever | 200 (100%) | 78 (100%) | 1 (100%) | 0 |
| Headache | 184 (92%) | 73 (93.58%) | 1 (100%) | 0 |
| Myalgia | 176 (88%) | 71 (91.03%) | 1 (100%) | 0 |
| Arthralgia | 131 (65.5%) | 61 (78.20%) | 1 (100%) | 0 |
| Nausea/ Vomiting | 136 (68%) | 57 (73.08%) | 1 (100%) | 0 |
| Pain abdoman | 82 (41%) | 54 (69.23%) | 0 (0.00%) | 0 |
| Rash | 40 (20%) | 38 (48.71%) | 0 (0.00%) | 0 |
| Shock | 15 (7.5%) | 14 (17.94%) | 0 (0.00%) | 0 |
| Hemorrhgic Manifestation | 24 (12%) | 23 (29.48%) | 0 (0.00%) | 0 |
| Altered Consciousness | 15 (7.5%0 | 13 (16.67%) | 0 (0.00%) | 0 |

**Table 1: Age wise distribution of Study group, Dengue, Chikungunya and their co-infection**

| Age Group (years) | No. of sample (%) | No. of Dengue (IgM) positive (%) | No. of Chikungunya (IgM) positive (%) | Co-infection |
|---|---|---|---|---|
| ≤10 | 7 (3.50%) | 3 (3.85%) | 0 | 0 |
| 11-20 | 81 (40.50%) | 30 (38.46%) | 0 | 0 |
| 21-30 | 51 (25.50%) | 22 (28.20%) | 0 | 0 |
| 31-40 | 37 (18.50%) | 15 (19.23%) | 0 | 0 |
| 41-50 | 11 (5.50%) | 4 (5.13%) | 1(100%) | 0 |
| 51-60 | 5 (2.50%) | 1 (1.28%) | 0 | 0 |
| 61-70 | 8 (4.00%) | 3 (3.85%) | 0 | 0 |
| **Total (n)** | **200 (100%)** | **78 (100%)** | **1 (100%)** | **0** |

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