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**ORIGINAL RESEARCH**

# CLINICO-SEROLOGICAL ASSESSMENT OF CASES OF DENGUE INFECTION

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## ABSTRACT

**Background:** To assess cases of dengue infection using serology.

**Methods**: A sum total of ninety-five cases of dengue virus infection in age 20- 60 years of either gender was selected. All patients were subjected to evaluation of NS1 antigen, IgM and IgG antibodies. NS1 antigen and IgM antibodies using ELISA method and IgG antibodies were detected using lateral flow assay.

**Results:** Out of 95 patients, males comprised 52 (54.7%) and females 43 (45.3%). Common clinical features recorded were arthralgia in 58%, myalgia in 42%, headache in 69%, retro- orbital pain in 31%, rash in 78% and bleeding in 56%. A significant difference between was observed ($P<0.05$). NS1 was identified in 48%, IgM in 22%, IgG in 5%, NS1+ IgM in 13%, NS1+ IgG in 4% and NS1+ IgM+ IgG in 8%. A significant difference was observed ($P< 0.05$).

**Conclusion**: Male dengue infection rates were significantly higher than female rates. In the majority of cases, NS1 was found first, then NS1+ IgM.

**Keywords: Arthralgia, Dengue, Headache**

## INTRODUCTION

Throughout the world, dengue is an endemic arboviral illness. The World Health Organization (WHO) believes that around two-fifths of the world's population lives in tropical and subtropical nations, where they are constantly at danger of developing this infection[1]. Dengue is a serious public health issue and the primary cause of hospitalisation in India. Over the past three to five years, there has been an upsurge in dengue incidence, and the disease is expanding to new regions. It was formerly thought to be a sickness exclusive to urban and semi-urban settings, but it is increasingly spreading to the wealthy elite as well, raising serious public health concerns. Dengue is more commonly transmitted during and after the rainfall.[2]

Dengue Fever (DF) is one of the main viral infections. The stranded RNA virus that causes dengue-related diseases is known as the dengue virus (DENV). Dengue can cause a number of different symptoms, including dengue fever, dengue hemorrhagic fever (DHF), and dengue shock syndrome (DSS). Dengue cases have been reported to be increasing during the past few years. However,

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compared to two decades ago, the death rate among population has drastically decreased due to widespread improvements in diagnosis and timely treatment.[3]

The genome of the virus is cleaved into three structural proteins, namely, C, prM, E and seven non-structural proteins, NS1, NS2a, NS2b, NS3, NS4a, NS4b and NS5.[3] Dengue NS1 antigen detection and RT-PCR are tests currently available for diagnosis of early dengue infections.[4] It is evident that a very less number of patients advance to severe disease, characteristically revealing transient systemic vascular leak syndrome around the time of defervescence; plasma leakage occurs, typically related with altered haemostasis and decreased platelet counts.[5] In this regard severe complications like severe liver, cardiac or neurological involvement, may also occur but are less frequent.[6]

Urgent shock resuscitation is only necessary in a tiny percentage of cases; careful observation, assessment, and prudent use of intravenous fluid treatment are essential. But a big problem for doctors caring for these patients is still that it can be challenging to diagnose dengue clinically in the early stages of the illness without using costly testing.[7,8] Considering this, we performed present study to assess cases of dengue.

## MATERIALS & METHOD

In this prospective, observational study, a sum total of ninety- five cases of dengue virus infection in age 20- 60 years of either gender was selected. A valid written consent was obtained from all selected cases.

Demographic characteristics such as name, age, gender etc. was recorded in case history proforma. A careful clinical examination was performed and features such as myalgia, arthralgia, rash, headache, retro-orbital pain, hemorrhagic manifestations etc. was recorded. All patients were subjected to evaluation of NS1 antigen, IgM and IgG antibodies. NS1 antigen and IgM antibodies using ELISA method and IgG antibodies were detected using lateral flow assay following the manufacturer's instructions. Measurement of total leukocyte and differential leukocyte level was also recorded. The results of the study was spread along MS excel sheet and all the comparison was made using chi-square test. The level of significance was set below 0.05 as significant and below 0.01 as highly significant.

## RESULTS

**Table 1 Distribution of patients**

| Total- 95 | | |
|---|---|---|
| **Gender** | **Male** | **Female** |
| Number (%) | 52 (54.7%) | 43 (45.3%) |

Out of 95 patients, males comprised 52 (54.7%) and females 43 (45.3%) (Table I).

**Table 2 Evaluation of clinical features**

| Clinical features | Percentage (%) | P value |
|---|---|---|
| Arthralgia | 58% | 0.05 |
| Myalgia | 42% | |
| Headache | 69% | |
| Retro-orbital pain | 31% | |
| Rash | 78% | |

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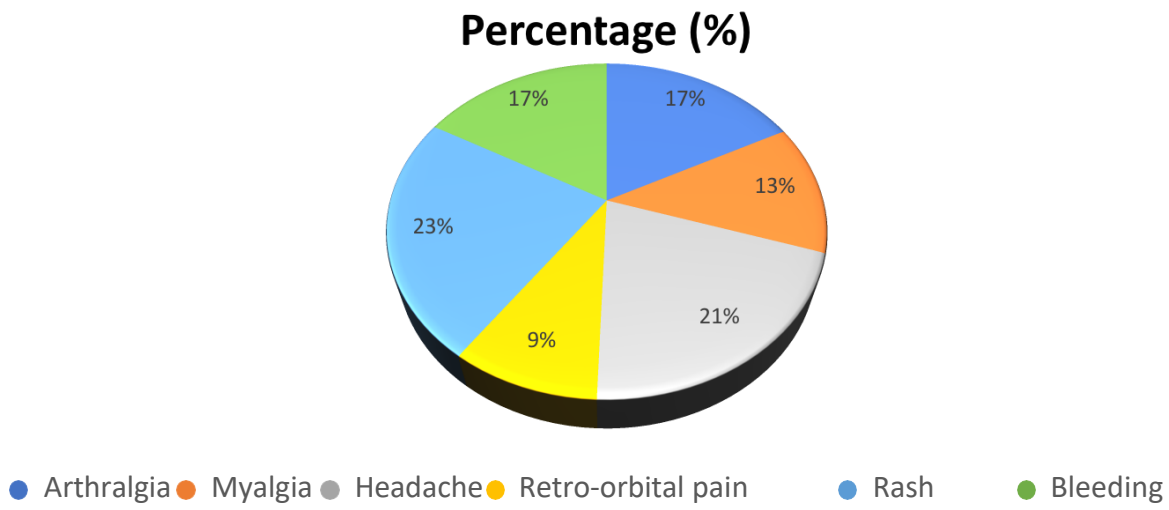
| | | |
|---|---|---|
| Bleeding | 56% | |

Common clinical features recorded were arthralgia in 58%, myalgia in 42%, headache in 69%, retro-orbital pain in 31%, rash in 78% and bleeding in 56%. A significant difference between was observed (P<0.05) (Table 2, graph 1).




**Graph 1 Evaluation of clinical features**

**Table 3 Serological investigations**

| Serological investigations | Percentage (%) | P value |
|---|---|---|
| NS1 | 48% | 0.05 |
| IgM | 22% | |
| IgG | 5% | |
| NS1+ IgM | 13% | |
| NS1+ IgG | 4% | |
| NS1+ IgM+ IgG | 8% | |

NS1 was identified in 48%, IgM in 22%, IgG in 5%, NS1+ IgM in 13%, NS1+ IgG in 4% and NS1+ IgM+ IgG in 8%. A significant difference was observed (P< 0.05) (Table 3, graph 2).

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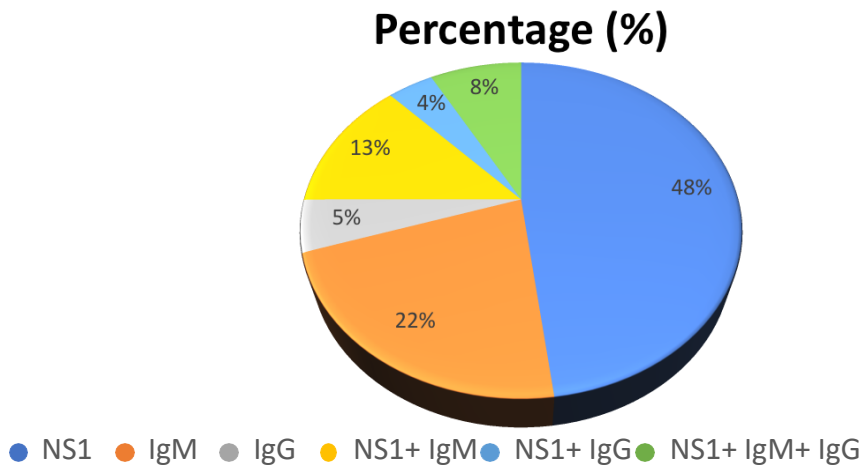


**Graph 2 Serological investigations**

## DISCUSSION

Around 100 million cases of dengue fever are recorded every year worldwide, indicating that the disease has persisted as a problem.[9,10] Although prevalence varies depending on the region, dengue is thought to be responsible for at least 20,000 fatalities annually. India's current situation is indicative of a worldwide trend.[11,12] Viral nucleic acid detection and serological detection of NS1 antigen or IgM antibodies using a variety of techniques, including rapid card tests or ELISA, are included in the diagnostic support for dengue detection. The value of these diagnostic markers has been contested, nevertheless.[13,14]

Lifelong immunity against re-infection by the same serotype, but not against other serotypes, is conferred by infection with one serotype. The great majority of dengue infections are asymptomatic, although a small percentage show up as a generalized feverish sickness or worsen with time.[15,16] The primary dengue mosquito vector is Aedes aegypti. During the day, adult mosquitoes hide indoors and bite. They have evolved to procreate in and around human habitations, as well as in vases, cans, old tires, and other abandoned items. Aedes albopictus is the dengue virus's secondary vector; it plays a major role in the virus's transmission in Asia and is becoming more prevalent in Latin American nations.[17,18] We performed the present study to assess cases of dengue.

Our results showed that out of 95 patients, males comprised 52 (54.7%) and females 43 (45.3%). Sharma et al[19] found that among 667 patients enrolled, 328 (49.2%) had prolonged hospitalization. The mean hospital stay was 4.88±2.74 days. It was found that dengue hemorrhagic fever, elevated alkaline phosphatase (ALP), prolonged prothrombin time (PT), activated partial thromboplastin time and multiple-organ dysfunctions were independently associated with prolonged hospitalization. Overall case fatality rate was 1.1%. Factors associated with dengue mortality were age >40 years, secondary infection, comorbidities, acute kidney injury, prolonged PT, multiple-organ dysfunctions, hematocrit >20%, rhabdomyolosis and respiratory failure.

Common clinical features recorded were arthralgia in 58%, myalgia in 42%, headache in 69%, retro-orbital pain in 31%, rash in 78% and bleeding in 56%. Harichandran et al[19] found that out of 115 patients, males comprised 60 (52.2%) and females 55 (47.8%). Common symptoms recorded were headache in 67%, retro orbital pain in 32%, myalgia in 52%, arthralgia in 45%, rash in 74%

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and bleeding in 53%. NS1 was identified in 45%, IgM in 20%, IgG in 3%, NS1+ IgM in 21%, NS1+ IgG in 5% and NS1+ IgM+ IgG in 6%.

In our study NS1 was identified in 48%, IgM in 22%, IgG in 5%, NS1+ IgM in 13%, NS1+ IgG in 4% and NS1+ IgM+ IgG in 8%. Mangaiyarkarasi T et al[20] in their study, 1880 patients were subjected for dengue screening by tests for NS1 antigen and IgM antibody by ELISA method and IgG antibody detection was done by rapid card test. Results showed that 32.2% (607) were diagnosed as positive for dengue. Among them 58.2% (353) were male. The common age group was 21-30 years (9.57%) followed by 31-40 years (6.48 %). A total of 48.3% (293) were found to be reactive for dengue NS1 antigen alone whereas 22.6% (137) and 2.9% (18) were reactive for IgM and IgG respectively. A peak in the number of incidences was observed during the month of October (N=256) followed by September (N=124) and minimum was observed during January and February (N=5).

Basawarajappa et al[21] studied 6126 clinically suspected dengue samples. The samples were tested for IgM and IgG antibodies and NS1 antigen by both ELISA and rapid tests. Clinical signs and symptoms could not predict dengue positivity due to lack of specific symptoms. The performance of IgM rapid test was found to be lower than the ELISA method (53.5% agreement). The NS1 rapid and NS1 ELISA tests were comparable (89.2% agreement). Majority of the infections were caused due to DEN-2 serotype and phylogenetic analysis revealed all the sequenced DEN-2 serotypes belong to Genotype IV.

## CONCLUSION

Male dengue infection rates were significantly higher than female rates. In the majority of cases, NS1 was found first, then NS1+ IgM.

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