

# Effect of acute phase of dengue fever on leucocyte count: A study in rural tertiary health care centre

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## Abstract

**Background:** Dengue fever caused by flavivirus is transmitted by mosquitoes. is an arboviral disease caused by flavivirus. Morbidity and mortality caused by dengue fever is increasing in India. More number of patients are getting infected by dengue than before in rural population also. Clinical course and presentation varies in each patient. Therefore laboratory parameters can guide us to the timely diagnosis and proper management of the disease. **Aim of Study:** To study the effect of acute phase of dengue fever on total leucocyte count. **Study Design:** Prospective observational study. **Material and Methods:** Total 92 adults (>18 years) who tested positive for NS1 antigen and / or IgM antibody were included in the study. They were analyzed for total leucocyte count measurements. These patients were divided into three groups based on there leucocyte counts into leucocyte count<4000/ $\mu$ l, leucocyte count from 4000-11,000/ $\mu$ l and leucocyte count >11,000/ $\mu$ l. **Results:** Statistically significant number of patients, 66 (71.7%) showed leucopenia less than 4000/ $\mu$ l. **Conclusion:** Leucopenia can be used as an early predictor of dengue infection in patients presenting with fever and can be used for timely diagnosis and treatment of dengue.

**Key Words:** dengue, total leucocyte count, leucopenia.

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represented by fever to final phase of resolution.<sup>5</sup> In these phases, Dengue virus causes alterations in various haematological parameters. One of the important effect is leucopenia or decreased total WBC count. New-onset leucopenia (WBC <5,000 cells/mm<sup>3</sup>) indicates that the fever will likely dissipate within the next 24 hours and that the patient is entering into the critical phase<sup>4,6</sup> The course of illness varies in each patient of dengue fever. Therefore, regular monitoring of total leucocyte count is important for early detection and timely treatment of severe cases.

## INTRODUCTION

Dengue fever is a common infection in tropical countries like India. It is a common and serious source of mortality and morbidity in India. Dengue was first reported in Chennai in 1780.<sup>1</sup> Since then Dengue is spreading rapidly in all parts of India.<sup>2,3</sup> Dengue fever is caused by dengue virus belonging to family Flaviviridae. It has four serotypes – DEN-1, DEN-2, DEN-3, DEN-4. It is transmitted by Aedes mosquitoes.<sup>4</sup> In humans, Dengue fever has different phases from initial phase of viraemia

## AIM OF STUDY

To study the effect of dengue fever on total leucocyte count in adults (>18 years) in acute phase of viraemia indicated by isolated NS1 positive serology test in a tertiary health care centre in Maval region of Maharashtra.

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## MATERIAL AND METHODS

This is a prospective observational study done in rural tertiary health care centre in maval region of Maharashtra from January 2019 to May 2019. Total 92 adults (>18 years) who were positive for NS1 antigen and / or IgM antibody were included in the study. Patients who were positive for IgG antibodies were excluded from the study. Also children and adolescents below 18 years with dengue positive serology were excluded from the study. These 92 patients were divided into three groups depending on their total leucocyte count (TLC) as follows:

Group 1: TLC <4,000/ $\mu$ l

Group2: TLC 4,000-11,000/ $\mu$ l

Group3: TLC >11,000/ $\mu$ l.

Serological testing for NS1 antigen and IgM antibody was done using rapid serology tests. Total leucocyte count in these patients was obtained from 5 part fully automated cell counter. It is a prospective descriptive observational study. Results were analyzed using chi square test and percentage. Level of significance was fixed at p value less than 0.05.

## RESULTS

In this study, out of total 92 patients, 68 were males (73%) and 24 were females (27%).

**Table 1:** Male and female distribution of cases

Gender	N ( number of patients)	Percentage (%)
Male	68	73%
Female	24	27%
Total	92	100%

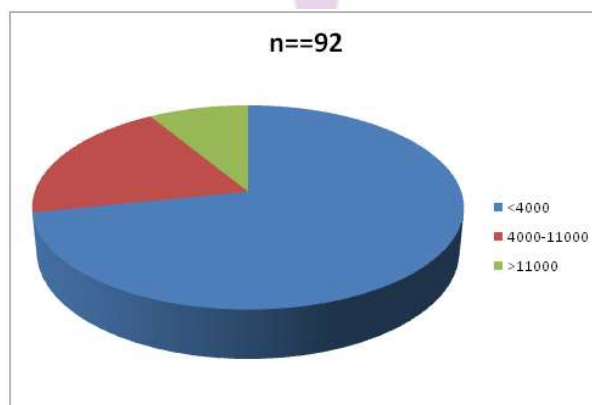
**Table 2:** Dengue positive serological profile of patients studied

Dengue serology test	N (Number of patients)	%
Ns1	72	78.2
IgM	16	17.3
NS1 + IgM	04	4.3

As shown in table 2 and fig 2, maximum number of patients i.e. 72 (78.2%) were positive for dengue NS1 antigen. 16 patients (17.3%) were positive for IgM antibodies and 4 patients (4.3%) were positive for both NS1 antigen and IgM antibodies.

**Table 3:** Total leucocyte count of patients

Total leucocyte count	Number of patients (n=92)	Percentage (%)
TLC <4000/ $\mu$ l	66	71.7
TLC 4000-11000/ $\mu$ l	18	19.7
TLC >11000/ $\mu$ l	08	8.6



**Figure 1:** Total leucocyte count of patients

As can be seen in fig 3, maximum number of patients i.e. 66 (71.7%), showed leucopenia, which was stastically significant (p value < 0.05%).

## DISCUSSION

In this study, percentage of males (73%) was more than females (27%). Similar findings were found in a study done in Odisha by Mishra *et al*<sup>7</sup>. In this study there were 75 (77.31%) males and 22 (22.68%) females. We found that statistically significant number of patients showed leucopenia. Similar findings were obtained by Potts JA and Rothman AL<sup>8</sup> and Manas Kotepui, *et al*<sup>9</sup>

## CONCLUSION

Leucopenia is a significant finding in early acute phase of dengue fever. Therefore evaluation of total leucocyte count at regular intervals can be utilized for monitoring the course of dengue fever patients. Also, high level of suspicion for dengue fever should kept in patients presenting with fever and leucopenia for timely diagnosis and treatment of dengue.

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