Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 15s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

An Observational Study Of Using Lactate Dehydrogenase As Prognostic Marker In Dengue Patients

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Cite this paper as: Dr. R. H. P. V. Vineela, Dr. Srinivasa. S. V, Dr. Lokesh M, (2025) An Observational Study Of Using Lactate Dehydrogenase As Prognostic Marker In Dengue Patients. *Journal of Neonatal Surgery*, 14 (15s), 2172-2177.

ABSTRACT

Dengue infection is a febrile illness caused by one of 4 serotypes of dengue virus which is transmitted by mosquito named aedes aegypti or aedes albopictus. Dengue is also called as “break bone fever”. Most patients with dengue are asymptomatic/ mildly symptomatic**.** Some patients may present with severe form known as Dengue Shock Syndrome which is life threatening. LDH enzyme is usually high in states with high reticuloendothelial activity. Pathogenesis of dengue infection is directly related to level of reticuloendothelial activity, thrombocytopenia. This study will be done to analyze the relation between serum lactate dehydrogenase with severity of dengue and predicting complications

Introduction: Dengue is a febrile illness caused by infection with one of four dengue viruses (DENV) transmitted by *Aedes aegypti* or *Aedes albopictus* mosquitoes. Infection may be asymptomatic or present with a broad spectrum of clinical manifestations which include mild febrile illness to a life-threatening dengue shock syndrome. Numerous viral, host, and vector factors are thought to impact risk of infection, disease, and disease severity.

There are four closely related but serologically distinct DENV types of the genus *Orthoflavivirus*, called DENV-1, DENV-2, DENV-3, and DENV-4. There is transient cross-protection among the four DENVs, which wanes and disappears over the months following infection. Therefore individuals living in a dengue-endemic area with all DENV types cocirculating are at risk for infection with any and all DENV types.

Materials And Methods:

- **Study Design:** open labelled, observational prospective study
- **Study period:** 3 months
- **Sample size:** 30patients
  - **Study area:** R. L. Jalappa Hospital
  - **Study population:** All patients > 18yrs age who are serologically tested dengue positive and admitted to R. L. Jalappa Hospital, Kolar.

Results

1. The age of the study population varied between 40-68 years.
2. Male patients were 58% and female patients were 42% of the study population.
3. Of the 30 patients studied most of them have complications related to dengue fever.
4. Serum LDH levels in patients with complications was higher compared to those without complications.
5. Serum magnesium levels is proportional to severity of complications in patients with dengue fever.

Conclusion

- Serum LDH levels were higher in patients with complications.
- Patients with severe complications had relatively higher serum LDH levels compared to those with mild and moderate complications.

Keywords: *Dengue fever, lactate dehydrogenase*

1. INTRODUCTION

Dengue is a febrile illness caused by infection with one of four dengue viruses (DENV) transmitted by *Aedes aegypti* or *Aedes albopictus* mosquitoes. Infection may be asymptomatic or present with a broad spectrum of clinical manifestations which include mild febrile illness to a life-threatening dengue shock syndrome. Numerous viral, host, and vector factors are thought to impact risk of infection, disease, and disease severity.

There are four closely related but serologically distinct DENV types of the genus *Orthoflavivirus*, called DENV-1, DENV-2, DENV-3, and DENV-4. There is transient cross-protection among the four DENVs, which wanes and disappears over the months following infection. Therefore individuals living in a dengue-endemic area with all DENV types cocirculating are at risk for infection with any and all DENV types.

OBJECTIVES

1. To study the association between serum LDH and severity of dengue fever
2. Role of serum LDH as independent prognostic marker in predicting complications in dengue fever

2. MATERIALS AND METHODS

- **Study Design:** open labelled, observational prospective study
- **Study period:** 3 months
- **Sample size:** 30patients
  - **Study area:** R. L. Jalappa Hospital
  - **Study population:** All patients > 18yrs age who are serologically tested dengue positive and admitted to R. L. Jalappa Hospital, Kolar.

3. STATISTICAL ANALYSIS METHODS

Statistical Methods:

Data will be entered into Microsoft excel data sheet and will be analyzed using SPSS 22 version software. Categorical data will be represented in the form of Frequencies and proportions. **Chi-square test or Fischer's exact test** (for 2x2 tables only) will be used as test of significance for qualitative data. **Yates correction** will be applied were ever chi-square rules were not fulfilled (for 2x2 tables only).

Continuous data will be represented as mean and standard deviation. **Independent t test or Mann Whitney U test** will be used as test of significance to identify the mean difference between two quantitative variables and qualitative variables respectively.

Graphical representation of data: MS Excel and MS word will be used to obtain various types of graphs such as bar diagram, Pie diagram and Scatter plots.

Pearson correlation or Spearman's correlation will be done to find the correlation between two quantitative variables and qualitative variables respectively.

p value (Probability that the result is true) of <0.05 will be considered as statistically significant after assuming all the rules of statistical tests.

Statistical software: MS Excel**,** SPSS version 22 **(**IBM SPSS Statistics, Somers NY, USA) will be used to analyze data.

Sample size: Sample size was estimated by using correlation coefficient (r) of LDH with severity of diseases as 0.778 (i.e. r = 0.778) from the study by Harish kasarabada et al. Using these values at 95% confidence level and 90% power and substituting in the below formula, sample size of 27 was obtained. Considering 10% Non response rate a sample size of 27 + 2.7 = 30 subjects will be included in the study.

4. RESULTS

Table 1. Age distribution among the samples in the study was as follows:

Age(Years)	Total	
	Number	Percentage
<30	11	37%
30 – 60	14	47%
>60	5	16%
Total	30	100%

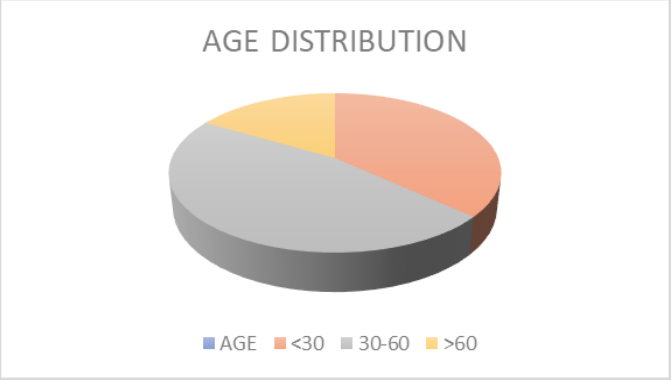

Figure 1. Age distribution among the samples in the study was as follows

Of the 30 patients studied, 20 patients developed complications related to dengue fever and 10 patients did not develop any complications. Among the patients studied most of the patients developed complications related to dengue fever

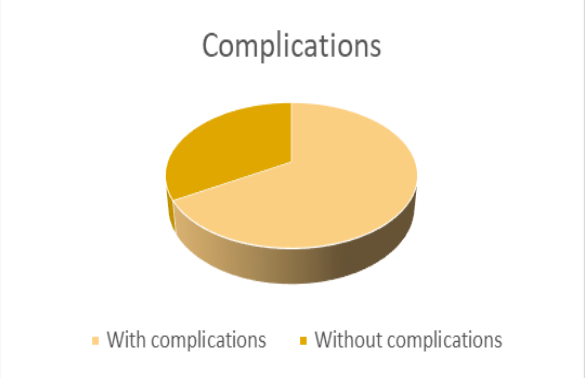

Figure 2. Distribution of complications in dengue patients.

In the study males accounted for 58% and females for 42% of the total population

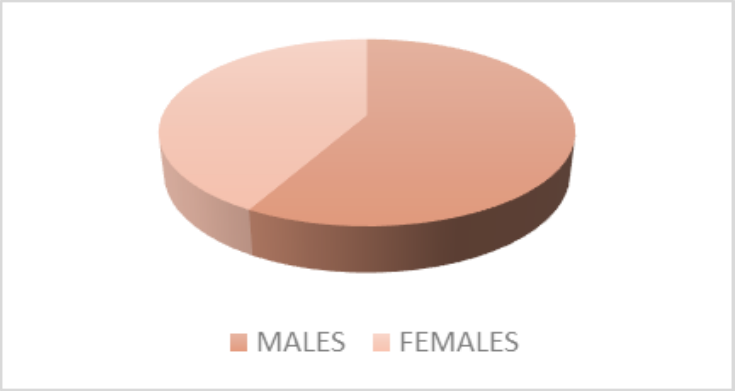

Figure 3. Gender distribution among the sample population.

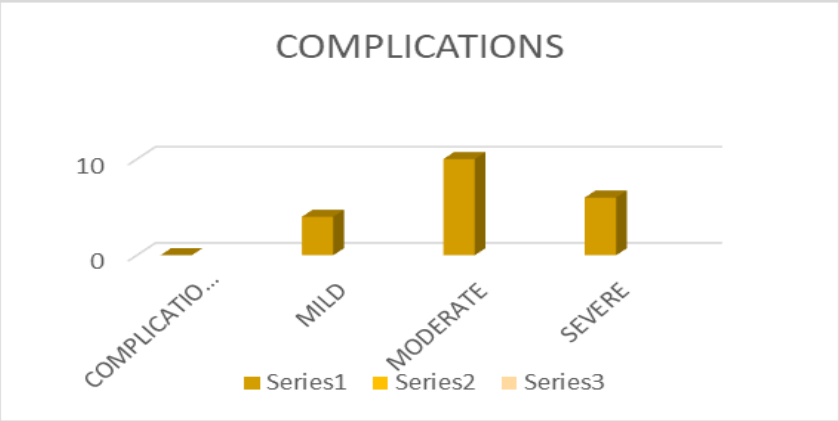

Figure 4. Analysis of complications in dengue patients.

Out of 30 patients with dengue only 20 patients developed complications. Of the 20 patients, 4 patients (30%) developed mild complications, 10 patients (50%) developed moderate complications, 6 patients (30%) developed severe complications.

COMPLICATIONS	Total No. of patients	Percentage
Mild	4	20%
Moderate	10	50%
Severe	6	30%
Total	20	100%

Table 2. Analysis of complications in dengue patients.

Among the patients with complications, 75% had increased LDH levels and 25% had LDH within normal range.

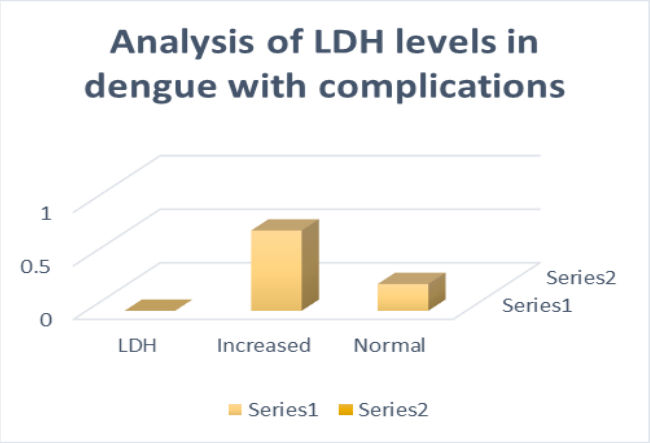

Figure 6. Analysis od LDH levels in dengue patients with complications

5. SUMMARY

30 patients of dengue admitted to Sri Devraj Urs Medical College on conservative management were studied for LDH levels.

1. The age of the study population varied between 40-68 years.
2. Male patients were 58% and female patients were 42% of the study population.
3. Of the 30 patients studied most of them have complications related to dengue fever.
4. Serum LDH levels in patients with complications was higher compared to those without complications.
5. Serum magnesium levels is proportional to severity of complications in patients with dengue fever.

6. LIMITATIONS OF THIS STUDY

- Sample size in this study is small and requires large sample size to define the results to a larger population.
- Establishment of LDH as biomarker in dengue along with comorbid conditions like Lymphoma or sepsis is not clear.

7. CONCLUSION

- Serum LDH levels were higher in patients with complications.
- Patients with severe complications had relatively higher serum LDH levels compared to those with mild and moderate complications.

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