



The Association of Platelet Count and Hematocrit Levels with Length of Hospital Stay Among Dengue Patients at Hospital

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Abstract

Dengue fever remains a significant public health problem in Indonesia, where hematological parameters are commonly used to support clinical assessment and patient management. This study aimed to analyze the association between platelet count, hematocrit levels, and length of hospital stay among dengue patients treated at Hospital X in Mataram. An observational analytic study with a retrospective design was conducted using secondary data from 73 confirmed dengue patients with complete medical records. Due to non-normal data distribution, Spearman correlation analysis was applied. The results showed a moderate and statistically significant positive correlation between platelet count and length of hospital stay ($r = 0.422$; $p < 0.001$), while hematocrit levels were not significantly associated with hospitalization duration ($r = 0.059$; $p = 0.620$). These findings suggest that platelet count may be associated with hospitalization duration; however, this relationship should be interpreted cautiously, as clinical management and timing of hospital presentation may influence outcomes. The study highlights the importance of contextual interpretation of routine hematological parameters in dengue management and supports their role in clinical monitoring within hospital settings.

Keywords: Dengue Fever; Platelet Count; Hematocrit Value; Length Of Hospital Stay

INTRODUCTION

Dengue remains a major public health problem globally, particularly in tropical regions, with increasing incidence and significant burden on healthcare systems (Bhatt, et al., 2021; Gubler, 2020; Messina et al., 2020). Dengue transmission and clinical burden continue to increase globally, particularly in endemic countries, posing challenges to healthcare systems and resource allocation (Brady & others, 2020; Gubler, 2020; Messina et al., 2020). The disease often requires hospitalization due to complications such as

plasma leakage, bleeding, and organ impairment. Effective clinical management relies heavily on routine laboratory parameters to assess disease progression and guide treatment decisions (Bhatt, Gething, Brady, & others, 2021; Wilder-Smith et al., 2020; World Health Organization, 2023)

Hematological alterations, including thrombocytopenia and hemoconcentration, are key features of dengue infection (Malavige & Ogg, 2020; Srikiatkachorn & Kelley, 2020). Thrombocytopenia occurs due to bone marrow

suppression and immune-mediated destruction, while elevated hematocrit reflects plasma leakage during the critical phase of illness. These parameters are widely used in clinical settings to monitor disease severity (Nascimento et al., 2022; Sangkaew et al., 2021; Zhang et al., 2021). However, their role in predicting hospitalization outcomes, particularly length of stay (LOS), remains unclear.

Several recent studies have explored predictors of dengue severity and clinical outcomes, yet findings related to LOS are inconsistent. Some studies suggest that hematological abnormalities are associated with prolonged hospitalization, while others report that LOS is influenced more by clinical management, timing of presentation, and institutional practices (Trunfio et al., 2020; Wang et al., 2020; Yacoub & Wills, 2020). Additionally, most studies focus on severity classification rather than hospitalization duration, indicating a gap in understanding how routine laboratory parameters relate to LOS in real-world clinical settings.

Conceptually, platelet count and hematocrit may influence LOS through their association with disease progression and clinical decision-making. Patients with abnormal laboratory findings may require closer monitoring and supportive therapy, potentially extending hospitalization. However, the relationship may not be linear due to variations in treatment protocols and physician judgment (Kularatne, 2021; Nguyen et al., 2020).

Based on this gap, the research question is whether platelet count and hematocrit levels are associated with length of hospital stay among dengue patients. This study hypothesizes that both parameters are associated with LOS, although the strength of the relationship may vary. Therefore, this study aims to analyze the association between

platelet count, hematocrit levels, and LOS among hospitalized dengue patients in Mataram.

METHOD

Study Design

This study used an observational analytic design with a retrospective approach. The design was selected to analyze the association between hematological parameters and length of hospital stay using existing medical record data. A retrospective observational approach allows the evaluation of real-world clinical conditions and laboratory findings among dengue patients in a hospital setting without interfering with routine patient management.

Study Setting and Data Source

The study was conducted at Hospital X in Mataram using secondary data obtained from medical records of hospitalized dengue patients during the period 2024–2025. Data were collected anonymously to ensure patient confidentiality and consisted of routinely recorded clinical and laboratory information documented during hospitalization.

Hematological parameters analyzed in this study were based on initial laboratory measurements obtained at the time of hospital admission (day 1 of hospitalization). Platelet count and hematocrit values were extracted from the first recorded laboratory results to ensure consistency across patients and to reflect baseline clinical status upon presentation. The use of admission values was intended to minimize variability related to disease progression and differences in timing of repeated measurements.

It is acknowledged that hematological parameters in dengue infection are dynamic and may fluctuate significantly during the course of illness. Therefore, the use of single measurements at admission may not fully capture the temporal

changes, such as nadir platelet levels or peak hematocrit values, which could influence clinical outcomes. However, admission values were selected as they represent the most standardized and consistently available data across all patients in retrospective medical records.

Study Population and Sample Size

The study population included all hospitalized patients with a confirmed diagnosis of dengue fever. A total sampling technique was applied, in which all eligible patients who met the inclusion criteria were included in the study. The inclusion criteria were patients with confirmed dengue diagnosis, complete medical records including platelet count, hematocrit level, and length of hospital stay, and a minimum hospitalization duration of 24 hours. Patients with chronic hematological disorders or co-infections that could affect hematological parameters were excluded.

A total of 73 patients met the inclusion criteria and were included in the final analysis. Since this study utilized secondary data with a finite population, formal sample size calculation prior to data collection was not performed. However, this sample size is considered adequate for correlation analysis in observational studies (Bujang & Adnan, 2016).

Power Analysis

A post-hoc power analysis was conducted to assess the adequacy of the sample size in detecting the observed correlation. Using the observed correlation coefficient ($r = 0.422$), a sample size of 73, and a significance level of 0.05, the statistical power was estimated to be greater than 80%, indicating sufficient power to detect a moderate correlation effect (Cohen, 1988; Hulley et al., 2013). Therefore, the study sample was considered adequate to support the reliability of the findings.

Data Collection

The variables collected included platelet count (cells/ μ L), hematocrit level (%), and length of hospital stay (days), along with demographic characteristics such as age and sex. All laboratory measurements were obtained using standard hematology analyzers as part of routine hospital examinations.

Statistical Analysis

Data analysis was performed using statistical software. Descriptive analysis was conducted to summarize patient characteristics and hematological profiles. The normality of continuous variables was assessed using the Shapiro–Wilk test. Since the data were not normally distributed, the association between platelet count, hematocrit level, and length of hospital stay was analyzed using Spearman’s rank correlation test. Statistical significance was determined at a p-value of less than 0.05. The results of the analysis were presented in tables to support clarity and interpretation.

RESULT AND DISCUSSION

Characteristics of Dengue Patients

A total of 73 hospitalized dengue patients were included in this study. The demographic and clinical characteristics are presented in Table 1. The median age of patients was 15 years (IQR: 10–20 years), indicating that most cases occurred among children and adolescents. Male patients accounted for 58.9% of cases, while females comprised 41.1%. The median length of hospital stay was 3 days (IQR: 2–4 days), reflecting relatively short hospitalization duration among the study population.

Variables	Value
Age (years)	15 (IQR: 10–20)
Male	43 (58.9%)
Female	30 (41.1%)
Length of stay (days)	3 (IQR: 2–4)
Recovered	71 (97.3%)
Died	2 (2.7%)

Table 1. Characteristics of Dengue Patients

These findings are consistent with previous studies reporting that dengue predominantly affects younger populations in endemic regions (Bhatt, Gething, Brady, & others, 2021; Wilder-Smith et al., 2020)

Hematological Profile of Dengue Patients

The hematological characteristics are summarized in Table 2. The median platelet count was 138,000/ μ L (IQR: 105,000–165,000/ μ L), indicating mild to moderate thrombocytopenia. The median hematocrit level was 43.7% (IQR: 39–47%), reflecting variability in hemoconcentration among patients. These findings are consistent with the known dynamic hematological changes in dengue infection.

Parameter	Median (IQR)
Platelet (cells/ μ L)	138,000 (105,000–165,000)
Hematocrit (%)	43.7 (39–47)

Table 2. Hematological Profile of Dengue Patients

Thrombocytopenia and hemoconcentration are widely recognized as hallmark features of dengue infection and are frequently used in clinical monitoring (Muller & Depelsenaire, 2020; Sam & others, 2021). Reflecting underlying pathophysiological processes such as immune-mediated platelet destruction and plasma leakage (Nascimento et al., 2022; Sangkaew et al., 2021; Zhang et al., 2021)

Normality Testing and Correlation Analysis

Spearman correlation analysis demonstrated a moderate and statistically significant positive correlation between platelet count and length of hospital stay ($r = 0.422$; $p < 0.001$). In contrast, hematocrit level showed no significant correlation with hospitalization duration ($r = 0.059$; $p = 0.620$). These results are presented in Table 3.

To further illustrate the relationship between platelet count and length of hospital stay, a scatter plot is presented in Figure 1. The plot shows a positive trend, although with considerable variability, indicating that while platelet count is associated with length of stay, other factors may also influence hospitalization duration.

Variables	Length of hospital stay (days)
Platelet count (cells/ μ L)	$r = 0.422$; $p < 0.001$
Hematocrit level (%)	$r = 0.059$; $p = 0.620$

Table 3. Normality Testing and Correlation Analysis

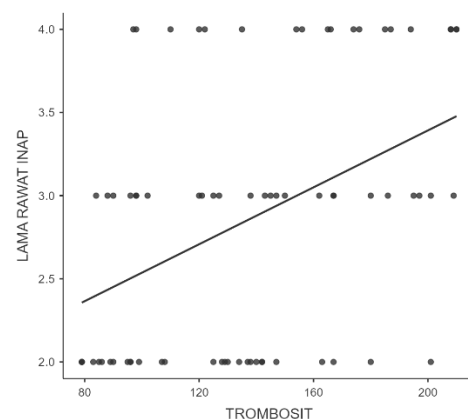


Figure 1. Scatter plot of platelet count and length of hospital stay among dengue patients

The plot shows a positive trend between platelet count and length of hospital stay, although with considerable variability.

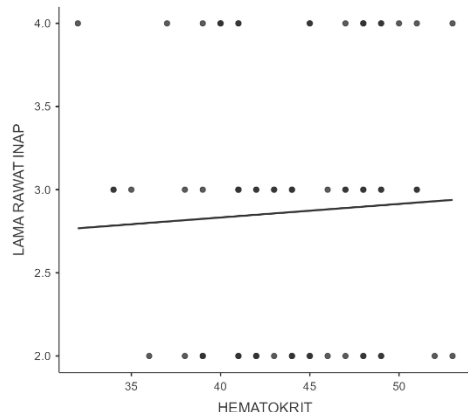


Figure 1. Scatter plot of hematocrit level and length of hospital stay among dengue patients. The plot shows no clear linear relationship between hematocrit level and length of hospital stay.

Interpretation of the Association Between Platelet Count and Length of Hospital Stay

The present study found a moderate positive association between platelet count and length of hospital stay. This finding may appear counterintuitive, as thrombocytopenia is commonly associated with disease severity in dengue infection. However, this result may reflect early hospital presentation, where patients are admitted before reaching the critical phase, leading to longer observation periods during hospitalization.

In addition, clinical decision-making processes, including monitoring requirements and supportive management, may contribute to prolonged hospitalization regardless of initial platelet levels. Previous studies have also highlighted that hospitalization outcomes in dengue are influenced not only by laboratory parameters but also by clinical judgment and institutional practices (Sangkaew et al., 2021; Wang et al., 2020; Yacoub & Wills, 2020).

Furthermore, potential interventions such as platelet transfusion in selected cases may extend hospital stay due to the need for continued monitoring. Therefore, platelet count should be

interpreted within a broader clinical context rather than as a sole predictor of hospitalization duration

Lack of Association Between Hematocrit Level and Length of Hospital Stay

This study found no significant association between hematocrit level and length of hospital stay. This finding may be explained by the dynamic nature of hematocrit in dengue infection, which can fluctuate rapidly during different phases of the disease (Rajapakse et al., 2020; Vairo & others, 2021). Hematocrit levels are also highly influenced by fluid management, which may normalize values during hospitalization and obscure their relationship with clinical outcomes.

Previous studies have similarly reported that single hematocrit measurements may not adequately reflect disease severity or predict hospitalization outcomes, particularly when not assessed longitudinally (Nguyen et al., 2020; Trunfio et al., 2020). Therefore, the lack of association observed in this study may be due to the use of admission values, which do not capture temporal changes during disease progression.

Implications for Clinical Practice and Global Health Security

From a clinical perspective, these findings emphasize the importance of interpreting hematological parameters within the broader clinical context rather than relying solely on absolute values. From a global health security perspective, strengthening hospital-based laboratory surveillance and integrating laboratory data with clinical assessment can improve early detection, risk stratification, and preparedness during dengue outbreaks, particularly in endemic regions (Chen & Hamer, 2020; World Health Organization, 2023)

CONCLUSION

This study concludes that platelet count is moderately and positively associated with length of hospital stay among dengue patients treated at Hospital X, Mataram, while hematocrit level shows no significant relationship with hospitalization duration. These findings indicate that routine hematological parameters, particularly platelet count at the time of hospitalization, may not solely reflect disease severity or predict clinical outcomes without considering the clinical phase of illness and patient management strategies. The absence of an association between hematocrit level and length of stay suggests that hematocrit is more useful for acute clinical monitoring rather than as a predictor of hospitalization duration.

Based on these findings, it is recommended that clinicians interpret platelet count and hematocrit levels within the broader clinical context, including timing of patient presentation, disease phase, and treatment decisions, rather than relying on single laboratory values to guide hospitalization duration. Hospital management and laboratory units are encouraged to strengthen integrated laboratory-clinical surveillance systems to support early detection and risk stratification during dengue outbreaks. Furthermore, future research is recommended to incorporate longitudinal hematological measurements, larger multicenter samples, and additional clinical variables to better understand factors influencing length of hospital stay and to support evidence-based strategies for improving dengue case management and global health security preparedness.

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