



CORRELATION OF LEUKOCYTE COUNT AND DEGREE OF THROMBOCYTOPENIA WITH DISEASE SEVERITY IN PATIENTS WITH DENGUE HEMORRHAGIC FEVER HOSPITALIZED

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ABSTRACT

Dengue hemorrhagic fever remains a major health problem requiring appropriate clinical and hematological monitoring. Abnormal leukocyte and platelet counts are frequently observed in affected patients, but evidence regarding their correlations with disease severity remains inconsistent. To determine the correlations of leukocyte count and degree of thrombocytopenia with disease severity among patients with dengue hemorrhagic fever hospitalized at Waled Regional General Hospital in 2025. This observational analytic study used a retrospective cross-sectional design based on medical record data. A total of 204 patients were selected through consecutive sampling. Leukocyte and platelet counts were obtained from the first complete blood count at hospital admission, while disease severity was classified according to the 2009 WHO criteria. Bivariate analysis was performed using the Spearman rank correlation test. The largest age group was children aged 6–11 years, comprising 93 patients (45.6%), and most patients were male, comprising 107 patients (52.5%). Leukopenia was found in 90 patients (44.1%), moderate thrombocytopenia in 60 patients (29.4%), and dengue with warning signs in 115 patients (56.4%). No statistically significant correlation was found between leukocyte count and disease severity ($r = 0.017$, $p = 0.809$). A statistically significant weak positive correlation was found between the degree of thrombocytopenia and disease severity ($r = 0.377$, $p < 0.001$). Leukocyte count was not significantly correlated with disease severity, whereas the degree of thrombocytopenia showed a statistically significant weak positive correlation. Greater thrombocytopenia severity tended to be associated with greater disease severity.

Keywords: dengue hemorrhagic fever; disease severity; leukocyte count; spearman; thrombocytopenia

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INTRODUCTION

Dengue hemorrhagic fever (DHF) is an infectious disease caused by the dengue virus, which belongs to the Flavivirus genus and Flaviviridae family and is primarily transmitted through the bites of *Aedes aegypti* and *Aedes albopictus* mosquitoes (World Health Organization (WHO), 2009). DHF remains a major public health problem in Indonesia because of its persistently high morbidity and mortality. In 2023, Indonesia reported 114,720 dengue cases with 894 deaths, corresponding to an incidence rate of 41.4 per 100,000 population and a case fatality rate (CFR) of 0.78% (Kementerian Kesehatan Republik Indonesia, 2024).

The burden of DHF is also evident at the provincial and local levels relevant to this study. In West Java, 61,423 dengue cases and 339 deaths were reported in 2024, corresponding to a CFR of 0.55% and an incidence rate of 122.00 per 100,000 population (Tim Penyusun Profil Kesehatan, 2024). In the Cirebon area, Cirebon Regency recorded 1,833 cases with six deaths (CFR 0.33%) and an incidence rate of 75 per 100,000 population, while Cirebon City reported 597 cases with two deaths (CFR 0.34%) (Tim Penyusun Profil Kesehatan, 2024). These data indicate that dengue at the local

level continues to be associated with mortality, emphasizing the importance of early detection of clinical deterioration, including among patients hospitalized at Waled Regional General Hospital as a referral healthcare facility in Cirebon Regency.

Clinically, dengue infection has a broad spectrum of manifestations, ranging from febrile illness to severe conditions such as dengue shock syndrome (Soedarmo et al., 2021; Kumar et al., 2021). Disease severity is primarily associated with plasma leakage, severe bleeding, and involvement of vital organs (Kumar et al., 2021). The 2009 WHO classification categorizes dengue into dengue without warning signs, dengue with warning signs, and severe dengue, which provides an important basis for risk stratification and clinical decision-making throughout the course of the disease (World Health Organization (WHO), 2009).

One of the important characteristics of DHF is hematological alteration, particularly leukopenia, thrombocytopenia, and increased hematocrit as an indication of hemoconcentration during the critical phase (Soedarmo et al., 2021; Kumar et al., 2021). Leukopenia may occur early during the febrile phase as a consequence of bone marrow suppression, whereas thrombocytopenia and increased hematocrit become more prominent as patients approach the critical phase in association with increased capillary permeability (Cherie et al., 2024; Puc et al., 2022). Endothelial dysfunction and increased vascular permeability in dengue are influenced by interactions among inflammatory mediators, complement activation, and the NS1 protein, which contribute to plasma leakage and progression toward the critical phase (McBride et al., 2024; Tang et al., 2025).

From a pathophysiological perspective, leukopenia in DHF may result from suppression of leukocyte production, impaired cell maturation in the bone marrow, and increased apoptosis of immune cells during the viremic phase (Sinha et al., 2024; Vuong et al., 2020). Thrombocytopenia in dengue infection is associated with disruption of the balance between platelet production and platelet clearance. Dengue virus infection can interfere with megakaryopoiesis and thrombopoiesis in the bone marrow, thereby reducing platelet production, while simultaneously increasing platelet activation, apoptosis, and clearance in the circulation (Khazali et al., 2024). These mechanisms contribute substantially to the reduction in platelet count during the acute phase of infection. Changes in leukocyte and platelet counts may therefore reflect the dynamics of the host immune response and potentially be associated with clinical disease severity (Suharrati et al., 2025; Triana et al., 2020).

Leukocyte and platelet counts are components of routine hematological examinations used to assess the disease phase, identify clinical deterioration, and recognize the critical phase in patients with dengue (World Health Organization (WHO), 2009; Soedarmo et al., 2021). These parameters are clinically relevant because their changes may reflect immunological responses and indicate the potential development of more severe complications (Sinha et al., 2024; Setiawan et al., 2023).

Previous studies have reported inconsistent findings regarding the relationship between hematological parameters and dengue severity. (Triana et al., 2020) reported a relationship between platelet count, hematocrit, leukocyte count, and dengue severity in patients in Bengkulu, Indonesia. Similarly, (Setiawan et al., 2023) demonstrated associations among leukocyte reduction, thrombocytopenia, and disease severity in patients with DHF. However, (Suharrati et al., 2025) found no significant correlation between leukocyte and platelet counts among patients with grade 1 and 2 dengue fever. In addition, (Ileandea, 2025) identified an association between high-fluorescence lymphocyte counts and thrombocytopenia, suggesting the involvement of adaptive immune responses in dengue infection. (Vuong et al., 2020) also reported that hematological and inflammatory parameters may have potential prognostic value in dengue disease progression.

The differences among previous findings indicate a research gap in understanding the relationships between leukocyte count, degree of thrombocytopenia, and dengue severity (Suharrtati et al., 2025; Triana et al., 2020; Setiawan et al., 2023). Such variation may be attributable to differences in the timing of blood sample collection, population characteristics, clinical classification, and heterogeneity of immune responses to dengue virus infection (Kumar et al., 2021; Khanam et al., 2022). Therefore, further research using a systematic approach among hospitalized dengue patients is warranted to clarify these relationships and determine the extent to which hematological parameters are associated with disease severity.

Based on the findings and gaps identified in previous studies, this study aimed to determine the correlation between leukocyte count, degree of thrombocytopenia, and disease severity among patients with DHF hospitalized at Waled Regional General Hospital. The study focuses on clarifying hematological changes as indicators of immune response and disease progression and providing an evidence-based basis for clinical monitoring using accessible and routinely measured hematological parameters.

METHOD

This observational analytic study employed a retrospective cross-sectional design using medical record data of hospitalized dengue hemorrhagic fever (DHF) patients at Waled Regional General Hospital, Cirebon Regency, Indonesia. The study was conducted from May to June 2026 using records from patients hospitalized between January and December 2025. The study population comprised DHF patients who met the inclusion criteria, namely a confirmed DHF diagnosis, an initial complete blood count (CBC) at admission, and complete medical records. Patients with comorbidities that could affect leukocyte or platelet counts were excluded. Consecutive sampling was used, with a minimum sample size of 196 patients calculated using the Lemeshow formula; 204 eligible patients were ultimately included.

The independent variables were leukocyte count and degree of thrombocytopenia, while the dependent variable was DHF severity based on the 2009 WHO classification (dengue without warning signs, dengue with warning signs, and severe dengue). Leukocyte count and platelet count were obtained from the first CBC performed at admission. Leukocyte count was categorized as leukopenia ($<4,000/\mu\text{L}$), normal ($4,000\text{--}11,000/\mu\text{L}$), or leukocytosis ($>11,000/\mu\text{L}$). Thrombocytopenia was categorized as mild ($100,000\text{--}149,999/\mu\text{L}$), moderate ($50,000\text{--}99,999/\mu\text{L}$), severe ($20,000\text{--}49,999/\mu\text{L}$), and very severe ($<20,000/\mu\text{L}$). Additional variables included age, sex, fever duration at admission, and hematocrit level.

Data were extracted from medical records using a standardized data extraction sheet, coded anonymously, entered into SPSS, and subjected to data cleaning before analysis. Descriptive analysis was used to present participant characteristics and variable distributions as frequencies and percentages or means and standard deviations, as appropriate. Spearman's rank correlation test was used to assess the correlations between leukocyte count and DHF severity and between the degree of thrombocytopenia and DHF severity. Statistical significance was set at $p < 0.05$. Ethical approval was obtained from the Health Research Ethics Committee of Waled Regional General Hospital (No. 000.9.2/294/KEPK/V/2026).

RESULT

A total of 204 hospitalized patients with dengue hemorrhagic fever (DHF) who met the inclusion and exclusion criteria were included in the analysis. The medical record data covered the period from January 1 to December 31, 2025, and data collection was conducted from May to June 2026. The analyzed variables included sociodemographic characteristics, fever duration at admission, leukocyte count, platelet count, hematocrit level, leukocyte category, degree of thrombocytopenia, and DHF severity.

Sociodemographic Characteristics

Table 1.
Sociodemographic characteristics of hospitalized patients with DHF

Characteristic	Category	f (%)
Age	Children aged 0–<6 years	9 (4.4)
	Children aged 6–<12 years	93 (45.6)
	Adolescents aged 12–<19 years	48 (23.5)
	Adults aged 19–<59 years	54 (26.5)
Sex	Male	107 (52.5)
	Female	97 (47.5)

Note: Median age = 11.5 years (range, 5–41 years).

As shown in Table 1, the largest age group was children aged 6–<12 years, comprising 93 patients (45.6%). The median age was 11.5 years, with a range of 5–41 years. Regarding sex, male patients slightly outnumbered female patients, with 107 (52.5%) and 97 (47.5%) patients, respectively.

Clinical and Laboratory Characteristics

Table 2.
Clinical and laboratory characteristics of hospitalized patients with DHF

Variable	Category	f (%)	Median (min–max)
Platelet count	Normal (150,000–450,000/ μ L)	45 (22.1)	88.5 (12–338) $\times 10^3/\mu$ L
	Mild thrombocytopenia (100,000–149,999/ μ L)	48 (23.5)	
	Moderate thrombocytopenia (50,000–99,999/ μ L)	60 (29.4)	
	Severe thrombocytopenia (20,000–49,999/ μ L)	43 (21.1)	
	Very severe thrombocytopenia (<20,000/ μ L)	8 (3.9)	
Leukocyte count	Leukopenia (<4,000/ μ L)	90 (44.1)	4.8 (1.00–21.50) $\times 10^3/\mu$ L
	Normal (4,000–11,000/ μ L)	80 (39.2)	
	Leukocytosis (>11,000/ μ L)	34 (16.7)	
DHF severity	Dengue without warning signs	78 (38.2)	
	Dengue with warning signs	115 (56.4)	
	Severe dengue	11 (5.4)	
Hematocrit	Low (<40%)	100 (49.0)	40 (22–62)%
	Normal (40–52%)	94 (46.1)	
	High (>52%)	10 (4.9)	
Fever duration at admission	1–3 days	86 (42.2)	4 (1–14) days
	4–6 days	99 (48.5)	
	≥ 7 days	19 (9.3)	

Table 2 shows that the median fever duration at hospital admission was 4 days (range, 1–14 days). The median leukocyte count was 4.8 $\times 10^3/\mu$ L (range, 1.00–21.50 $\times 10^3/\mu$ L), while the median platelet count was 88.5 $\times 10^3/\mu$ L (range, 12–338 $\times 10^3/\mu$ L). The median hematocrit was 40% (range, 22–62%).

The most common fever-duration category was 4–6 days, observed in 99 patients (48.5%). Leukopenia was the most frequent leukocyte abnormality, occurring in 90 patients (44.1%). Moderate thrombocytopenia was the most common platelet category, occurring in 60 patients (29.4%). Regarding hematocrit, the low category was most frequent, accounting for 100 patients (49.0%). Based on disease severity, dengue with warning signs was the predominant category, occurring in 115 patients (56.4%).

Characteristics According to Degree of Thrombocytopenia

As presented in Table 3, children aged 6–<12 years represented the largest age group across most thrombocytopenia categories. The highest proportion of this age group was observed among patients with very severe thrombocytopenia (5 patients, 62.5%), followed by those with mild thrombocytopenia (26 patients, 54.2%).

Table 3.

Sociodemographic and clinical characteristics according to degree of thrombocytopenia

Characteristic	Normal f (%)	Mild f (%)	Moderate f (%)	Severe f (%)	Very severe f (%)
Male	23 (51.1)	28 (58.3)	32 (53.3)	19 (44.2)	5 (62.5)
Female	22 (48.9)	20 (41.7)	28 (46.7)	24 (55.8)	3 (37.5)
Age 0–<6 years	2 (4.4)	1 (2.1)	4 (6.7)	2 (4.7)	0 (0.0)
Age 6–<12 years	17 (37.8)	26 (54.2)	26 (43.3)	19 (44.2)	5 (62.5)
Age 12–<19 years	14 (31.1)	9 (18.8)	15 (25.0)	8 (18.6)	2 (25.0)
Age 19–<59 years	12 (26.7)	12 (25.0)	15 (25.0)	14 (32.6)	1 (12.5)
Dengue without warning signs	28 (62.2)	26 (54.2)	15 (25.0)	8 (18.6)	1 (12.5)
Dengue with warning signs	15 (33.3)	21 (43.8)	43 (71.7)	33 (76.7)	3 (37.5)
Severe dengue	2 (4.4)	1 (2.1)	2 (3.3)	2 (4.7)	4 (50.0)
Fever 1–3 days	26 (57.8)	24 (50.0)	18 (30.0)	16 (37.2)	2 (25.0)
Fever 4–6 days	16 (35.6)	21 (43.8)	37 (61.7)	20 (46.5)	5 (62.5)
Fever ≥ 7 days	3 (6.7)	3 (6.2)	5 (8.3)	7 (16.3)	1 (12.5)
Low hematocrit	27 (60.0)	29 (60.4)	27 (45.0)	17 (39.5)	0 (0.0)
Normal hematocrit	17 (37.8)	19 (39.6)	31 (51.7)	22 (51.2)	5 (62.5)
High hematocrit	1 (2.2)	0 (0.0)	2 (3.3)	4 (9.3)	3 (37.5)

Regarding DHF severity, dengue without warning signs was predominant among patients with normal platelet counts (28, 62.2%) and mild thrombocytopenia (26, 54.2%). In contrast, dengue with warning signs predominated among patients with moderate thrombocytopenia (43, 71.7%) and severe thrombocytopenia (33, 76.7%). Among patients with very severe thrombocytopenia, severe dengue was the most frequent category, accounting for 4 patients (50.0%).

For hematocrit, low hematocrit was most common among patients with normal platelet counts (27, 60.0%) and mild thrombocytopenia (29, 60.4%). Normal hematocrit was predominant among patients with moderate, severe, and very severe thrombocytopenia. The highest proportion of high hematocrit was observed among patients with very severe thrombocytopenia (3, 37.5%).

Characteristics According to Leukocyte Category

Table 4.

Sociodemographic and clinical characteristics according to leukocyte category

Characteristic	Leukopenia f (%)	Normal f (%)	Leukocytosis f (%)
Male	49 (54.4)	40 (50.0)	18 (52.9)
Female	41 (45.6)	40 (50.0)	16 (47.1)
Age 0–<6 years	4 (4.4)	4 (5.0)	1 (2.9)
Age 6–<12 years	44 (48.9)	34 (42.5)	15 (44.1)
Age 12–<19 years	23 (25.6)	22 (27.5)	3 (8.8)
Age 19–<59 years	19 (21.1)	20 (25.0)	15 (44.1)
Dengue without warning signs	31 (34.4)	35 (43.8)	12 (35.3)
Dengue with warning signs	57 (63.3)	42 (52.5)	16 (47.1)
Severe dengue	2 (2.2)	3 (3.8)	6 (17.6)
Fever 1–3 days	38 (42.2)	37 (46.2)	11 (32.4)
Fever 4–6 days	44 (48.9)	35 (43.8)	20 (58.8)
Fever ≥ 7 days	8 (8.9)	8 (10.0)	3 (8.8)
Low hematocrit	47 (52.2)	39 (48.8)	14 (41.2)
Normal hematocrit	41 (45.6)	38 (47.5)	15 (44.1)
High hematocrit	2 (2.2)	3 (3.8)	5 (14.7)

Table 4 shows that children aged 6–<12 years were the most frequent age group among patients with leukopenia (44, 48.9%) and normal leukocyte counts (34, 42.5%). Among patients with leukocytosis, children aged 6–<12 years and adults aged 19–<59 years were equally represented, with 15 patients each (44.1%). Dengue with warning signs was the most common severity category among patients with leukopenia (57, 63.3%), normal leukocyte counts (42, 52.5%), and leukocytosis (16, 47.1%). Severe dengue represented the largest proportion within the leukocytosis category, involving 6 patients (17.6%). Regarding hematocrit, high hematocrit was proportionally most frequent among patients with leukocytosis (5, 14.7%).

Correlation Analysis

Table 5.

Spearman rank correlation between hematological parameters and DHF severity

Predictor	n	Mean	Correlation coefficient (r)	p-value
Leukocyte count	204	$6.155 \times 10^3/\mu\text{L}$	0.017	0.809
Degree of thrombocytopenia	204	$109.2 \times 10^3/\mu\text{L}$	0.377	<0.001

Note: Statistical significance was set at $p < 0.05$.

The Spearman rank correlation analysis showed no statistically significant correlation between leukocyte count and DHF severity ($r = 0.017$, $p = 0.809$). The correlation coefficient indicated an extremely weak positive association, but the p -value exceeded the predetermined significance threshold.

In contrast, a statistically significant weak positive correlation was identified between the degree of thrombocytopenia and DHF severity ($r = 0.377$, $p < 0.001$). The positive correlation indicates that greater thrombocytopenia severity tended to be associated with greater DHF severity. Thus, among the hematological parameters examined in this study, the degree of thrombocytopenia demonstrated a statistically significant association with disease severity, whereas leukocyte count did not.

Overall, these findings are consistent with the clinical importance of platelet changes in dengue progression, although the strength of the observed correlation was weak. The findings should therefore be interpreted as evidence of an association rather than as evidence that thrombocytopenia alone determines disease severity.

DISCUSSION

Sociodemographic and Clinical Characteristics

The present study found that the largest proportion of hospitalized DHF patients were children aged 6–<12 years (45.6%), with a median age of 11.5 years. This finding may reflect the epidemiological characteristics of dengue in endemic areas, differences in exposure to *Aedes* mosquitoes, and the pattern of healthcare utilization among children. Previous evidence indicates that children remain an important group affected by dengue and may have different clinical manifestations and hospitalization patterns compared with adults (Tsheten et al., 2021). However, the present study did not assess vector exposure, school activities, household conditions, or preventive behaviors; therefore, these factors cannot be established as direct explanations for the predominance of children.

The median duration of fever at admission was four days, with the 4–6-day category being the most common. This finding is clinically relevant because the transition from the febrile phase to the critical phase commonly occurs around defervescence. During this period, warning signs and plasma leakage may become apparent, accompanied by progressive thrombocytopenia and changes in hematocrit. The predominance of patients admitted during days 4–6 may therefore reflect the clinical tendency for patients to seek hospital care when warning signs begin to emerge (Zafar et al., 2025).

Leukopenia was the most frequent leukocyte abnormality (44.1%), with a median leukocyte count of $4.8 \times 10^3/\mu\text{L}$. Leukopenia is a common hematological manifestation of acute dengue and may be associated with transient bone marrow suppression, altered hematopoiesis, apoptosis, and redistribution of leukocytes during the viremic phase. These mechanisms indicate that changes in leukocyte count reflect a complex host response rather than a single pathological process.

The median platelet count was $88.5 \times 10^3/\mu\text{L}$, and moderate thrombocytopenia was the most frequent category (29.4%). Thrombocytopenia in dengue is associated with impaired platelet production in the bone marrow and increased platelet activation, destruction, consumption, and

clearance in the circulation. These processes may occur simultaneously with endothelial activation and inflammatory responses during disease progression.

Dengue with warning signs was the most common severity category (56.4%), whereas severe dengue accounted for 5.4% of patients. This distribution is understandable because the study population consisted exclusively of hospitalized patients. Patients without warning signs are more likely to be managed as outpatients, whereas warning signs are important indications for closer observation and hospitalization (Zafar et al., 2025). Thus, the distribution in this study should be interpreted as representing hospitalized patients rather than the overall dengue population in the community.

Correlation Between Leukocyte Count and DHF Severity

The present study found no significant correlation between leukocyte count and DHF severity ($r = 0.017$, $p = 0.809$). The extremely weak correlation indicates that total leukocyte count showed almost no monotonic relationship with increasing disease severity in this population. A recent hospital-based study likewise showed that leukocyte-related hematological changes do not necessarily parallel clinical severity uniformly across patients (Setiawan et al., 2023).

This finding does not imply that leukocytes are unimportant in dengue pathogenesis. Dengue infection involves complex modulation of dendritic cells, monocytes, macrophages, natural killer cells, and T and B lymphocytes. Therefore, changes in immune-cell function and composition may occur without producing a consistent change in total peripheral leukocyte count.

The absence of a significant correlation may also be related to the use of total leukocyte count as a single parameter. Total leukocyte count does not provide information regarding neutrophil and lymphocyte proportions, reactive lymphocytes, neutrophil-to-lymphocyte ratio, or immune-cell activation. Consequently, two patients with similar total leukocyte counts may have substantially different immunological profiles.

The timing of laboratory examination may also explain the finding. This study used the first CBC obtained at hospital admission, while patients presented at different stages of illness, ranging from day 1 to day 14 of fever. Leukocyte counts may decrease during the acute viremic phase and subsequently increase during recovery. Therefore, a single measurement may not adequately capture the dynamic changes in leukocytes throughout dengue infection (Puc et al., 2022).

The finding is also consistent with the concept that severe dengue is a multifactorial process. Disease progression is strongly associated with endothelial dysfunction, plasma leakage, inflammatory responses, and organ involvement rather than with total leukocyte count alone. Prospective cohort evidence has shown that endothelial and inflammatory alterations are prominent in dengue shock, supporting the interpretation that total leukocyte count alone cannot represent the mechanisms driving severe disease (McBride et al., 2024).

Correlation Between Degree of Thrombocytopenia and DHF Severity

In contrast, this study demonstrated a statistically significant weak positive correlation between the degree of thrombocytopenia and DHF severity ($r = 0.377$, $p < 0.001$). The positive direction indicates that greater thrombocytopenia tended to be associated with greater disease severity. However, the weak correlation indicates that thrombocytopenia alone cannot explain the overall severity of dengue.

The finding has a plausible biological basis. Dengue virus infection can impair megakaryopoiesis and thrombopoiesis while simultaneously increasing platelet activation, apoptosis, immune-

mediated destruction, and clearance. In more severe disease, endothelial activation, inflammation, coagulation abnormalities, and bleeding may further increase platelet consumption.

The present finding is consistent with previous research indicating that thrombocytopenia is frequently associated with more severe dengue manifestations. Previous studies have reported that platelet abnormalities may help distinguish patients with more severe disease, although platelet count should not be considered an independent determinant of severity (Setiawan et al., 2023; Triana et al., 2020). The findings therefore support the clinical value of platelet monitoring as part of the overall assessment of hospitalized dengue patients.

Nevertheless, the strength of the correlation was only weak. This is consistent with the multifactorial nature of dengue severity, which involves plasma leakage, endothelial dysfunction, immune activation, coagulation abnormalities, viral characteristics, and organ involvement. Moreover, the platelet count used in this study was obtained from the initial CBC and therefore may not represent the nadir platelet count during the critical phase. Serial platelet measurements may provide a better representation of disease progression.

From a clinical perspective, thrombocytopenia should therefore be interpreted together with warning signs, serial hematocrit changes, evidence of plasma leakage, bleeding manifestations, hemodynamic status, and organ involvement. The significant but weak correlation observed in this study suggests that thrombocytopenia is an important component of dengue progression, but it should not be used as a single predictor of severe dengue.

Overall Interpretation

Overall, the findings demonstrate different patterns for the two hematological parameters examined. Total leukocyte count was not significantly associated with DHF severity, whereas the degree of thrombocytopenia showed a significant, although weak, positive correlation with disease severity. These results suggest that platelet abnormalities may have greater clinical relevance than total leukocyte count when assessing disease severity in this hospitalized population.

The findings also emphasize the importance of interpreting hematological parameters dynamically and in conjunction with clinical findings. Future studies should consider serial measurements of leukocytes, platelets, and hematocrit, as well as differential leukocyte counts, dengue serological status, NS1 results, viral serotype, and primary or secondary infection status. Such an approach could provide a more comprehensive understanding of hematological changes and their relationship with dengue severity. The retrospective design and dependence on medical-record completeness should also be considered when interpreting the findings.

CONCLUSION

This study concludes that hospitalized DHF patients at Waled Regional General Hospital were predominantly children aged 6–<12 years, with most patients admitted during days 4–6 of fever and classified as dengue with warning signs. Leukopenia was the most common leukocyte abnormality, while moderate thrombocytopenia was the most frequent degree of thrombocytopenia. There was no statistically significant correlation between leukocyte count and DHF severity ($r = 0.017$, $p = 0.809$), indicating that total leukocyte count alone is not a reliable indicator of disease severity in this population. In contrast, the degree of thrombocytopenia showed a statistically significant weak positive correlation with DHF severity ($r = 0.377$, $p < 0.001$), suggesting that greater thrombocytopenia tended to be associated with greater disease severity. Nevertheless, because the correlation was weak, thrombocytopenia should not be used as a single predictor of severe dengue. Hematological parameters should be interpreted together with clinical warning signs, serial hematocrit and platelet measurements, evidence of plasma leakage, hemodynamic status, bleeding manifestations, and organ involvement.

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