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ORIGINAL ARTICLE

Clinical and laboratory manifestations of dengue fever cases at subang regional general hospital

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ABSTRACT

Dengue fever remains a major public health problem in Indonesia, particularly among children. Early recognition of clinical manifestations, supported by laboratory findings, is crucial for diagnosis, monitoring disease progression, and preventing severe complications. This study aimed to describe the clinical manifestations and laboratory findings of dengue fever cases in children. A cross-sectional study design was used, based on medical records of all pediatric patients aged 0–18 years who were diagnosed with dengue infection at Subang Regional Hospital from January to December 2024. Total sampling yielded 197 cases that met the inclusion criteria. Most patients were aged 6–18 years (73.1%) and male (57.4%). The highest incidence occurred in March (20.8%). The most common clinical manifestations were fever (100%), abdominal pain (61.9%), nausea (61.4%), vomiting (53.8%), and headache (37.1%). Warning signs were identified in 46.2% of patients, with persistent vomiting and abdominal pain being the most frequent. Laboratory findings showed thrombocytopenia (75.0%) and leukopenia (62.5%), particularly in the 6–18 age group, while anemia was most common in infants aged 0–1 year (92.3%). Serological examinations showed all patients were NS1 positive at initial testing, with IgM and IgG detected in subsequent examinations, indicating progression from the acute to the convalescent phase. These findings highlight the importance of integrated clinical and laboratory evaluation for early detection and appropriate management of dengue fever.

Keyword: Clinical manifestations, dengue, laboratory, early detection

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INTRODUCTION

Dengue infection is one of the most significant mosquito-borne viral diseases affecting humans, particularly in tropical and subtropical regions.[1,2] The disease is caused by the dengue virus (DENV serotypes 1-4). It is transmitted to humans mainly through the bite of Aedes aegypti and Aedes albopictus.[3,4] Transmission is strongly influenced by environmental factors such as rainfall, water stagnation, and vector breeding, as well as by population mobility, density, and community behavior. These factors contribute to recurrent outbreaks that occur annually, particularly during the rainy season.[5–7] Globally, dengue has emerged as a major international public health problem over the past few decades. According to the World Health Organization (WHO), approximately 14 million dengue cases were reported worldwide in 2024.[8] The burden of dengue is greatest in Asia, where countries such as India, Indonesia, Myanmar, Sri Lanka, and Thailand are among the most endemic.[9]

Indonesia remains one of the countries with the highest dengue burden in the Southeast Asian region. Since the first case was identified in Surabaya in 1968, dengue has become endemic throughout the archipelago.[10] In 2023, a total of 877,531 dengue cases were reported nationally, with West Java ranking seventh among provinces. Subang Regency has consistently experienced recurrent outbreaks. In 2024, Subang reported 1,917 dengue cases. These figures demonstrate the persistent public health burden of dengue in the region.[11] Clinically, dengue infection presents with a wide spectrum of manifestations, ranging from mild febrile illness to severe and life-threatening forms, including dengue with warning signs and severe dengue. Common symptoms include fever, headache, myalgia, arthralgia, abdominal pain, vomiting, rash, seizures, and shock in severe cases. The Indonesian Ministry of Health (2021), following the WHO 2009 classification, categorizes dengue into three groups: dengue without warning signs, dengue with warning signs, and severe dengue. Laboratory parameters such as hematocrit, leukocyte count, platelet count, NS1 antigen detection, and dengue-specific antibodies (IgM and IgG) are essential for diagnosis and disease monitoring. Early recognition of both clinical features and laboratory abnormalities is crucial for timely management and prevention of complications.[12–14]

Although several studies in Indonesia have described the clinical and laboratory characteristics of dengue, regional variations may occur due to differences in patient demographics, healthcare access, and environmental conditions. Despite the availability of national data, information focusing on pediatric dengue cases in Subang remains limited. Considering that children and adolescents represent one of the most vulnerable groups, understanding local epidemiological, clinical, and laboratory characteristics is essential for optimizing clinical management and strengthening public health interventions.[12–14] Therefore, this study aimed to describe the clinical manifestations and laboratory findings of pediatric patients diagnosed with dengue infection at Subang Regional General Hospital over a one-year period.

METHODS AND SUBJECT

A descriptive cross-sectional study was conducted at Subang Regional General Hospital, West Java, Indonesia. The study population consisted of all pediatric patients aged 0–18 years who were diagnosed with dengue infection between January and December 2024.15 This study received ethical approval from the Ethics Committee of the Faculty of Medicine, Universitas Jenderal Achmad Yani (No. 033/UM1.07/2025). In addition, formal research permission and approval for data collection were obtained from Subang Regional General Hospital. The study was conducted in accordance with the principles of the Declaration of Helsinki, and patient confidentiality was ensured through anonymized data handling.

The inclusion criteria were (1) patients with a clinical diagnosis of dengue supported by laboratory confirmation (NS1 antigen, IgM, and/or IgG), (2) availability of complete medical record data, and (3) age ≤18 years. The exclusion criteria were (1) incomplete or missing medical records, (2) patients with comorbid hematological disorders, and (3) cases with unclear diagnostic confirmation. A total sampling technique was applied, including all eligible patients during the study period.

Data were collected retrospectively from hospital medical records by trained researchers using a standardized data extraction form. The variables included patient characteristics, clinical manifestations, laboratory parameters (platelet count, leukocyte count, hematocrit, hemoglobin), and serological results (NS1, IgM, IgG). Clinical manifestations were categorized according to the WHO 2009 dengue classification guidelines.[16]

RESULTS AND DISCUSSION

The final sample consisted of 197 pediatric patients diagnosed with dengue infections. As shown in Table 1, the highest proportion of cases occurred in the 6–18 years age group, accounting for 73.1% of the total sample, while the lowest proportion was observed in the 0–1 year age group, at 6.6%. This distribution indicates a predominance of dengue infection among school-aged children. Regarding sex distribution, most patients were male (57.4%), whereas females accounted for 42.6% of cases.

Table 1. Characteristics of Pediatric Patients with Dengue Infection

Ages	N	%
0-1 Year	13	6.6
1-5 Year	40	20.3
6-18 Year	144	73.1
Male	113	57.4
Female	84	42.6

The present study demonstrated that dengue infection was most prevalent among children aged 6–18 years, which is consistent with several previous studies conducted in Asia. Prayitno et al. reported that more than 70% of children aged ≥5 years were affected by dengue infection, indicating high viral circulation among school-aged populations. Similarly, Khan et al. in Bangladesh found the highest incidence among children aged 10–14 years (45.3%), with the lowest incidence in children under five years of age. Burattini et al. also reported the highest distribution among patients aged 11–20 years (50%). Kumar et al. further supported these findings by identifying peak prevalence among adolescents aged 13–18 years.

In contrast, studies in Africa and Taiwan reported different age distributions. Tchuandom et al. identified the highest number of cases among children aged 1–5 years (48.8%), while Lee et al. in Taiwan reported the greatest frequency in the 0–9 years age group (61.5%). These variations may be attributed to differences in herd immunity, circulating viral serotypes, and exposure patterns across geographic regions.[17-22]

Sex distribution in the present study showed a predominance of male patients, which is consistent with findings from Indonesia and South Asia. Kesetyaningsih et al. reported dengue incidence rates of 52.1% in males and 47.9% in females in Yogyakarta. Zohra et al. in Pakistan observed a more pronounced imbalance, with 71.6% of cases occurring in males and 28.4% in females among 26,582 patients. The higher incidence of dengue infection in males has been attributed to both biological and behavioral factors. From an immunological perspective,

males are thought to exhibit weaker humoral and cellular responses, whereas estrogen in females enhances antibody synthesis, particularly IgG and IgA, as well as cytokine production, offering greater protection against viral infections. Behaviorally, boys are more likely to engage in outdoor activities during peak mosquito biting hours, increasing the risk of exposure. However, some studies suggest that females may be more susceptible to severe disease or complications, indicating that sex-related susceptibility to dengue infection is multifactorial.[23-25]

Table 2. Clinical Manifestations of Pediatric Dengue Patients

No	Clinical Manifestation	N	%
1	Fever	197	100.0
2	Abdominal Pain	122	61.9
3	Nausea	121	61.4
4	Vomiting	106	53.8
5	Headache	73	37.1
6	Fatigue	57	28.9
7	Cough	40	20.3
8	Diarrhea	27	13.7
9	Muscle Pain	26	13.2
10	Dyspnea	24	12.2
11	Shock	22	11.2
12	Epistaxis	20	10.2
13	Joint pain	16	8.1
14	Decreased Consciousness	13	6.6
15	Rash	13	6.6
16	Common cold symptomps	8	4.1
17	Abdominal bloating	7	3.6
18	Bleeding Gums	6	3.0
19	Chest pain	6	3.0
20	Seizure	6	3.0
21	Sore Throat	3	1.5
22	Oral Thrush	2	1.0
23	Pruritus	2	1.0
24	Retro-orbital pain	1	0.5
25	Slurred speech	1	0.5

Based on Table 2, fever was the most common clinical manifestation, occcurring in all patients (100%). Other frequently reported symptoms included abdominal pain (61.9%), nausea (61.4%), and vomiting (53.8%), indicating that gastrointestinal manifestations are predominant in this cohort. Symptoms of moderate frequency included headache (37.1%), fatigue (28.9%), cough (20.3%), diarrhea (13.7%), and muscle pain (13.2%). Clinical features such as epistaxis, dyspnea, shock, and decreased consciousness were observed in fewer than 15% of patients. Less common manifestations, reported in fewer than 5% of cases, included sore throat, abdominal bloating, rash, chest pain, seizures, bleeding gums, retro-orbital pain, oral thrush, slurred speech, and pruritus. Overall, these findings indicate that most pediatric dengue patients presented with systemic and gastrointestinal symptoms, whereas neurological and mucocutaneous manifestations were relatively uncommon. The pattern of clinical manifestations in this study is consistent with previous reports identifying fever and gastrointestinal symptoms as the dominant features of dengue infection in children.

Setrkraising et al. reported anorexia (91.7%), vomiting (57.6%), abdominal pain (38.3%), and diarrhea (33.3%) as the most frequent symptoms, with vomiting and abdominal pain occurring more commonly in older children. Similarly, Afroze et al. found that fever was present in 100% of pediatric dengue cases, followed by flushed appearance (71.7%), rash (43.4%), abdominal pain (35.8%), and headache (33%). Less frequent symptoms, including cough, respiratory distress, and retro-orbital pain, were also documented but occurred at lower rates. Collectively, these findings reinforce that fever is a universal symptom of dengue infection, while gastrointestinal manifestations serve as important clinical indicators and potential warning signs, particularly in pediatric populations.[26,27]

Table 3. Warning Signs in Pediatric Dengue Patients

No	*Warning Signs*	N	%
1	Thrombocytopenia	137	69.5
2	Abdominal Pain or Abdominal Tenderness	120	60.9
3	Restlessness or Lethargy	71	36.0
4	Mucosal Bleeding	43	21.8
5	Persistent Vomiting	17	8.6
6	Increased Hematocrit	2	1.0
7	Hepatomegaly	0	0
	Total		100.0

As shown in Table 3, the most frequent warning sign was thrombocytopenia (69.5%), followed by abdominal pain or abdominal tenderness (60.9%), indicating that hematological abnormalities and gastrointestinal manifestations were the predominant warning signs in this cohort. Restlessness or lethargy was also relatively common (36.0%), indicating systemic or mild neurological involvement. Mucosal bleeding was observed in 21.8% of patients, while persistent vomiting occurred in 8.6%. Increased hematocrit was rarely detected, and no cases of hepatomegaly were identified.

Warning signs that predict progression to severe dengue were evident in a substantial proportion of patients in this study. Similar findings were reported by Karyanti et al. (2024), who identified abdominal pain or tenderness (23.2%), persistent vomiting (21.4%), and increased hematocrit or platelet decline (20.6%) as the most common warning signs. Other warning signs reported included hepatomegaly (11.9%), fluid accumulation (10.3%), mucosal bleeding (7.1%), and restlessness or lethargy (1.8%). The predominance of gastrointestinal symptoms in both the present study and previous reports underscores the importance of close monitoring of pediatric patients presenting with abdominal symptoms during dengue outbreaks, as these features may signal disease progression.[28]

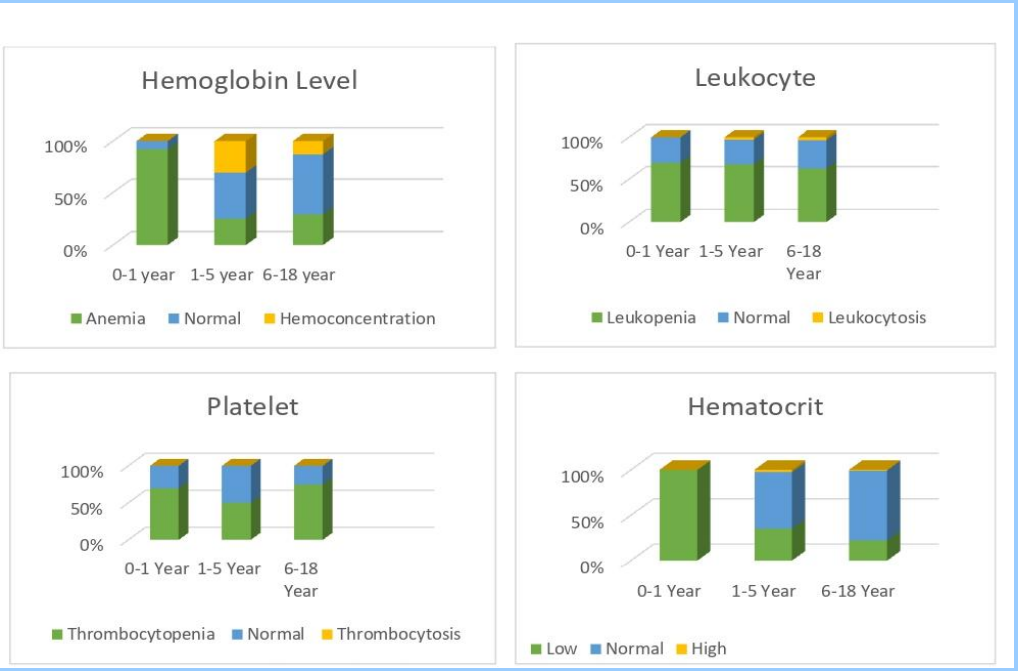

Figure 1. Laboratory findings

Laboratory results of hemoglobin examination showed that most infants (0–1 years) had anemia (92.3%), suggesting that impaired erythropoiesis or blood loss occurred more frequently in this age group. Among toddlers (1–5 years), hemoglobin distribution was relatively balanced, with 45% classified as normal, 25% as anemic, and 30% showing hemoconcentration. In the children's group (6–18 years), the proportion of normal hemoglobin was the highest (60.4%), indicating improved hematological status with increasing age. Leukopenia predominated across all age groups, particularly among toddlers (67.5%) and children (62.5%). Thrombocytopenia was most frequently observed in children (75%). Hematocrit analysis revealed that anemia was present in all infants (0–1 years) at 100% and decreased markedly in older children (6–18 years), reaching 22.2%. In contrast, hemoconcentration was rare across all age groups, occurring in ≤1% of patients. The hematologic alterations observed in this study are consistent with findings reported globally. Islam et al. documented leukopenia (28.5%), thrombocytopenia (42.3%), and minimal hemoconcentration (3.3%), noting that these abnormalities were more pronounced in severe dengue cases. Similarly, Bodinayake et al. in Sri Lanka reported leukopenia (50.6%) and thrombocytopenia (36.1%) as the most common laboratory abnormalities in pediatric dengue patients. Leukopenia typically appears early in the febrile phase and serves as a reliable marker of viral infection, whereas thrombocytopenia reflects impaired platelet production and immune-mediated clearance, making it an important indicator of disease severity.[29-30]

Table 4. Serological test results

	NS1			IgG Antidengue			IgM Antidengue			
Test	Positive	Negative	No Checked	Positve	Negative	No Checked	Positve	Negative	No Checked	N
1st Test	133	0	0	0	0	133	0	0	133	133
2nd Test	1	0	12	11	2	0	4	8	1	13
3rd Test	42	9	0	15	36	0	9	42	0	51

Table four shows that during the first examination (n=133), all patients (100%) tested positive for NS1 antigen, while IgM and IgG antibodies were not detected. This finding indicates that most patients were in the early acute phase of dengue infection, during which NS1 antigen is detectable earlier than dengue-specific antibodies. Among patients who underwent a second examination (n=13), NS1 positivity declined markedly, while IgG and IgM antibodies began to appear. Eleven patients tested positive for IgG, and four tested positive for IgM. This pattern supports the immunological profile of secondary dengue infection, in which IgG antibodies appear earlier and at higher titers than IgM. In patients who underwent a third examination (n=51), 42 patients (82%) remained NS1 positive, while nine patients tested negative. These results indicate that the NS1 antigen was consistently positive during the acute phase in this study. This finding reinforces the role of NS1 as a reliable early diagnostic marker. Prieto-Torres et al. similarly reported 100% NS1 positivity in acute-phase dengue patients, with IgM antibodies typically appearing between days five and ten and IgG antibodies indicating past or secondary infection. Versiani et al. also emphasized that combining these serological markers enhances diagnostic sensitivity, allows clinicians to better identify the infection phase, and guides appropriate management.[31,32]

Table 5. Patient diagnosis

Diagnosis	N	%
Dengue with warning sign	156	79.2
Dengue without warning sign	15	7.6
Severe Dengue	26	13.2
Total	197	100.0

The majority of patients were diagnosed with dengue with warning signs (79.2%), indicating that most experienced dengue infection with clinical warning signs. A total of 26 patients were diagnosed with severe dengue, representing a serious condition requiring intensive management. In contrast, only 15 patients were diagnosed with dengue without warning signs, representing the mildest form of infection. The classification of dengue cases in this study is consistent with both regional and international findings. Papa et al. reported that 86.1% of patients had dengue with warning signs, followed by 5.6% with dengue without warning signs and 8.3% with severe dengue.[33] Anika et al. similarly identified dengue with warning signs as the most common clinical category.[34] In contrast, Felix et al. described a predominance of dengue without warning signs (70%), with fewer cases presenting with warning signs (25%) or severe disease (5%). These discrepancies may reflect differences in study populations, healthcare settings, and diagnostic thresholds. Nonetheless, the consistently high proportion of patients with warning signs underscores the importance of early detection and monitoring to prevent disease progression.[35]

The findings of this study have important implications for clinical practice and public health in dengue-endemic regions such as Subang, Indonesia. The predominance of school-aged children, male patients, and gastrointestinal symptoms as common clinical presentations highlights key indicators for early recognition and triage. Hematological and serological markers remain essential tools for assessing disease severity and monitoring disease progression. Nevertheless, several limitations should be acknowledged. The retrospective design based on medical records introduces the possibility of incomplete or inconsistent documentation. The single-center setting may also limit the generalizability of the findings to the broader population of West Java. In addition, laboratory evaluation was limited to routine hematological and serological parameters and did not include advanced biomarkers such as liver enzymes or coagulation profiles, which could provide further insights into disease severity. Despite these limitations, this study has notable strengths, including a relatively large pediatric sample size, systematic data collection, and a specific focus on children, who represent one of the most vulnerable populations for dengue morbidity.

Future research should incorporate prospective, multicenter designs with expanded laboratory panels, clinical follow-up, and evaluation of host-related factors such as nutritional status, comorbidities, and genetic predisposition. Furthermore, assessing the impact of preventive strategies, including the potential implementation of dengue vaccines, will be critical to reducing the overall burden of dengue infection in pediatric populations.

CONCLUSION

This study provides a comprehensive description of the clinical and laboratory characteristics of pediatric dengue cases in Subang, Indonesia. The findings indicate that dengue infection is most prevalent among school-aged children, with a predominance in males and gastrointestinal symptoms as the leading clinical manifestations. Hematological abnormalities, particularly thrombocytopenia and leukopenia, along with serological markers such as NS1, IgM, and IgG, were essential indicators for disease detection and monitoring. These results not only reinforce existing evidence from other dengue-endemic regions but also contribute valuable local data from an area with limited published reports. By identifying key clinical and laboratory patterns, this study strengthens the basis for early recognition, risk stratification, and improved management of pediatric dengue, while also underscoring the need for further multicenter and prospective research to refine prevention and treatment strategies.

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DECLARATION OF INTERESTS

The authors declare that there is no conflict of interest related to the publication of this article.

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