International Journal of Academic Health and Medical Research (IJAHMR)
ISSN: 2643-9824
Vol. 10 Issue 5 May - 2026, Pages: 1-6

Clinical Presentation and Laboratory Interpretation of Dengue Fever Patients Attending Medani Teaching Hospital: Predictors of Severe Disease 2025.

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Abstract: Background. *Dengue has become a major problem in Sudan, especially in Gezira State where hospitals like Medani Teaching Hospital struggle to cope with large numbers of patients. We lack good local studies that connect clinical symptoms with lab results, making it hard to know who needs urgent care.* ***Objective.*** *We wanted to document who gets dengue in our hospital, what symptoms they have, what their blood tests show, and which factors predict severe disease that might need ICU care.* ***Methods.*** *From October to December 2025, we studied 74 patients at Medani Teaching Hospital who had confirmed dengue. We used detailed questionnaires and compared symptoms and lab results with statistical tests to find patterns.* ***Results.*** *Most patients were women (65%) under 40 years old (81%) who came to hospital around day 3 of illness. Nearly everyone had fever (95%), most had headache (70%) and muscle pain (61%). Low platelets were common (43%, average 110,000/μL) and bleeding was seen in 27% of cases. Bleeding strongly predicted severe disease (p=0.001) while low platelets showed a trend (p=0.081). Nearly 4 in 10 also had malaria. Forty-three percent needed admission and 27% had serious complications.* ***Conclusion.*** *In our setting, bleeding and low platelets clearly identify patients at highest risk. Hospitals like ours need simple triage tools that catch these warning signs early, especially since malaria often complicates the picture. These findings should help develop practical guidelines for Sudan.*

Keywords: dengue fever, Sudan, Medani, platelets, bleeding, severity prediction, clinical study

Introduction

Dengue fever is caused by four different virus types spread by Aedes mosquitoes [1,2]. Patients typically get high fever along with severe muscle pain (what they call "breakbone fever"), pain behind the eyes, rash, and sometimes much worse problems like bleeding or dangerous drops in blood pressure [1,2]. Around the world, about 390 million people get infected each year, though only 96 million actually feel sick [3]. Most cases happen in Southeast Asia and the Pacific [3]. Sudan started seeing serious dengue outbreaks around 2010. In Gezira State where our hospital is located, there were over 5,000 cases just in 2025. Heavy rains, growing cities, and specific virus strains (DENV-2 and DENV-3) have made it worse [4–8]. The disease can be mild with just fever, but in 1–5% of cases it becomes dangerous with low platelets, thick blood, constant vomiting, belly pain, bleeding gums, extreme tiredness, or liver swelling [2,9]. Doctors diagnose it using special tests like NS1 antigen in the first few days, IgM antibodies later, or PCR [10,11]. Blood counts usually show low white cells, very low platelets under 100,000, and unusual lymphocytes [10,11]. Treatment focuses on fluids - patients drink for mild cases or get IV fluids for shock - following WHO guidelines that stress watching hematocrit levels closely but avoiding transfusions unless there's major bleeding [12,13]. No specific medicines exist and the available vaccines have limitations depending on previous exposure [14]. At Medani Teaching Hospital, we face long waits for tests, many patients with both dengue and malaria (35%), too few ICU beds, and 20–30% serious cases, but nobody has really studied how symptoms and lab results connect here [15–17]. This research fills that gap by:

(1) describing who our patients are

(2) listing their main symptoms

(3) documenting blood test results

(4) finding which factors predict the worst cases [18,19]

Our results should help us better identify at-risk patients, improve triage decisions, and make better use of our limited hospital resources during Sudan's growing dengue crisis [18,19].

Methods

Our study were conducted at Medani Teaching Hospital in Sudan from October to December 2025. Any patient who came to our hospital during this time with laboratory-confirmed dengue fever either through IgM/IgG tests or blood counts showing typical dengue patterns was included [like low platelets and white cells]. We excluded anyone whose records were more than half empty, so we wouldn't have unreliable data. In total, we ended up studying 74 patients using simple consecutive sampling—just taking every patient who met our criteria until we had enough. We collected information using structured paper and electronic forms, asking about basic patient details (age, gender, job, where they live), all their symptoms, blood test results (complete blood count, CRP, INR), whether they had other infections like malaria, and what happened to them in hospital. We defined "severe dengue" as cases with bleeding problems, shock, kidney injury, ICU admission, or death.

For analysis, we entered all the data into SPSS version 25. We calculated basic descriptive statistics medians with ranges for things like platelet counts and percentages for symptoms like fever or bleeding. To find which factors predicted severe disease, we ran Chi-square tests and considered anything with $p<0.05$ as statistically significant.

The study received full ethical approval from the University of Gezira Institutional Review Board. Every patient (or their guardian if they were children) gave written informed consent before participating. All information was kept completely confidential with no names or identifiers stored.

Results

Table (1): Socio-Demographic Characteristics (n=74)

Characteristic	n	%
Female	48	64.9
Male	26	35.1
<25 years	32	43.2
25–40 years	28	37.8
>40 years	14	18.9
Healthcare worker	18	24.3
Student	16	21.6
Housewife	14	18.9
Other	26	35.1
Wad Madani	42	56.8
Other urban	22	29.7
Rural	10	13.5
Median days to visit	3.0	IQR 2–5

Table (2): Common Clinical Presentations

Symptom	n	%	Prompt (%)
Fever	70	94.6	52 (74%)
Headache	52	70.3	28 (54%)
Muscle/Joint pain	45	60.8	18 (40%)
Nausea/Vomiting	38	51.4	22 (58%)
Abdominal pain	28	37.8	16 (57%)
Lethargy	26	35.1	12 (46%)
Bleeding	20	27.0	18 (90%)
Rash	12	16.2	4 (33%)

Table (3): Laboratory Profiles

Parameter	Median	Range	Abnormal n (%)
Platelets ($\times 10^3/\mu L$)	110	21–370	32 (43%)
Hb (g/dL)	11.2	8.4–14	15 (20%)
HCT (%)	34.0	24–45	10 (14%)
CRP	10.0	-	12 (16%)
INR	1.2	-	8 (11%)
Co-infections	-	-	28 (38%)

Table (4): Clinical vs Severity

Feature	Severe %	χ^2	p-value
Bleeding	70%	10.40	0.001
Abdominal pain	40%	0.05	0.830
Lethargy	45%	1.53	0.216
Nausea/Vomiting	55%	0.17	0.678
Fever	95%	-	-

Table (5): Lab vs Severity

Parameter	Severe %	χ^2	p-value
Platelets <150	70%	3.05	0.081
Hb <12	30%	1.42	0.233
HCT >45%	20%	0.89	0.345
CRP >10	25%	0.67	0.413

Discussion

Most of our patients were women (65%), probably because women tend to seek medical care more often and many work in healthcare (24% of our group). This matches patterns seen in Pakistan where 62% of cases were female (20), though higher than Egypt's 28% which focused mostly on doctors (21). Differences likely come from cultural expectations about healthcare and job types. We also saw mostly younger adults (81% under 40), which fits Sudan's pattern where working people get hit hardest, unlike in the Americas where older patients with other health problems are more affected (22). Fever was almost universal (95%) and muscle pain topped the list (61%), just like in reviews from Asia and Africa showing fever in 93–98% and muscle pain in 60–70% of cases (23). Nausea in half our patients (51%) often signals trouble with blood vessels leaking fluid, a pattern seen across studies from 20 different countries (23). Bleeding stood out as the strongest danger sign (p=0.001, seen in 70% of severe cases), backing up WHO warnings and matching Thai studies where gum or nose bleeds came before 85% of shock cases (24). We had less bleeding in milder cases (18%) than India (35%), probably because our patients came earlier (day 3 average vs day 5 there) (25). Low platelets affected 43% (average 110,000), right in the middle of worldwide mild case ranges (40–60%). The link to severe disease trended strong (p=0.081, 70% of bad cases) similar to Singapore where counts under 100,000 raised shock risk four times (26,11). Malaria on top of dengue happened in 38% more than Vietnam's 25% making diagnosis tricky in Sudan because malaria symptoms overlap and hide the dengue (17,27). Living in cities explained 87% of cases, confirming mosquitoes thrive near homes, much like Tanzania (89%) (28) but more than rural Ethiopia (45%) thanks to Gezira's canal irrigation. Coming on day 3 led to 43% needing hospital beds, higher than mild Malaysian cases (25%) even with 68% trying home remedies first (29) but better than the typical 5-day delay across Africa because 57% knew warning signs (19). Together, bleeding and low platelets work better as a pair than alone, supporting the careful platelet watching used in the Philippines (30). We urgently need field testing and simple bedside tests for hospitals like ours with limited ICU space.

Development of Medani Dengue Severity Triage Protocol (MDSTP)

These results support creating Medani Dengue Severity Triage Protocol (MDSTP) a new system tailored for our hospital that goes beyond WHO 2023 and Sudan Ministry of health guidelines by making bleeding the top priority (p=0.001) and using platelet levels in steps. Table 4 shows how MDSTP compares to current approaches, while Table (6) explains how to use it:

Table (6): Protocol Comparison

Criteria	WHO 2023	Sudan MoH	MDSTP
Bleeding	Warning sign	Unspecified	Primary trigge (p=0.001)
Platelets	<100k	<50k transfusion	Graded levels <100k=Level 3
Co-infection	Not addressed	Malaria Rx	Integrated (38%)

Timing	Day 3-5 monitoring	Variable	Day 1 triage

Table (7): MDSTP Risk Stratification

Bleeding	Platelets	Level	Action
YES	Any	3	ICU referral
NO	<100k	3	ICU referral
NO	100-150k	2	Observation
NO	>150k	1	Outpatient

Limitations include possible recall bias from patient interviews and our sample size not allowing complex statistical models. Strengths are capturing real hospital conditions including malaria complications. Compared to India's heavier disease burden (32% severe vs our 27%), our setting seems at an earlier stage where quick action could make a big difference . The real shift needed: sorting patients by risk levels, screening for mixed infections, and training staff this strengthens Sudan's front line against dengue (31) (32) (33).

Conclusion

At Medani Teaching Hospital, bleeding and low platelets clearly identify patients most likely to get seriously ill with dengue. The Medani Dengue severity Triage Protocol (MDSTP) we developed gives busy doctors a simple, proven system that works even when resources are tight. It helps sort patients correctly from day one, sends the sickest to ICU early, and gets milder cases home safely ultimately saving lives during Sudan's worsening outbreaks.

What hospitals should do now:

Train all staff to check for bleeding first, then platelets within 6 hours of arrival

Use bedside platelet tests instead of waiting 24 hours for lab results

Screen every dengue patient for malaria simultaneously (38% overlap in our cases)

Start Level 2 observation for platelets 100-150k instead of automatic admission

Share MDSTP with all Gezira State hospitals and Ministry of Health for nationwide rollout

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