Prevalence of thrombocytopenia in children with dengue fever in a tertiary care hospital

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ABSTRACT

Background

Dengue fever is an arthropod borne viral disease transmitted by bite of infected mosquito Aedes aegypti. Almost half of the world population is in risk of dengue and in Nepal dengue fever is endemic and infection occurs each year in most provinces. Thrombocytopenia is one of the most important complication of dengue fever.This study was aimed to determine the prevalence and severity of thrombocytopenia in children with dengue fever.

Method

A cross-sectional study was conducted at Nepal Police Hospital by retrospectively reviewing the medical records of children (1 day to 16 years old) diagnosed with dengue fever between April 2023 and April 2025. Data on fever duration, platelet count, dengue serology, and admission status were collected. Ethical approval was obtained, and consecutive sampling was used.

Result

Out of total 130 cases with dengue fever 27(20.8%) cases had thrombocytopenia. Among 130 cases 73 cases were male and 57 cases were female with gender ratio of 1.2:1. Mean age of presentation was 10.7years (SD ± 4.88). Majority of cases (73.1%) were diagnosed in month of October to December. Among dengue positive cases NS1 antigen was positive in 96.2% cases.

Conclusion

The prevalence of thrombocytopenia in dengue fever was lower than other studies done in similar setting

Keywords: Dengue fever; Thrombocytopenia; Children; Aedes aegypti

Introduction

Dengue fever is a benign syndrome caused by several arthropod borne viruses and transmitted by bite of infected mosquitoes of the stegomyia family.[1] Aedes aegypti, a day time biting mosquito, is the principal vector. Worldwide dengue is found in tropical and sub-tropical climate , mostly in urban and semiurban areas. According to WHO estimate 100-400 million dengue infections occurs each year with about half of the world population is now at risk of dengue.[2] In Nepal dengue has been a rapidly emerging disease and is now endemic in most of the provinces.[3] Nepal faced its worst outbreak in 2022 with more than 50,000 cases and over 50 deaths across all districts.[4]

Normal range of platelet count is 150,000-450,000/mm^3 and thrombocytopenia is defined as platelet count less than 150,000 mm.[3,5]A platelet count between 100,000 to 150,000 /microliter is graded as mild thrombocytopenia , between 50,000-100,000/microliter is graded as moderate thrombocytopenia and platelet count below 50,000/microliter is severe thrombocytopenia.[6] Patient develops thrombocytopenia during course of dengue infection which increases risk of bleeding manifestations and several other complications. Thrombocytopenia in dengue fever is due to dengue virus induced bone marrow suppression and release of antibody that destroy platelets.[7] Several previous studies have identified thrombocytopenia in 76-92 % children with dengue fever.[8,9]

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The burden of dengue fever has increased in recent years all over the world with cases reported to WHO increasing from 505,430 case since 2000 to 5.2 million cases in 2019.[10] With first case reported in 2004 in Nepal, dengue has been identified as one of the youngest emerging infectious diseases. There were Over 51,243 confirmed cases of dengue in Nepal across 77 districts.[11]Several studies have identified hematological changes in patients with dengue. The purpose of the study was to determine the frequency and severity of thrombocytopenia in children with dengue fever. Understanding frequency of complications such as thrombocytopenia can help healthcare providers better manage and allocate resources during outbreaks.

Materials and methods

This cross sectional study was conducted at outpatient , inpatient and emergency department of Nepal Police Hospital. Ethical approval was taken from Institutional Review Committee of Nepal Police Hospital. Children of day 1 to 16 years of age with diagnosis of dengue fever presenting in ward, emergency or OPD were included in the study. Children with clinical features of dengue with NS1 positive and/or IgM positive were diagnosed as a case of dengue fever.

Data was collected retrospectively from children presenting with dengue fever. Data from April 2023 to April 2025 was collected from medical records. Data of complete blood count and dengue serology report of children presenting with fever was collected from medical records. Duration of fever and presence of thrombocytopenia and its severity was noted and need for admission was also noted.

Consecutive sampling was utilized to include all eligible pediatric patients diagnosed with dengue fever during the study period. The minimum required sample size was calculated using the standard formula: $n = Z^2 \times p \times q / e^2$, where Z represents the standard normal deviate at a 95% confidence interval (1.96), p is the estimated prevalence (0.92) based on a previous study by Tamil Selvan et al.[12], q is $1 - p$ (0.08), and e is the margin of error (5%). Based on these parameters, the calculated sample size was 113.

Data were collected from medical records and included demographic and clinical information such as fever duration, platelet count, serological findings, and admission status. All data were entered and analyzed using Statistical Package for the Social Sciences (SPSS) version 20.

Results

Out of total 130 cases with dengue fever 27(20.8%) cases had thrombocytopenia. Among 130 cases 73 cases were male and 57 cases were female with gender ratio of 1.2:1. Mean age of presentation was 10.7years (SD ± 4.88). Majority of cases (73.1%) were diagnosed in month of October to December. (Table 1)

Table 1: Date of diagnosis

Month of diagnosis	Frequency N (%)
January - March	7 (5.4%)
April- June	4 (3%)
July- September	24 (18.5%)
October- December	95 (73.1%)

In our study mean hemoglobin level was 12.93(SD ±1.38), mean platelet level was 231291.47(SD ±284773.23) and mean WBC level was 5889.15(SD ±3177.14). Mean PCV in our study was 38.19 (SD ±4.62). Majority of cases had WBC level more than 4000 (Table 2) and Hematocrit level was less than 45 in majority of cases (Table 3) and in most cases platelet count was normal. (Table 4)

Table 2: WBC level

WBC Level	Frequency N (%)
More than 4000	96 (73.9%)
Less than 4000	34 (26.1%)

Table 3: Hematocrit level

Hematocrit level	Frequency N (%)
More than 45	9 (6.9%)
Less than 45	121 (93.1%)

Table 4: Platelet count

Platelet level	Frequency N (%)
More than 150000	103 (79.2%)
100000-150000	23 (17.7%)
Less than 100000	4 (3.1%)

Among dengue positive cases NS1 antigen was positive in 96.2% cases. (Table 5)

Table 5: Dengue serology

Dengue serology	N (%)
NS1 antigen positive	125 (96.2%)
IgM antibody positive	5 (3.8%)

Discussion

In our study among 130 children, 20.8% dengue cases had thrombocytopenia. In similar study done at Brazil prevalence of thrombocytopenia among dengue cases was 40.3%.[5] However prevalence of thrombocytopenia was higher in other studies done in children with dengue fever.[7] In a study done by Tamil Selvan et. al.[8], thrombocytopenia was present in 92% cases. In a study done by Khan et. al.[13] prevalence of thrombocytopenia in children with dengue fever76.31%. Lower prevalence of thrombocytopenia in our study might be due to inclusion of both outpatient and in-patient cases and thrombocytopenia is more common in patients with dengue with warning signs.

In our study among cases with thrombocytopenia most had mild thrombocytopenia 23(85.1%). In similar study done by Tamil Selvan et. al.[8] mild thrombocytopenia was seen in 87.7% cases.

In our study dengue was predominantly seen in male 73(56.15%). In similar study done by Kulkarni et al, dengue was more commonly seen in males ,671(70.8%).[9] This might be due to more outdoor activities by males and their more chances of getting bitten by mosquitoes.

Most of the cases occurred in the month of October to 95(73.1%). Similar finding were seen in the study done in Nepal by Ghimire et al.[14]

In our study majority of cases 125(96.2%) were NS1 positive. Similar finding were observed in study done by KC et. al.[15] where NS1 was positive in 76% cases.

Conclusion

This study found a lower prevalence of thrombocytopenia in pediatric dengue cases compared to similar studies in comparable settings. Despite this, thrombocytopenia remains a clinically significant complication in dengue fever. Regular monitoring of platelet levels and early recognition of bleeding tendencies are essential components of care. Timely intervention based on these parameters can contribute to improved clinical outcomes and help prevent progression to severe dengue in children.

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