ORIGINAL ARTICLE

Pattern of Platelet and Blood Component Transfusion among Children at tertiary care Hospital: A Clinical Cross-Sectional Study

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Abstract

Background: Dengue is a major public health problem in tropical countries and frequently presents with thrombocytopenia, leading to widespread use of prophylactic platelet transfusion. However, the appropriateness of platelet transfusion in pediatric dengue remains controversial. The present study aimed to assess the pattern of platelet transfusion and hematological profile, and to evaluate the relationship between platelet count and hemoglobin levels among pediatric dengue patients. **Methods:** A descriptive observational study was conducted in the pediatric dengue unit of a tertiary care hospital in Firozabad, Uttar Pradesh, from September to November 2021. A total of 212 clinically suspected cases (≤15 years) were enrolled using purposive sampling; 202 laboratory-confirmed dengue cases were analyzed. Clinical features, hematological parameters, and transfusion practices were recorded. SPSS version 20.0 was used to analyse the data. Mean ± SD was used to summarise continuous variables, whereas frequencies and percentages were used to summarise categorical variables. The Shapiro-Wilk test was used to determine normality. The association between haemoglobin and platelet count was evaluated using Spearman rank correlation. Statistical significance was defined as a p value of less than 0.05. **Result**: Among 202 confirmed cases, dengue fever, dengue hemorrhagic fever, and dengue shock syndrome accounted for 89.6%, 12.3%, and 1.8% respectively. Fever (95.5%) and bleeding (22.8%) were the most common manifestations. Platelet transfusion was required in 22 (11%) patients, while only 2.5% required packed red cell transfusion. All patients with platelet count <20,000/µL received transfusion, whereas 44.4% and 13% of patients with platelet counts of 20,000–50,000/µL and 50,000–100,000/µL respectively also received transfusion. Platelet count showed a skewed distribution, while hemoglobin remained relatively stable. A statistically significant moderate negative correlation was observed between platelet count and hemoglobin (Spearman r = −0.326, 95% CI: −0.448 to −0.193, p <0.0001). **Conclusion:** Platelet transfusion was required in a minority of paediatric dengue cases and was not consistently associated with bleeding manifestations. The inverse relationship between platelet count and haemoglobin suggests haemoconcentration rather than blood loss in dengue infection. Judicious use of platelet transfusion based on clinical indications rather than platelet count alone is recommended to avoid unnecessary transfusion.

Keywords
Dengue, Hematological Parameters, Public Health, Hospital

Introduction

Dengue fever is a significant global public health concern, with a rapidly increasing incidence in many tropical and subtropical regions. This viral illness, caused by the dengue virus and transmitted primarily by the *Aedes aegypti* mosquito, presents a broad spectrum of clinical manifestations, from mild flu-like symptoms to severe dengue hemorrhagic fever and dengue shock syndrome. It is a vector-borne viral illness endemic in many parts of the world, with Asia being one of the most heavily affected regions. The incidence of dengue has been steadily rising over the years, and it poses a significant burden on healthcare systems.

Dengue fever and its severe forms Dengue hemorrhagic fever (DHF) and Dengue Shock Syndrome (DSS) are one of the most common and challenging public health concerns. Over the past three decades, there has been a continuous rise in the frequency of Dengue Fever, DHF, and DSS. The incidence of dengue has grown dramatically around the world in recent decades, with cases reported to WHO increased from 505 430 cases in 2000 to 5.2 million in 2019(1). A vast majority of cases are asymptomatic or mild and self-managed, and hence the actual numbers of dengue cases are under-reported. Many cases are also misdiagnosed as other febrile illnesses (2).

In cases with dengue fever with thrombocytopenia, prophylactic platelet transfusions are used to avoid hemorrhagic consequences (3). Prophylactic platelet transfusions are becoming more common in nations where dengue is endemic, although there are hazards involved and financial ramifications. (4)

The appropriateness of platelet transfusion in dengue cases is a subject of debate. Some studies suggest that prophylactic platelet transfusions may not be beneficial and could lead to adverse outcomes. Concerns include potential transfusion-related reactions, alloimmunization, and the need for a large number of platelet donors. Striking the right balance between the potential benefits and risks of platelet transfusion in dengue-positive patients remains a challenge.

The decision to transfuse platelets is primarily based on several factors including evaluation of platelet count and function, reasons of thrombocytopenia, the status of coagulation system, the presence or likelihood of bleeding and the hazards of transfusion. (5) The rapid spread of the dengue virus, especially in densely populated areas, underscores the importance of optimizing clinical management strategies, including platelet transfusion.

Objectives of the Current Study:

The present cross-sectional study at a Tertiary Care Hospital in the context of Firozabad aims to contribute to the ongoing discourse on platelet transfusion strategies in dengue management as well as the spectrum of Dengue fever and its complications. It seeks to assess the current practices, the rationale behind them, and their impact on patient outcomes. By doing so, the study aims to provide a solid foundation for evidence-based recommendations, thus contributing to the improvement of dengue care protocols and patient outcomes.

Material & Methods

Study Area: The study was conducted in Department of Paediatrics (Dengue Unit), tertiary care hospital of Autonomous State Medical College, Firozabad, Uttar Pradesh.

Study Design: A descriptive observational study

Study Period: The study was conducted for a period of three months from September to November 2021

Study Population: All clinically suspected patients up to 15 years of age admitted in dengue unit, tertiary care hospital of Autonomous State Medical College, Firozabad, Uttar Pradesh from Sep 2021 to Nov 2021 are registered for the study.

Sample size calculation: A previous community-based study in western Uttar Pradesh, by Kumar *et al*. [6] reported that the seroprevalence rate of dengue is 16%. The sample size was estimated considering confidence interval of 95% with $Z_{1-\alpha}=Z_{0.95}=1.96$ and absolute error (L) of 5%.

Sample size $N = \frac{Z^2 \times p \times (1-p)}{\epsilon^2}$

Where, p was the prevalence rate of Dengue is around 16% in western UP (p =0.16).

Z was inverse normal probability = 1.96

ϵ was taken as margin of error (i.e., 0.05)

Using the above formula, the sample calculated was 206

After applying final population correction considering the total no. of fever cases as population(N=5000)

Final Sample size n= 199. However, 212 patients were enrolled to ensure achieving minimum sample size.

Data Collection: According to specific inclusion criteria mentioned by WHO, 212 clinically suspected patients of DF, DHF, and DSS were included in the study by using purposive sampling. A written consent was taken from the parents or the guardians.

Data were collected by face-to-face interview of parents or guardians. Physical examination data was obtained through indoor patient file. Reports of hematological investigations, dengue serology and platelet requirement, transfusion and daily follow-up were also analyzed.

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using statistical software SPSS version 20.0. Continuous variables were assessed for normality using the Shapiro–Wilk test. As platelet count showed a non-normal distribution, non-parametric methods were applied where appropriate. Continuous variables were summarized as mean ± standard deviation (SD), and categorical variables were presented as frequencies and percentages. Correlation between platelet count and hemoglobin level was assessed using the Spearman rank correlation coefficient with 95% confidence interval. A two-tailed p value <0.05 was considered statistically significant.

Results

Among the 212 clinically suspected cases admitted in the Pediatric ward, 202 were found to be laboratory confirmed Dengue positive by any of the three criteria i.e. Dengue rapid diagnostic test, NS1 Antigen, or IgM ELISA test.

Table 1 Socio-Demographic Profile of Dengue positive Patients

Categories		No. of Patients	n (%)
Age Group	0-4 Years	58	29.71%
	5-10 Years	83	41.09%
	11-15 Years	61	30.20%
Gender	Female	99	49.01%
	Male	103	50.99%
Type of Residence	Rural	93	46.04%
	Urban	106	52.48%
	Other District	3	1.49%

Apart from infancy, all age groups were equally involved with slight dominance towards age group 5–10 years (41.09%), followed by 11–15 years (30.20%) and 0–4 years (29.71%). The gender distribution was almost equal

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with a slight male predominance (50.99% males vs 49.01% females). Most patients were from urban areas (52.48%), while 46.04% were from rural areas and only 1.49% were referred from other districts. as shown in Table 1.

Out of 202 Dengue positive cases 181 (89.6%), 25 (12.3%), 4(1.8%) were classified as Dengue fever, Dengue Hemorrhagic fever and Dengue Shock Syndrome respectively according to WHO classification. Most common symptoms reported were fever (95.5 %) and bleeding (22.8%) only 1.9% cases reported shock. Most common systemic manifestations (13.6%) were gastrointestinal manifestations as shown in figure-3.

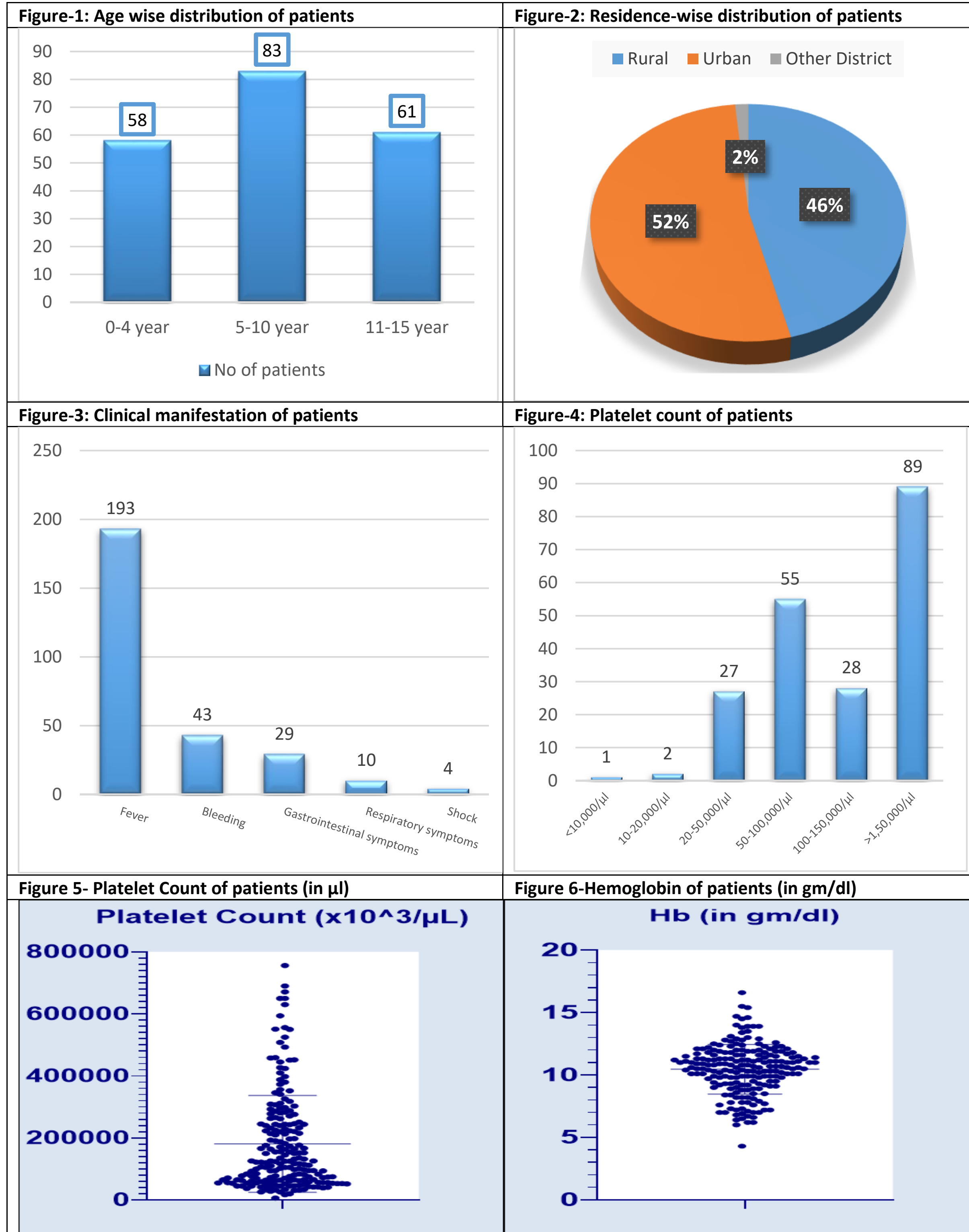

Figure-1: Age wise distribution of patients

Figure-2: Residence-wise distribution of patients

Figure-3: Clinical manifestation of patients

Figure-4: Platelet count of patients

Figure 5- Platelet Count of patients (in µl)

Figure 6-Hemoglobin of patients (in gm/dl)

The majority of patients had platelet counts above 150,000/µL (n = 89), followed by those in the range of 50,000–100,000/µL (n = 55). Moderate thrombocytopenia (20,000–50,000/µL) was observed in 27 patients, while 28 patients had platelet counts between 100,000–150,000/µL. Severe thrombocytopenia was relatively uncommon, with only 2 patients in the 10,000–20,000/µL range and 1 patient having platelet count below 10,000/µL. Overall, the figure-4 indicates that most dengue cases had normal or mildly reduced platelet counts, whereas severe thrombocytopenia was present in only a small proportion of patients.

As Figure-5 depicts, platelet count shows a highly skewed distribution with a wide dispersion of values. A large clustering of observations is seen at lower platelet counts, while a smaller proportion of cases extends toward very high values, indicating the presence of outliers. The majority of patients had platelet counts concentrated in the lower range, reflecting the thrombocytopenic nature of dengue infection. In contrast, Figure-6 shows that hemoglobin values demonstrate a relatively symmetrical and compact distribution around the central range (approximately 9–12 g/dL). The dispersion is narrow compared to platelet count, and only a few extreme observations are present. This indicates comparatively stable hemoglobin levels among patients, with less variability than platelet counts.

A statistically significant moderate negative association between haemoglobin level and platelet count was found using Spearman rank correlation analysis (r = -0.326, 95% CI: -0.448 to -0.193, p < 0.0001; n = 202).

All the patients were transfused with Random Donor Platelet except one which also needed SDP transfusion. None of the patients having platelet count more than 100,000µl received platelet transfusion. Among the 202 confirmed cases of Dengue only five patients (2.5%) required packed RBCs as shown in table-2.

Table 2- Distribution and pattern of Platelet Transfusion

Platelet count (x103/µL)	No. of patients (n)	Platelet transfused (n)	PCV (n)	Bleeding (n)
Less than 10	1	1	0	2
10-20	2	2	0	3
20-50	27	12	1	8
50-100	54	7	1	15
100-150	29	0	3	11
more than 150	89	0	0	6
Total	202	22	5	0

Out of the total patients, 45 who reported bleeding manifestations only 22 were given platelet transfusion. None of the confirmed cases of dengue were malaria positive.

Table 3 – Demographic Profile Transfused Patients

Particulars		Number of Patients	n (%)
Gender	Male	10	45.45
	Female	12	54.55
Age-Group	less than 1 years	0	0.00
	less than 4 years	0	0.00
	5 to 8 years	0	0.00
	9 to 12 years	9	40.91
	13 and above (up to 15 Years)	13	59.09
Type of Residence	Rural	11	50.00
	Urban	9	40.91
	Other District	2	9.09

Out of total 22 patients with platelet transfusion majorly 12(54.55%) were female and 10 (45.45%) were male as well as the maximum no. of patients receiving platelet transfusion were in 13-15 Years of Age group followed by 9-12 year of age group. While there was not slightly difference between the type of residence of these groups which was higher in Rural area with 11(50%) followed by 9(40.91%) were from urban area and 2(9.09%) were from the urban areas of other districts as shown in Table-3.

Discussion

Dengue remains the major public health challenges in India. In the present study out of suspected children 95.2% were laboratory confirmed Dengue positive, similar findings were reported by Makroo et al (6) in their study in a tertiary care hospital in Delhi. Classical Dengue fever was most common followed by Dengue Hemorrhagic fever and DSS which is similar to the findings in the study done by Makroo et al. (6)

Bleeding manifestations were reported in 22.2 % similar finding was observed in a study conducted by Pothapregada et al in a tertiary care hospital in Puducherry. (7). Thrombocytopenia was reported in 41.5 % of total Dengue positive cases which was lower as compared to studies done by Charulfatah et al (83%) among hospitalized patients and Makroo et al. (8, 6). Platelets were transfused in 11.4% of patients which is much lower as compared to the study done by Makroo et al. (6)

Different figures have been reported as the cause of platelet transfusion in hospitalised dengue patients based on published data from different hospitals across the nation. According to DHS standards, patients with a platelet count of less than 20,000/cumm should have a platelet transfusion. [9-11] In our study 3 (13%) of patients out of 22 who received transfusion were having platelet count <20,000 and in patients with platelet count more than 20,000 bleeding manifestations were present in 23 whereas platelets were transfused to only 19 patients. Thus, all the patients who were having bleeding were not transfused with platelets, so there was not inappropriate platelet transfusion.

In our study, 118 were having platelet count of more than 100,000/µL but none was given platelet transfusion

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whereas bleeding manifestations were present in 17 of them. This shows that there is no co-relation with bleeding manifestations and platelet transfusion which is in accordance with many authors who observed no correlation between clinical bleed and platelet count. About 21.5% of platelet transfusions were considered inappropriate. (12)

A statistically significant moderate negative association between haemoglobin level and platelet count was found using Spearman rank correlation analysis ($r = -0.326$, 95% CI: -0.448 to -0.193, $p < 0.0001$; $n = 202$). This suggests that among dengue patients, comparatively greater haemoglobin levels were linked to lower platelet counts. This conclusion was corroborated by the graphic distribution, which displayed rather consistent haemoglobin levels together with significant variability in platelet counts. Haemoconcentration during plasma leakage and the compensatory haematological response found in dengue infection may account for the observed inverse connection. There has been prior evidence of a similar negative relationship between haemoglobin and platelet count, where decreasing haemoglobin concentrations were accompanied by comparatively higher platelet counts, indicating a compensatory mechanism.[14]

Conclusion

Overall, these findings support the concept that thrombocytopenia in dengue is not necessarily accompanied by anemia and may instead coexist with hemoconcentration, reflecting disease pathophysiology rather than blood loss.

Authors Contribution

All authors have contributed equally.

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Nil

Conflict of Interest

There are no conflicts of interest.

Declaration of Generative AI and AI Assisted Technologies in the Writing Process

The authors haven't used any generative AI/AI assisted technologies in the writing process.

References

1. World Health Organization. Dengue and severe dengue [Internet]. Geneva: WHO; 2023 Mar 17 [cited 2026 Feb 19]. Available from: https://www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue
2. Bhatt S, Gething PW, Brady OJ, Messina JP, Farlow AW, Moyes CL, et al. The global distribution and burden of dengue. Nature. 2013;496(7446):504–7.
3. Kaur P, Kaur G. Transfusion support in patients with dengue fever. Int J Appl Basic Med Res. 2014;4:8–12.
4. Kurukularatne C, Dimatatac F, Teo DL, Lye DC, Leo YS. When less is more: Can we abandon prophylactic platelet transfusion in dengue fever? Ann Acad Med Singapore. 2011;40:539–45.
5. Galel SA, Malone JM, Viele MK. Transfusion medicine. In: Greer JP, Foerster J, Lukens JN, Rodgers GM, Paraskevas F, Glader B, editors. Wintrobe's clinical hematology. 11th ed. Philadelphia: Lippincott Williams & Wilkins; 2004. p. 831–82.
6. Makroo RN, Raina V, Kumar P, Kanth RK. Role of platelet transfusion in the management of dengue patients in a tertiary care hospital. Asian J Transfus Sci. 2007;1(1):4–7.
7. Pothapregada S, Kamalakannan B, Thulasingam M. Role of platelet transfusion in children with bleeding in dengue fever. J Vector Borne Dis. 2015;52(4):304–8.
8. Chairulfatah A, Setiabudi D, Agoes R, Colebunders R. Thrombocytopenia and platelet transfusions in dengue haemorrhagic fever and dengue shock syndrome. Paediatr Indones. 2003;43:138–43.
9. Epidemiological News Bulletin. Management guidelines for dengue patients at Tan Tock Seng Hospital and Communicable Diseases Centre, Singapore. Platelet transfusion. 2005;49.
10. Teik OC. A guide to DHF/DSS management. Dengue Bull. 2001;25:48.
11. Directorate of Health Services. Management of dengue fever/DHF/DSS: guidelines for indoor patients. 2005.
12. Chaudhary R, Khetan D, Sinha S, Sinha P, Sonker A, Pandey P, et al. Transfusion support to dengue patients in a hospital-based blood transfusion service in North India. Transfus Apher Sci. 2006;35:239–44.
13. Kumar V, Chaturvedi M, Agrawal A, Singh G, Maurya P, Goyal A, et al. Dengue infection in Agra region, Uttar Pradesh: an observational study of seroprevalence, clinico-epidemiological profile, and serotype of dengue virus from a tertiary care center. Asian J Med Sci [Internet]. 2022 [cited 2026 Feb 19];13(12):162–8. Available from: https://www.nepjol.info/index.php/AJMS/article/view/47909
14. Tahseen Z, Yadav C. Serological insights and clinical patterns of dengue fever in a tertiary care hospital: a survey-based study. J Ideas Health. 2025;8:1240–6.