

ORIGINAL ARTICLE

Optimizing Platelet Transfusion Practices: A Comprehensive Analysis of Adherence to Guidelines in a Tertiary Care HospitalAmina Kanwal¹, Sehar Khaliq², Nadia Arif³, Amatul Nawal⁴, Fakhra Noureen⁵, Muhammad Awais Niaz⁶**ABSTRACT**

Objective: To evaluate adherence of platelet transfusion practices to British Society for Haematology (BSH) guidelines – 2024 and identify patterns of non-compliance across clinical settings.

Study Design: A descriptive cross-sectional study.

Place and Duration of Study: Department of Haematology and Blood Bank, Fauji Foundation Hospital, Rawalpindi, from July 01, 2025 to December 31, 2025.

Materials and Methods: A total of 260 patients who received platelet transfusions during the study period were included. Demographic details, clinical diagnoses, indications for transfusion, and requesting departments were recorded. The appropriateness of platelet transfusion practices was assessed in accordance with the 2024 BSH platelet transfusion guidelines. Data were analyzed using SPSS v29. Guideline adherence was classified as adherent or non-adherent, and associations between diagnosis and adherence were assessed using the Chi-square test.

Results: Adults constituted 56.2% of study population, whereas paediatric patients accounted for 43.8%. Females constituted 66.5% of the study population. Most platelet transfusions were administered in the NICU (18.1%), followed by oncology units (15.4%), ICU (14.2%), Medical wards (14.2%), paediatric wards (14.2%) and others (23.9%). Overall, 161 platelet transfusions (61.9%) were found to be compliant with the recommended transfusion guidelines, whereas 99 transfusions (38.1%) were identified as non-compliant.

Conclusion: Despite reasonable overall compliance, a substantial proportion of platelet transfusions were inappropriate, particularly in non-haematology settings. These findings highlight the need to strengthen transfusion management, to improve guideline adherence, enhance patient safety and optimize platelet utilization.

Key Words: *Clinical Audit, Guideline Adherence, Platelet Transfusion, Tertiary Care Centers.*

Introduction

Platelet transfusion is critical supportive therapy for preventing and treating bleeding in patients with thrombocytopenia or platelet function disorders. Platelet concentrates are routinely administered in surgical, obstetric, haemato-oncological, and intensive care units based on clinical indications and

platelet dose requirements.¹ However, platelet demand and supply remain challenging due to stringent storage requirements and a storage duration of up to 7 days.²

Furthermore, platelet concentrates are associated with the highest risk of adverse transfusion reactions among all blood components due to their pro-inflammatory effects. Patients receiving platelets face an elevated risk of severe complications, including transfusion-associated acute lung injury (TRALI), anaphylactic reactions, transfusion-associated circulatory overload (TACO), and febrile non-haemolytic transfusion reactions (FNHTR).^{3,4} Additionally, because platelets must be stored at room temperature (approximately 20°C–22°C), they present a significant risk for bacterial proliferation. While the implementation of nucleic acid testing (NAT) has drastically minimized viral transmission risks, bacterial contamination remains a persistent complication.^{5,6} To mitigate these clinical risks and

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manage scarce resources, international bodies like the Association for the Advancement of Blood and Biotherapies (AABB) and the International Collaboration for Transfusion Medicine Guidelines (ICTMG) strongly advocate for restrictive platelet transfusion practices.^{7,8,9} In Pakistan, clinical settings generally align with the frameworks established by BSH.^{10,11} The BSH recommends strict, evidence-based triggers based on clinical indications, such as thresholds of $<100 \times 10^9/L$ for ophthalmic and neurosurgery, $<50 \times 10^9/L$ for major surgeries or active bleeding, and $<20 \times 10^9/L$ for central venous catheter insertion, while explicitly discouraging prophylactic transfusions in immune thrombocytopenic purpura (ITP). BSH guidelines similarly recommend restrictive practices, with specific thresholds for various procedures. Most platelet transfusions are administered prophylactically rather than therapeutically.¹¹

While audits of platelet transfusion practices are vital for patient blood management in haematology patients, detailed audits involving thorough medical record review remain limited. There is insufficient evidence on adherence to BSH guidelines in Pakistani tertiary care settings, and no comprehensive analysis of non-compliance patterns across different clinical departments.^{12,13} What remains unknown or poorly understood are the specific clinical drivers, systemic factors, and departmental habits that lead clinicians to deviate from established protocols. This study addresses the critical gap in understanding platelet transfusion practices in Pakistan. By systematically evaluating adherence to BSH guidelines and identifying non-compliance patterns, our findings will inform targeted strategies to improve guideline adherence, optimize patient blood management, and reduce transfusion-related complications in patients requiring haematological care. The aim of this study was to evaluate adherence of platelet transfusion practices to BSH guidelines (2024) and identify patterns of non-compliance across clinical settings.

Materials and Methods

This descriptive cross-sectional study was conducted at the Department of Haematology and Blood Bank, Fauji Foundation Hospital, Rawalpindi, after obtaining approval from the Institutional Ethical Review Board (Ref. No. 779/RC/FFH/RWP). The study

was carried out over a six-month period, from July 01, 2025 to December 31, 2025. A sample size of 260 was calculated using the WHO sample size calculator at a 95% confidence level, an anticipated prevalence of 50%, and a margin of error of 5%.

Patients receiving their first platelet transfusion during the study period were included. Patients who received multiple platelet transfusions during the same admission/study period were excluded. Consecutive non-probability sampling was employed. Data on demographic characteristics, clinical indications for platelet transfusion, pre-transfusion platelet count, transfusion thresholds, requesting department, and the presence of active bleeding or planned invasive procedures were collected using a structured data collection proforma.

Appropriateness of platelet transfusion was assessed using BSH platelet transfusion guidelines (2024), based on pre-transfusion platelet count and clinical indication. Platelet transfusions were considered adherent when the indication and pre-transfusion platelet count fulfilled its recommendations. Adherence to these guidelines were the primary outcome and the secondary outcome includes diagnosis-wise adherence and department wise adherence. Compliance with guideline thresholds was assessed across participating hospital departments. A summary of therapeutic and prophylactic clinical scenarios in which platelet transfusion was deemed appropriate under the BSH guidelines is presented.

The data were analyzed on SPSS v29. Normality of data was assessed using the Shapiro-Wilk test. Continuous variables are presented as mean $\pm$ SD or median (IQR), while categorical variables are reported as frequencies and percentages. The proportions of platelet transfusions that were compliant and non-compliant with the BSH guidelines were calculated. Associations between categorical variables were analyzed using the Chi-square test or Fisher's Exact test where appropriate. A p value ≤ 0.05 was considered statistically significant.

Results

A total of 260 patients who received platelet transfusions during the study period were included

in the analysis. Of these, 146 (56.2%) were adults, while 114 (43.8%) were pediatric patients. Females constituted the majority of the study population, accounting for 173 (66.5%) cases, whereas 87 (33.5%) were males. Platelet transfusions were most frequently administered in the Neonatal Intensive Care Unit (NICU), representing 47 (18.1%) of all transfusions, followed by oncology units with 40 (15.4%) cases. Intensive Care Unit, Medical wards, and Paediatric ward each contributed 37 (14.2%) transfusions, while the remaining 62 (23.8%) were distributed across other departments. Overall, 161 (61.9%) transfusions were adherent to the BSH platelet transfusion guidelines, whereas 99 (38.1%) were found to be non-adherent. The most common indication for platelet transfusion was thrombocytopenia, reported in 177 (68.1%) patients, followed by surgical procedures in 36

Table I: Baseline Demographic Characteristics, Clinical Department Distribution, and Overall Guideline Adherence among Patients Receiving Platelet Transfusions (n = 260).

Characteristic	Category	n (%)
Gender	male	87 (33.5)
	female	173 (66.5)
Age Group	paediatric (<18 years)	114 (43.8)
	adult (≥18 years)	146 (56.2)
Department	NICU	47 (18.1)
	oncology	40 (15.4)
	ICU	37 (14.2)
	medical Ward	37 (14.2)
	paeds Ward	37 (14.2)
	Other*	62 (23.8)
Guideline Adherence	adherent	161 (61.9)
	non-adherent	99 (38.1)

Table II: Distribution of Underlying Diagnoses among Patients Receiving Platelet Transfusions (n = 260).

Diagnosis	Frequency, n (percentage, %)
Neonatal sepsis	44 (16.9)
Acute leukemia	41 (15.8)
Dengue Fever	29 (11.2)
Solid tumors	21 (8.1)
Infection	17 (6.5)
DIC	15 (5.8)
CKD	18 (6.9)
All others	75 (28.8)
Others (Abdominal Surgery, Multiple Myeloma, Myelofibrosis)	

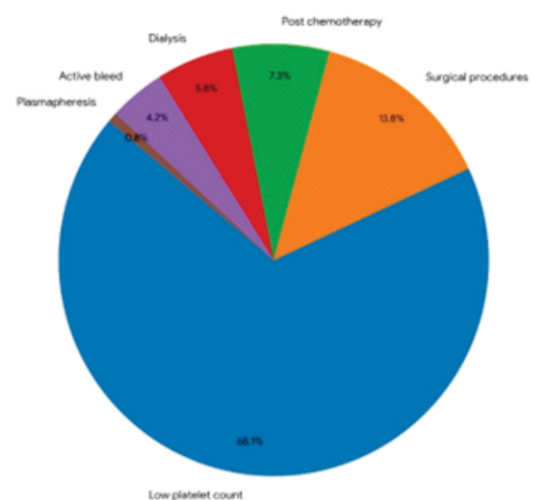
(13.8%) cases and post-chemotherapy support in 19 (7.3%). Neonatal sepsis (16.9%) and acute leukemia (15.8%) were the leading diagnoses associated with transfusion. A statistically significant association was observed between diagnosis and guideline adherence (Pearson's $\chi^2 = 46.30$, $p = 0.003$).

TABLE III: Diagnosis-Wise Adherence to BSH Platelet Transfusion Guidelines (n = 260).

Diagnosis	Adherent, n (%)	Non-adherent, n (%)	Total, n
Neonatal sepsis	29 (65.9)	15 (34.1)	44
Acute leukemia	32 (78.1)	9 (21.9)	41
Dengue Fever	22 (75.9)	7 (24.1)	29
Solid Tumors	9 (42.8)	12 (57.2)	21
CKD	5 (27.8)	13 (72.2)	18
Infection	9 (52.9)	8 (47.1)	17
DIC	12 (80)	3 (20)	15
ITP	6 (54.5)	5 (45.5)	11
Caesarean Section	3 (33.3)	6 (66.6)	9
Others*	34 (61.8)	21 (38.2)	55
Total	161 (61.9)	99 (38.1)	260
Others (Abdominal Surgery, Multiple Myeloma, Myelofibrosis)			

Table IV: Association Between Clinical Diagnosis and Platelet Transfusion Guideline Adherence (Chi-Square Analysis, n = 260)

Test	χ^2 value	df	p value
Pearson Chi-Square	46.298	23	0.003*
Likelihood Ratio	52.516	23	<0.001*



Indications for Platelet Transfusion (n = 260)

Discussion

Platelet transfusion plays a critical role in the prevention and management of bleeding. However, inappropriate utilization may expose patients to unnecessary risks and place an additional burden on limited blood bank resources. In the current study, 61.9% of platelet transfusions were found to be in accordance with BSH guidelines, whereas 38.1% did not meet the recommended criteria, reflecting considerable non-compliance in transfusion practices. These observations are comparable to findings reported in both regional and international studies, where inappropriate platelet transfusion practices continue to persist despite the implementation of standardized evidence-based guidelines.^{14,15,16}

Audits from Pakistan have reported varying rates of appropriate platelet transfusion, ranging from 55% to 75%, depending on the clinical setting and patient population.¹¹ Similar variability has been observed in Indian tertiary care hospitals, where inappropriate platelet transfusion rates between 20% and 45% have been documented.^{11,14} The level of non-adherence observed in our study therefore aligns with existing South Asian data and reinforces the need for sustained transfusion stewardship programs.

Our results revealed marked department-wise variation in guideline adherence, with significantly higher compliance observed in haematology-driven diagnoses such as acute leukemia (78.1%) and DIC (80%). This higher compliance in haematology-related diagnoses may reflect greater familiarity with transfusion thresholds in specialized services. Studies from both Pakistan and India have similarly shown that transfusions ordered by haematology or oncology services are more likely to be appropriate compared to those initiated in surgical or general medical wards.^{13,15}

Conversely, solid tumors, chronic kidney disease (CKD), obstetric cases, and ICU settings demonstrated poorer adherence. In CKD patients, 72.2% of transfusions were non-adherent, reflecting a common misconception that uremia-associated platelet dysfunction necessitates prophylactic platelet transfusion. However, BSH and other international guidelines do not support routine platelet transfusion in CKD in the absence of active

bleeding or invasive procedures. Similar patterns of over-transfusion in renal units have been reported in Indian studies, where clinicians' concern regarding bleeding often overrides guideline-based decision-making.^{7,17}

One of the most concerning findings was the low adherence in obstetric cases, particularly cesarean sections, where only 33.3% of transfusions were appropriate. This mirrors findings from audits conducted in Pakistan and India, which consistently demonstrate liberal platelet use in obstetrics due to fear of postpartum haemorrhage, medicolegal concerns, and lack of familiarity with evolving thresholds.^{18,19} Evidence suggests that prophylactic platelet transfusion is unnecessary at platelet counts $\geq 50 \times 10^9/L$ for vaginal delivery and $\geq 70\text{--}80 \times 10^9/L$ for neuraxial anesthesia, yet these thresholds are frequently exceeded in routine practice.

Surgical indications accounted for 13.8% of transfusions in our study, with many administered above recommended platelet counts. Previous regional audits have highlighted similar trends, emphasizing that surgeons often transfuse platelets pre-emptively rather than based on procedure-specific bleeding risk.^{14,16} This underscores the need for closer collaboration between surgical teams and transfusion medicine services.

Dengue fever represented a significant proportion of platelet transfusions in our cohort (11.2%), with adherence of 75.9%. Although relatively better than some other diagnoses, nearly one-quarter of dengue-related transfusions were still inappropriate. South Asian literature consistently demonstrates overuse of platelets in dengue fever without active bleeding, driven largely by public anxiety, pressure from attendants, and misconceptions regarding platelet counts as a marker of disease severity.²⁰ Several studies from Pakistan and India suggest limited clinical benefit of prophylactic platelet transfusion in dengue fever and, in some cases, increased transfusion-related complications.²¹

Neonatal sepsis was the most common diagnosis in this study, accounting for 16.9% of transfusions, with adherence of 65.9%. While this reflects moderate compliance, over one-third of neonatal transfusions were still non-adherent. Neonatal platelet transfusion thresholds have evolved significantly in

recent years, with increasing evidence supporting restrictive strategies to reduce morbidity and mortality. Studies from neonatal intensive care units in Pakistan have reported wide variability in platelet transfusion thresholds, often influenced by clinician experience rather than standardized protocols.²² These findings highlight the urgent need for neonatal-specific transfusion education and protocol implementation.

The high rate of non-adherent platelet transfusions observed in this study has important clinical and economic implications. Platelets are associated with the highest rate of transfusion-related adverse events, including allergic reactions, febrile non-haemolytic reactions, transfusion-associated circulatory overload, transfusion-related acute lung injury, and bacterial sepsis. In resource-limited settings such as Pakistan, inappropriate platelet use also exacerbates supply shortages and increases healthcare costs.

Evidence from transfusion stewardship programs in India has demonstrated that education, audit-feedback mechanisms, and mandatory indication documentation can significantly reduce inappropriate platelet transfusions without increasing bleeding complications.¹³ Implementing similar interventions locally could substantially improve adherence and patient safety.

This study has certain limitations. The sample size was relatively modest, and the study was conducted at a single tertiary care center, which may limit the wider generalizability of the findings. A multicenter design with a larger and more diverse patient population would provide more robust estimates of guideline adherence across different clinical settings. In addition, repeated transfusion episodes and long-term clinical outcomes such as bleeding complications or transfusion reactions were not assessed, which restricts evaluation of the direct impact of inappropriate transfusion practices. Furthermore, some diagnostic subgroups included small numbers of patients, which may reduce the statistical strength of comparisons. Future studies incorporating multicenter data, larger cohorts, and outcome-based assessment are recommended to validate and expand upon these observations.

Conclusion

This study demonstrates that while the majority of

platelet transfusions in a tertiary care hospital were compliant with the BSH (2024) guidelines, a considerable proportion (38.1%) were inappropriate, with higher non-compliance observed in non-haematology settings such as CKD, obstetrics, solid tumors, and selected surgical cases. Guideline adherence varied across clinical specialties and was influenced by underlying clinical indication. These findings underscore the importance of strengthening transfusion governance within institutions. Implementation of structured transfusion stewardship measures, including regular clinician education, dissemination of simplified guideline-based protocols, prospective audit with feedback, and active engagement of transfusion committees, is essential to improve adherence to evidence-based platelet transfusion practices, optimize utilization, and enhance patient safety.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

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DATA SHARING STATEMENT

The data that support the findings of this study are available from the corresponding author upon request.

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