

Demographic and Clinical Profiles of Plateletpheresis Donors: Insights from A Single-Center Study in the Capital City of Bangladesh

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Abstract

Background: Donor demographic studies are essential for profiling suitable platelet donors for future collections. **Objective:** This study aimed to analyze the demographic and clinical characteristics of platelet apheresis donors from 2023 to 2024. **Methodology:** This retrospective observational study was conducted in the Department of Transfusion Medicine, NILMRC, Dhaka. Donors who met eligibility criteria and completed platelet donation without complications were included. Platelet apheresis was performed using Haemonetics MCS+, and data on age, gender, occupation, blood group, and pre-donation platelet count were analyzed using Microsoft Excel. Ethical guidelines were strictly followed. **Results:** The Majority (59%) of donors were aged 26–35 years, and all were male. Service professionals comprised 54% of donors, with A +ve as the most common blood group. No significant correlation was observed between BMI and platelet count. Pre-donation platelet counts of 34% of donors fell within the $200\text{--}300 \times 10^3/\text{mm}^3$ range. **Conclusion:** Understanding platelet apheresis donor characteristics aids in future recruitment strategies and blood bank optimization while ensuring donor safety.

Keywords: Plateletpheresis; platelet donor; blood donation; transfusion medicine

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Introduction

Plateletpheresis is a specialized procedure used to collect platelets from a single donor, which has become increasingly essential in modern medicine. The growing demand for platelet transfusions, especially in patients undergoing chemotherapy for malignancies, has driven the development of advanced cell separators to facilitate the production of single donor platelets (SDP)¹. One of the key benefits of SDP is its ability to reduce transfusion-transmitted infections, allo-immunization,

platelet refractoriness, and other transfusion-related adverse events², making it a preferred choice over random donor platelets (RDP).

Modern blood banks utilize advanced cell separators, including MCS+, Amicus, Spectra optia which employ continuous or intermittent flow technology³. These systems enhance donor comfort and minimize procedure-related risks. To optimize the donor recruitment process, it is essential to consider the characteristics of potential donors,

ensuring they align with the demographic profile of existing donors, including factors such as age, sex, and other key attributes⁴⁻⁶. Therefore, understanding factors like age, sex, BMI, and health status helps in targeting suitable donor groups and increasing donation rates.

This retrospective study was investigated the demographic characteristics of plateletpheresis donors using the MCS+ system, focusing on variables such as gender, age, occupation, and platelet count. The aim is to provide valuable insights into the profile of plateletpheresis donors in Bangladesh, donor selection processes, and ensuring donor safety.

Methodology

Study Settings and Population: This retrospective study was conducted between 2023 and 2025 in the Department of Transfusion Medicine at the National Institute of Laboratory Medicine and Referral Centre (NILMRC), Dhaka, Bangladesh. It included 44 donors who met all the eligibility criteria for platelet donation and completed the procedure without complications. Eligible donors were aged between [range, e.g., 18–60 years], with hemoglobin (Hb) levels of ≥ 12.5 g/dL, hematocrit (HCT) within normal limits, and platelet counts of $\geq 150,000/\mu\text{L}$. Donors with incomplete records, dyslipidemia, hyperbilirubinemia, or any adverse reactions were excluded from the analysis.

Study Procedure: The donor's age, weight, blood group, medical history, drug history, and vein status were carefully assessed and recorded. A complete blood count (CBC), Blood grouping, and screening were done. Plateletpheresis was performed using the Haemonetics MCS+ (Multi-Component Collection System). The procedure duration ranged from 60–90 minutes, with a target platelet yield of $2.8\text{--}3\times 10^{11}$.

Statistical Analysis: The collected data were analyzed using Microsoft Excel. Descriptive statistical measures like frequency and percentage were calculated.

Ethical Considerations: The study adhered to ethical guidelines, maintaining donor confidentiality and anonymity. Ethical approval was obtained from the institutional ethics committee (approval number: 2025.02)

Results

In this study, all participants were male. Among the 44 donors, the majority (26 donors) fall within the 26-35 age group. The second largest group consists of individuals in the 18-25 age range (Table 1).

Table 1: Age group and occupation distribution

Variables	Frequency	Percent
Age Group		
18 to 25 Years	15	34.0
26 to 35 Years	26	59.0
36 to 45 Years	2	5.0
46 to 55 Years	1	2.0
Occupation		
Service	24	55.0
Student	14	32.0
Business	6	14.0

In the occupational distribution of the donors, the largest proportion are servicemen, accounting for approximately 54.0% of the total donor base. This segment is followed by students, who comprise 32.0% of the donors (Table 1).

Figure I illustrates the distribution of blood groups among the donors. Of the 44 donors, 16 individuals belong to the A positive blood group, 14 are B positive, and 13 are O positive.

In the normal BMI group, 10 individuals had platelet counts below 250, while 16 had counts above this threshold. Among obese individuals, only 1 person had a platelet count below 250, and 1 had a count above 250. In the overweight group, 8 individuals had platelet counts below 250, and 8 had counts above 250. In Table 3, the platelet counts were categorized into several ranges, with varying frequencies observed in each (Table 2).

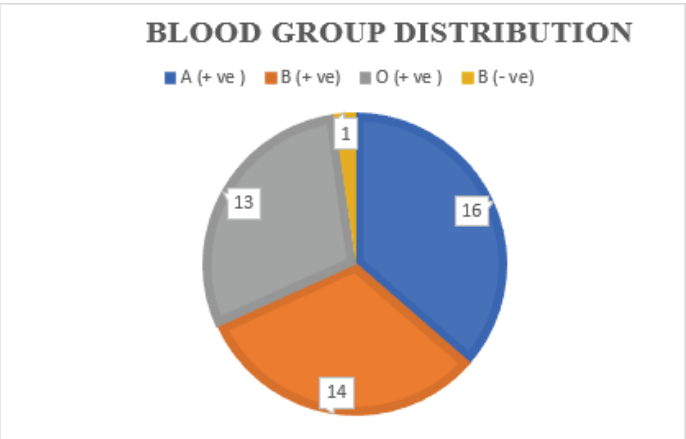


Figure I: Blood Group Distribution

Table 2: BMI Distribution

BMI Groups	Platelet<250	Platelet>250
Normal	10(52.6%)	16(64.0%)
Obese	1(5.3%)	1(4.0%)
Overweight	8(42.1%)	8(32.0%)

Table 3: Pre-Donation Platelet Count

Platelet Range-10 ³ /ul	Frequency	Percent
150 to 200	6	14.0
200 to 250	13	30.0
250 to 300	15	34.0
300 to 350	4	9.0
350 to 400	5	11.0
400 Plus	1	2.0

The largest proportion of participants, 34% (15 individuals), fell into the 250 to 300 × 10³/μL range, indicating a moderate platelet count. The next most common range was 200 to 250 × 10³/μL, with 30.0% (13 individuals) of participants falling into this category. 14.0% (6 individuals) had platelet counts between 150 to 200 × 10³/μL. 11% (5 individuals) had platelet counts in the 350 to 400 × 10³/μL range, while 9.0% (4 individuals) had counts between 300 to 350 × 10³/μL. Only 2.0% (1 individual) had a platelet count exceeding 400 × 10³/μL, representing the higher end of the normal range (Table 3).

Discussion

This study provides a glimpse into Bangladeshi platelet donors' demographic and clinical characteristics. Key findings include gender distribution, age group, blood group distribution, occupational background, pre-donation platelet count, and BMI. While these results offer valuable insights, it is important to acknowledge certain limitations, such as the small sample size, which may not fully represent the broader donor population.

One of the most notable findings was the absence of female donors, with all participants being male. This aligns with global trends where male donors are typically more prevalent. Similar findings were observed in the studies by Singh et al⁷, Quader⁸, and Das et al⁴. A study by France et al⁹ highlighted that female donors report more barriers than male donors. These barriers include fear of fainting or dizziness, fear of reduced health, and low blood hemoglobin levels. Furthermore, studies by Das et al⁴ indicated that female donor deferral is high due to low hemoglobin and poor venous access. These barriers could be explored in future studies to identify ways to encourage greater female involvement in platelet donation.

Regarding age distribution, the majority of donors were between 26 and 35 years of age, followed by those in the 18 to 25 age range. This is consistent with a previous study by Lasky et al¹⁰ and Chideme et al¹¹, which found that younger individuals are more likely to engage in blood and platelet

donation. Young people are ideal for platelet donation due to their good health and vein status, meeting eligibility criteria. They also actively promote blood and platelet donation awareness. As age increases, the likelihood of developing physical co-morbidities also increases, making individuals less likely to meet the eligibility criteria for donation. A study by Charbonneau et al¹² finds that donation frequency decreases with age due to health problems. Thus, focusing on younger individuals for donor recruitment is vital.

The blood group distribution in this study showed a predominance of A positive donors, which deviates from the expected pattern in Bangladesh. A previous study by Sultana et al¹³ found that B positive is generally the most common blood group, followed by O positive and A positive. This discrepancy may be attributed to the small sample size in the current study, which may not fully represent the wider population. A larger sample size in future studies would provide more reliable data on blood group distribution and its implications for platelet donation. Occupational background analysis revealed that 54.0% of donors were servicemen, with the remainder being students and businessmen. This suggests that individuals with stable occupations, such as those in the service sector or academia, are more likely to engage in platelet donation. This finding aligns with the study by Singh et al⁷. A study by Legese et al¹⁴ found that most donors were students. In our research, the second largest group consisted of students. Understanding the motivations and circumstances of these groups could help target future donor recruitment campaigns more effectively.

In the present study, no significant relationship was found between BMI and platelet count. However, a study by Malodan et al¹⁵ reported that donor platelet count and weight were the strongest predictors of high platelet yield donations, highlighting weight as an important factor for achieving a good yield. Similarly, a study by Sadri and Bilgen¹⁶ found that obese and overweight donors had higher platelet counts, suggesting a potential relationship between platelet count and obesity.

The observation in pre-donation platelet count suggests a predominance of platelet counts in the mid-range (200 to 300 × 10³/μL), with fewer individuals falling into the extremes of the platelet count spectrum. This observation suggests that most plateletpheresis donors tend to have moderate platelet counts, which is consistent with the characteristics of a typical, healthy donor population. This finding is in line with the study by Singh et al⁷, which

reported similar trends in platelet count distributions among plateletpheresis donors. The study provides valuable insight into the platelet count distribution among individuals in the pre-donation phase, which could be useful for assessing donor suitability and optimizing donation protocols.

One limitation of this study is the relatively small sample size, which may not fully capture the diversity of platelet donors across the region. Additionally, self-reporting by donors could introduce bias in the demographic data, as some individuals may not accurately report their age, occupation, or other details. Future studies should consider expanding the sample size to include donors from a wider geographical area, as well as investigating other factors such as education level, health status, and motivations for donation.

Conclusion

This study offers valuable insights into the demographic and clinical profile of platelet donors in Bangladesh. The majority of donors were males aged 26 to 35 years, with service professionals making up the largest occupational group. A positive was the most common blood group, and donors had pre-donation platelet counts within normal range. No significant correlation was observed between BMI and platelet count. These findings can support more targeted donor recruitment and education efforts. However, further research with a larger and more diverse sample is recommended to enhance understanding of the platelet donor population nationwide.

Conflict of interest: The author declares no conflict of interest, and no fund received for the study.

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