

Analysis of plateletpheresis donor deferral patterns over two years at a tertiary care hospital in Dhaka, Bangladesh

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Abstract

Background and objective: Plateletpheresis involves the separation of platelets from healthy donor blood, with the remaining components returned to the donor's circulation. With the increasing demand for aphaeretic platelets, the transfusion medicine department plays a crucial role in ensuring the availability of safe blood products when required. This study aimed to determine the frequency and underlying reasons for donor deferral during plateletpheresis.

Materials and Methods: This study was conducted in the Transfusion Medicine Department of BIRDEM General Hospital in Dhaka from January 2021 to December 2022. Apheresis donors of either sex who attended the department were selected and evaluated for deferral by physicians in accordance with the Standard Operating Procedure (SOP) outlined in the hospital protocol [1]. Data on deferred plateletpheresis donors were recorded manually in a register book and analyzed retrospectively.

Results: A total of 318 plateletpheresis donors were screened during this study period, of whom 43 (13.52%) were deferred for various reasons. The majority of the deferrals (93.9%) were temporary. The major causes of donor deferral were poor venous access (27.7%, mostly in females), low platelet count (16.2%), and the use of medications, most commonly analgesics, at 11.4%.

Conclusion: This study demonstrated that venous access plays a vital role in donor deferral. Additionally, low platelet count and use of antiplatelet drug can significantly impact the aphaeretic donor eligibility. Revising the selection criteria for plateletpheresis donors could substantially enhance donor participation and reduce deferral rates. Furthermore, continued efforts to provide advanced training for technical personnel and ensure effective supervision by Transfusion Medicine Specialists will contribute to minimizing donor deferrals.

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Introduction

Donor selection for plateletpheresis is essential to ensure the safety of both the donor and the recipient. The demand of plateletpheresis increases significantly in our country during dengue season. It is also highly beneficial for prophylactic platelet transfusions in various haematological disorders. However, donors may be deferred from platelet donations due to temporary or permanent reasons. Special attention is crucial during the selection and deferral process of apheresis platelet donors, as plateletpheresis differs significantly from whole blood donation. Plateletpheresis is an automated procedure in which whole blood is drawn from a donor, processed to separate platelets, referred to as single donor platelets (SDP), the remaining blood components are returned to the donor [2]. A routine plateletpheresis procedure session typically lasts between 1 to 1.5 hours. The product is collected using a closed automated system and can be stored for up to 5 days. Normally, the number of platelets collected in an apheresis product is equivalent to 6 to 8 units of random donor platelets (RDPs) [3]. SDP offers several advantages over RDP, including a higher yield, which allows for longer intervals between platelet transfusions. Additionally, it significantly reduces the risk of transfusion-transmitted diseases, alloimmunization, and febrile nonhemolytic reactions due to reduced donor exposure [4,5,6]. Platelets are used both therapeutically and prophylactically, particularly benefiting patients with thrombocytopenia. Therapeutic platelet transfusion is indicated when the platelet count is less than $50 \times 10^9/L$ in the presence of diffuse microvascular bleeding. Prophylactically, platelets are administered to prevent bleeding or control active bleeding [7]. Proper donor selection is crucial for ensuring an adequate supply of blood components, as donors are the only source. The primary objective of the current study was to investigate the causes and frequency of donor deferral during plateletpheresis.

Materials and methods

This single center observational study was conducted on 275 apheresis donors who attended the Transfusion Medicine department at BIRDEM

General Hospital, Dhaka, from January 2021 to December 2022. Donors of both sexes were purposively selected. Selection or deferral was based on a comprehensive medical history obtained through a questionnaire, followed by a complete physical examination and assessment of vital parameters, in accordance with the criteria for Single Donor Platelet (SDP) preparation as outlined by the Directorate General of Health Services (DGHS). The eligibility criteria included a minimum weight of 60 kg, an age range between 18 to 60 years, and a haemoglobin level of at least 12.5 g/dl. Donors who had taken aspirin containing medications within the past 36 hours were generally deferred. There had to be a minimum interval of 48 hours between procedures, and donors were not permitted to undergo the procedure more than twice a week or more than 24 times in a year. Additional requirements included a platelet count of more than 1.5 lakh, absence of any illness, negative test results for HBsAg, HCV, HIV, syphilis and malaria and the presence of adequate venous access, with firm, large and palpable veins in both arms.

After the preliminary selection of donors, their blood samples were tested for CBC (Complete Blood Count), focusing primarily on Hb, hematocrit (Hct), and platelet count. Samples were also screened for Transfusion Transmitted Infections (TTI) including HIV (Human Immunodeficiency Virus), Hepatitis B virus (HBsAg), Hepatitis C virus (Anti HCV), Syphilis, and Malaria using Rapid Immunochromatographic tests. If any CBC or TTI test result was abnormal, the donor was given appropriate counseling and referred to the relevant department for further evaluation and management. Plateletpheresis procedures were performed using the Haemonetics MCS+ with intermittent flow.

Results

During the study period, a total of 318 donors were screened for plateletpheresis of whom 275 (86.48%) donors were accepted and 43 (13.52%) were deferred for various reasons. All 275 donors accepted for plateletpheresis were male. Among the deferred donors, 28 (65.12%) were male and 15 (34.88%) were female, as shown in Figure-1. The

deferred apheresis blood donors were classified as either temporary or permanent, with 40 (93.03%) cases of temporary deferral and 3 (6.97%) cases of permanent deferral, as shown in Figure-2. In this study, most of the deferred donors- 22 (51.16%) were between the ages of 26 and 35 years, as shown in Figure-3. The major causes of temporary donor deferral were poor venous access (25.58%,

mostly in females), low platelet count (16.28%) and recent use of medications (most commonly analgesic in 11.62% cases). The least common cause was a non-matching blood group (2.32%) between donor and recipient, as shown in Table-1. In our present study, the most common cause of permanent deferral was seropositivity for Hepatitis B, as shown in Table-1.

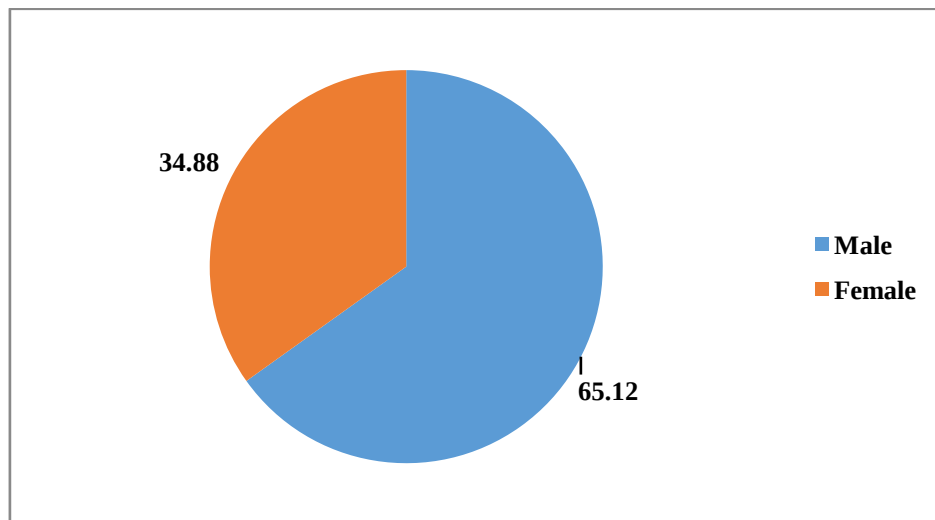


Figure -1: Distribution of Donor Deferral According to Gender (n=43)

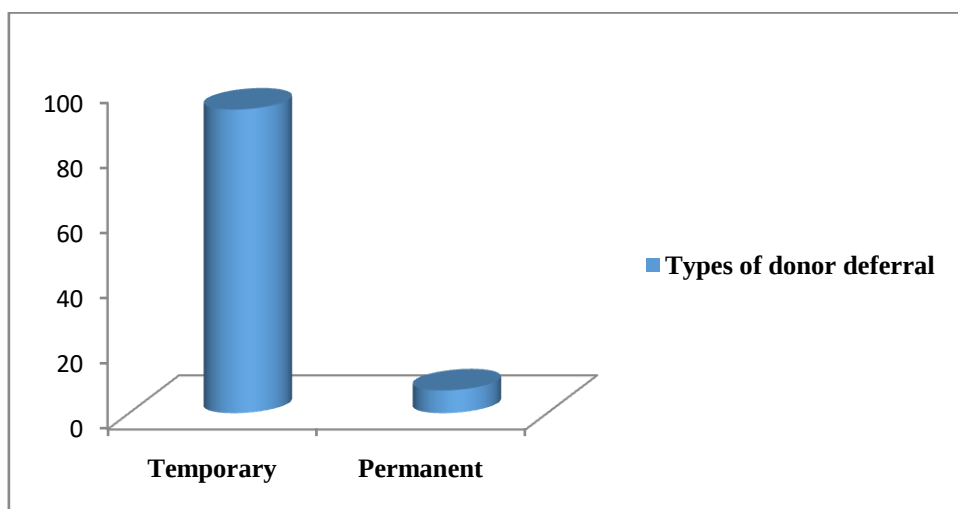


Figure-2: Types of donor deferral (n=43)

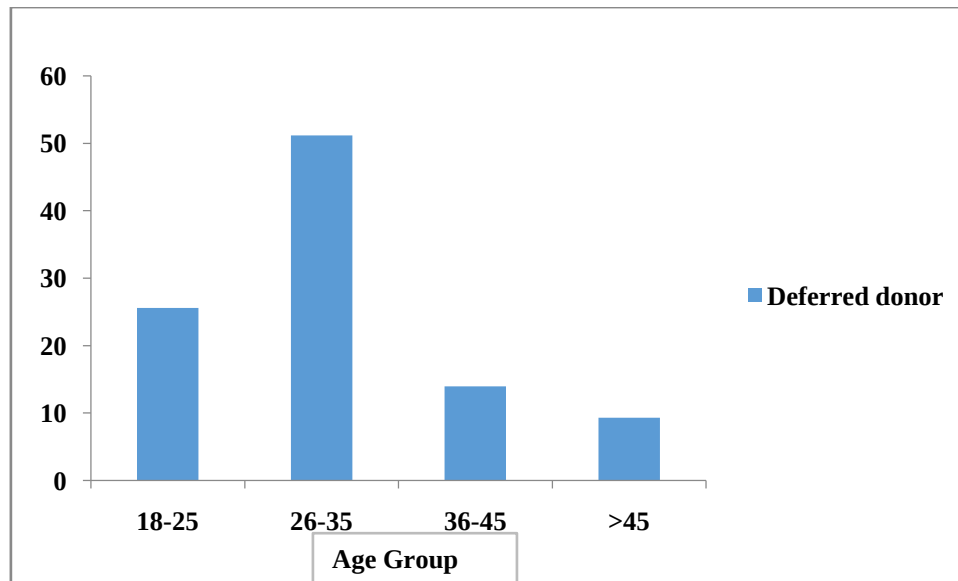


Figure-3: Distribution of deferred donors according to age group (n=43)

Table-1: Deferral types & causes of donor deferral (n=43)

Deferral type	Causes	Number	Percentages (%)
Temporary	Poor venous access	11	25.58%
	Low platelet count	7	16.28%
	Use of medications (on NSAIDs, Antibiotic)	5	11.62%
	Underweight(<50kg)	4	9.34%
	Abnormal blood pressure (Hyper/Hypotension)	3	6.97%
	Low Haemoglobin(<12.5gm/dl)	3	6.97%
	Skin allergy	2	4.65%
	H/O recent vaccination	2	4.65%
	High Haemoglobin and Hct	2	4.65%
	Non-matching blood group	1	2.32%
	Sub-total	40	93.03%
Permanent	Hepatitis B positive	2	4.65%
	Syphilis positive	1	2.32%
	Sub-total	3	6.97%

Discussion

The donor deferral process prior to blood donation is a vital step in safeguarding recipients from transfusion-related complications and in minimizing any negative impact on donor motivation. It is important to note that the donor deferral criteria may vary between regions and among different blood donation centers [8].

In our study, the deferral rate among apheresis donors was approximately 13.52%, attributed to various causes. This rate is comparable to the lowest deferral rate reported in the literature by Pandey et al. [9], who observed a deferral rate of 10.6%. Higher donor deferral rates, ranging from 18.02% to 28.03%, have been reported in several studies [10-13]. These findings indicate variability in

donor selection criteria, demographic differences, and institutional policies. Notably, the highest deferral rates during plateletpheresis procedures were reported Yadav et al. [14] (43.2%) and Syal et al. [15] (44.2%), suggesting more stringent donor eligibility protocols or higher prevalence of temporary deferral factors in those populations.

In the present study, the majority of deferred donors (51.16%) were between the ages of 26 and 35 years, which is consistent with the findings reported in several studies [10,12,15,16]. This age group often represents the largest proportion of the donor population, reflecting their active participation in voluntary blood donation programs. Additionally, donors in this age range may be more susceptible to temporary deferral factors such as minor illnesses, recent medication use, or lifestyle-related issues, which can transiently affect eligibility. Understanding the demographic profile of deferred donors helps tailor targeted interventions and counselling to reduce deferral rates and encourage donor retention in this key age group. Notably, in the present study, all the female (15 in number) donors were deferred, primarily due to low haemoglobin levels, or being underweight. This is likely due to high prevalence of iron deficiency anaemia among women. Tondon et al. [13], also highlighted challenges in recruiting female donors citing factors such as low body weight, physiological blood loss, and inadequate dietary intake. Existing literature has consistently reported lower participation of women as plateletpheresis donors.

In this study, we observed that the majority of donors (93.03%) were deferred for temporary reasons, indicating that most deferrals could be reversed with appropriate follow-up and management. This finding is consistent with the results reported by Seema et al. [11], who observed a temporary deferral rate of 89.65%, and Arora et al. [16], who reported a similar rate of 93.28%. Such high proportions of temporary deferrals suggest the potential to retain and re-engage a large pool of deferred donors by addressing short-term deferral causes. Similar trends have also been reported by Mehmet et al. [17], further supporting the predominance of temporary over permanent deferrals in apheresis donor populations. These

findings emphasize the importance of donor education, proper counselling, and periodic re-evaluation to minimize donor loss and maintain an adequate donor base. Mehmet et al. [17], observed that the main reason of donor deferral was unsuitable venous access (25.7%), a finding that aligns to our study (25.58%). As we know, proper venous access, firm, large and palpable veins in both arms, is essential to maintain a return blood flow of at least 70-80 ml/min during the plateletpheresis procedure.

In our study, the second most common reason for apheresis donor deferral was low platelet count (16.28%), which aligns closely with the findings of Kusumgar et al. [18], who reported a deferral rate of 21% for the same cause. However, other studies [10-12] identified low platelet count as the leading cause of donor deferral, with higher rates of 31.61%, 44.82%, and 43.5%, respectively. These variations likely reflect regional differences in donor demographics, screening criteria, and health status.

The third most common cause of donor deferral in our study was recent use of medications, such as NSAIDs or antibiotics (11.62%), which is comparable to the 14.7% reported by Mehmet et al. [17]. Regarding permanent deferrals, Hepatitis B positivity was the most frequent cause, consistent with findings reported in some studies [11-12,16].

These findings highlight the importance of continuous evaluation and refinement of donor selection criteria to ensure both donor safety and an adequate supply of platelets.

Conclusion

The demand for platelets collected through apheresis procedures is steadily increasing in routine medical and surgical practices. Careful selection of plateletpheresis donors is essential to ensure a higher yield of platelets. Effective counseling to deferred donors can help bridge the gap between the demand for and supply of Single Donor Platelets (SDPs).

Remodeling the eligibility criteria for plateletpheresis donors, along with appropriate education, counseling, and reassurance, can play

an integral role in retaining new donors. Continued efforts to enhance training modules for technical personnel, along with supervision provided by Transfusion Specialists, can contribute significantly to reduce donor deferrals.

Conflict of interest

Authors have no conflicts of interest to declare

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