Original Article

SPECTRUM OF CAUSES OF PRE-DONATION DEFERRALS BASED ON DONOR HISTORY QUESTIONNIARE AT JINNAH HOSPITAL, LAHORE

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ABSTRACT

Background: Pre-donation deferrals, determined through comprehensive donor history questionnaires, represent a crucial aspect of blood donation screening processes. Objective of this study was health care professionals can improve donor eligibility criteria to ensure the safety of blood transfusion recipients by investigating the various causes of these deferrals.

Materials and Methods: This cross-sectional study was conducted at the Blood Bank, Jinnah Hospital, Lahore, over a six-month period (August 2023 to January 2024). Data was collected from 550 donors aged, 18-65 years, both males and females through consecutive sampling after the informed consent through a structured questionnaire. It had with predefined questions which assess relevant information.

Results: Among 550 blood donors 537 were males (97.6%), and 13 were females (2.3%). The majority of donors were males in the age range of 21-40 years, with a mean age of 26 ± 1.2 years. A total of 65 donors (11.8%) were deferred from donating blood. Among the deferred donors, 28(43.1%) were temporarily deferred, while the remaining 37 (56.9%) were deferred permanently. The primary cause of deferral at our regional blood center was hepatitis C (27.6%), followed by hepatitis B (15.3%). In our study, besides Transfusion-Transmissible Infections (TTIs), the most common cause of deferral was recent blood donations (15.3%), followed by low hemoglobin levels (10.7%).

Conclusion: Blood donor deferral is a crucial step in donor selection and permanent deferrals causes being more prevalent in our setup demands adequate preventive strategies to address the prevailing causes of deferrals such as low hemoglobin levels and infections with HBV and HCV

Key Words: Donor deferral, Hepatitis C, Blood donations, Hemoglobin, Blood donor

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INTRODUCTION:

Blood safety is a major issue worldwide. The primary objective of blood transfusion services is to ensure the adequate availability of safe blood from healthy donors in order to supply needy patients with quality blood products on time.[1,2] In Pakistan, there are around 170 governmental and 450 private blood banks, with the majority of them attached to hospitals. Even in large cities, there is a significant blood shortage, with the supply falling short of more than half of the demand. However, the vast majority of blood donations in Pakistan are made as replacements by family or friends, with only a small contribution from volunteer blood donors.[3] Various blood donor screening processes contribute to blood transfusion safety and have been implemented in the United States, Europe, the United Kingdom, and Asia over the years. One of these is the deferral of high-risk

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donors before donation, which is determined by the risk assessment from the donor history questionnaire. [4] Blood donor eligibility criteria are based on research, informed medical opinions, and regulatory guidelines that aim to safeguard both blood donors and recipients from damage. The standards are also significant for blood safety (microbiological safety of blood); therefore, it is necessary to defer blood donors in order to prevent recipients from transfusion-transmitted illnesses. The recruitment and retention policies for blood donors are determined by the deferral trend in each area. [5] In general, there are four steps to this process. Knowledge-sharing about common infections that might spread through transfusions and other risks to a donor is part of the initial stage.[6] According to the procedure for selecting donors by transfusion services, only those who meet the criteria are eligible to donate blood. Donor history questionnaires (DHQ) are typically employed to detect potential hazards for transfusion-transmissible infectious diseases (TTI). Donors who pose higher risks are advised against donating. [7] Deferrals can be permanent or temporary. Permanent deferral applies to donors with long-term risks, such as transfusion-transmissible infections (TTIs). Temporary deferral occurs due to reversible factors like low hemoglobin. However, temporary deferrals may discourage future donations.[8],[9] Several studies have been conducted worldwide on the prevalence of blood deferral and its common causes. Some significant risk factors and medical circumstances leading to the exclusion of potential blood donors have been observed. According to these studies, the most prevalent causes of deferring include infectious diseases like HIV, hepatitis B and C, syphilis, and malaria. Additionally, several lifestyle factors, such as recent travel to certain countries, high-risk sexual conduct, and intravenous drug use, significantly affect deferral rates. [6] In Pakistan, there is not much literature on blood donor deferrals, perhaps due to a lack of awareness of the deferral criteria. Donor deferral information is not included in the annual data collection techniques; instead, the emphasis is on basic blood safety factors, such as the quantity and type of donations and screening procedures. [10] This research aimed to understand the underlying reasons for donor deferrals in our institute, providing insight into our health system's current procedures. To our knowledge, no previous study was conducted in the current study population during the same period.

MATERIALS AND METHODS

This descriptive cross-sectional study was conducted at the Blood Bank of Jinnah Hospital, Lahore, ERB number is ERB150/1/14-09-2023/S1 ERB dated 14-09-2023. Over a six-month period from August 2023 to January 2024. A total of 550 blood donors were included in the study using a non-probability consecutive sampling technique. The sample population consisted of adults aged between 18 and 60 years, including both male and female donors. However, individuals who did not provide informed consent were excluded from the study. Data collection was carried out using a structured questionnaire designed to obtain relevant information from blood donors. The questionnaire included predefined questions assessing medical history, lifestyle factors, and potential risk behaviors that could contribute to donor deferrals. Prior to participation, each donor was informed about the study objectives, and written informed consent was obtained to ensure ethical compliance and confidentiality. Following the completion of the questionnaire, participants underwent the standard blood donation screening procedure. Screening of blood products was performed using the Cobas c311 CHLIA-based assay, and jaundice was confirmed through physical examination and relevant history taking. During this process, donors were evaluated for medical conditions or risk factors that could lead to pre-donation deferral. All collected data were systematically recorded to maintain accuracy and consistency. The study aimed to assess both temporary and permanent deferrals, along with their underlying causes. By analyzing the data, this study aimed to identify the most common causes of donor

deferrals, providing valuable insights into improving donor eligibility criteria and ensuring the safety of blood transfusion recipients.

RESULTS

Among the 550 blood donors recruited for this study, a significant majority were male, constituting (97.6%) of the study population, while females accounted for only (2.3%). This gender disparity highlights a prevalent trend in blood donation demographics, reflecting a higher participation rate among males. Analysis of donor types revealed that the majority of participants, 520 (94.5%), were replacement donors, indicating a reliance on family or friends to replace blood used for medical purposes. Conversely, voluntary donors represented a smaller proportion, 30 (5.5%) of the total sample. Examination of blood group distribution among the donors unveiled interesting insights as highlighted by the tabular and graphical data provided below. The most prevalent blood type was 'B', with approximately 190 (34.5%) of the total donors belonging to this group. Following closely behind, individuals with blood type O constituted around 170 (30.9%) of the donors, while type A and type AB donors represented 150 (27.3%) and 40 (7.3%) of the donor pool, respectively. Additionally, analysis of Rh factor revealed that the majority of donors were Rh positive, accounting for 490 (89.1%) of the sample; whereas Rh negative donors comprised 60 (10.9%). (Table 1)

Out of the 550 blood donors enrolled in the study, a total of 65 donors (11.8%) were deferred from donating blood. Further analysis of donor demographics revealed a notable gender disparity within the study population. Of the total deferred donors, 56 were males, representing a substantial majority at 86.2%, while only 09 were females, comprising merely 13.8% of the study population. Among the deferred donors, 28 (43.1%) were temporarily deferred, while the remaining 37 (56.9%) were deferred permanently. (Table 2) Recent blood donations were the leading cause of temporary deferrals, 10 (15.3%). Following this, low hemoglobin levels were 7 donors (16.7%) and underweight 5 (7.6%). Other contributing factors included recent surgery, malaria, and ear piercings, each accounting for 3.0% of temporary deferrals, with two donors affected by each factor. (Table 3)

Table-1: Blood group distribution among study population

Blood Group	Frequency (n)	Percentage (%)
A	150	27.3
B	190	34.5
AB	40	7.3
O	170	30
Rh –Positive	490	89
Rh- Negative	60	11

Table-2: Distribution of donor deferral

Donor Deferrals	Frequency (n)	Percentage (%)
Permanent Deferred	37	56.9
Temporary Deferred	28	43.1
Total Deferred Donors	65	11.8

Table-3: Causes of permanent deferrals

Cause	Frequency (n)	Percentage (%)
HCV	18	27.6
HBV	10	15.3
Syphilis	5	7.6
Jaundice	4	6.1

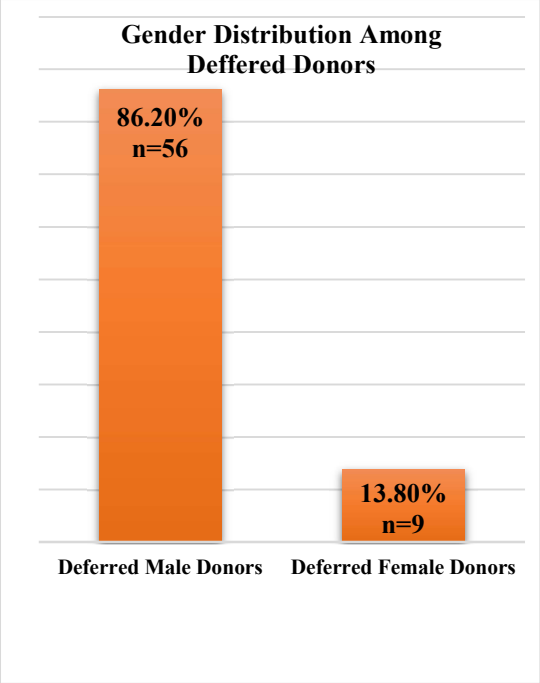

Figure 1; Gender Distribution Among Deferred Donors

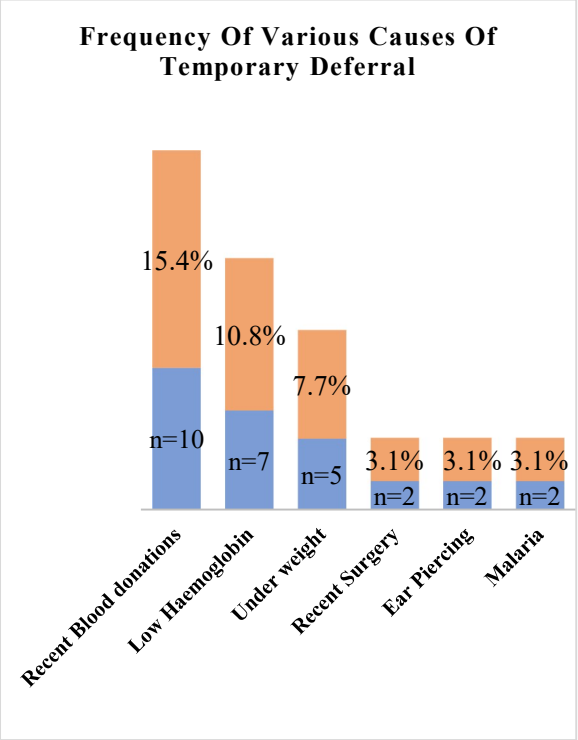

Figure –2: Frequency of various causes of temporary deferral

DISCUSSION

Selecting a blood donor is a crucial step in the transfusion process, involving multiple checks to ensure the safety of both donors and recipients. This process typically includes four key steps: educating donors about transfusion-related risks, an interview with a qualified healthcare professional, completion of a health questionnaire, and a thorough health evaluation through physical and laboratory assessments. Some deferrals are temporary, depending on the donor's condition. Our study aimed to assess the prevalence of donor deferrals and identify the most common reasons for them. The study found a significant male predominance in blood donation, with males comprising 97.6% of donors and females only 2.3%, aligning with previous research and highlighting a consistent gender disparity across regions. This mirrors the findings of Kujur P, et al.[11],[12] The findings emphasize the need for targeted initiatives to boost female participation in blood donation by addressing logistical barriers and misconceptions. Tailored awareness campaigns and educational programs can help close the gender gap and create a more inclusive donor pool. The study revealed that 94.5% of donors were replacement donors, while only 5.5% were voluntary, closely aligning with Khurram et al.[13] findings (93.8% replacement vs. 6.2% voluntary). This heavy reliance on replacement donors raises concerns about the sustainability and inclusivity of blood donation programs, highlighting the need for strategies to encourage voluntary donations. The higher proportion of voluntary donors (22.6%) in some studies, [14] compared to earlier findings, suggests successful outreach efforts or a societal shift toward supporting voluntary donations, highlighting potential progress in donor composition over time. The deferral rate in this study (11.5%) aligns with findings by Elsafi et al.[14] (11.7%) and falls within the range reported globally. Other studies show varying rates: Okoroiwu and Asemota[15] (8.69%), Khurram et al. [13] (12.2%), Saba et al.[3] (6.37%), and Malhotra and Negi[12] (16%). Internationally, rates are comparable to France[17] (10.8%) but lower than the U.S. (12.8%–15.6%)[35-42], Japan (14%)[26], Singapore

(14.4%)[18], Turkey (14.6%)[13], and Nigeria (16%)[10]. This variability reflects differences in screening processes and donor characteristics. The current study found a 56.9% permanent deferral rate, aligning with Saba et al. [3] (55.5%) and highlighting a significant challenge in blood donation efforts.[3] However, rates vary widely across studies, such as Kujur and Tiwari (9.8%) and Okoroiwu and Asemota (68.9%), likely due to regional differences in healthcare standards, prevalent medical conditions, and regulatory frameworks.[8] Temporary deferral rates also exhibit considerable diversity among studies. Our study reported a temporary deferral rate of (43.1%), aligning closely with the findings of Saba et al. [3] (44.4%). However, Elsafi[14] and Khurram et al. [13] reported notably lower temporary deferral rates of 11.7% and 11.1%, respectively, while Malhotra and Negi and Kujur and Tiwari reported substantially higher rates at (88%) and (90.1%), respectively. These discrepancies in temporary deferral rates may arise from variations in criteria for temporary deferral, such as recent travel to regions with prevalent diseases like malaria or the presence of medical conditions necessitating temporary deferral. The current study found an HCV prevalence of 27.6%, closely aligning with Saba et al. (21.5%) but differing from Okoroiwu and Asemota (18.9%) and Kujur and Tiwari (0.1%). These variations may stem from differences in screening assay sensitivity and regional HCV prevalence. Similarly, HBV prevalence rates varied, with the study reporting 15.3%, compared to Okoroiwu and Asemota (31.7%) and Saba et al. [3] (30.3%), likely due to geographical disparities in HBV prevalence and vaccine coverage.[3,8] The current study found a low hemoglobin (Hb) deferral rate of 10.7%, consistent with Saba et al. (8.2%) but lower than Elsafi[14] (14.8%), Kujur and Tiwari (15.9%), Okoroiwu and Asemota (21.9%), Khurram et al.[13] (30.7%), and Malhotra and Negi[12] (43.3%). These variations highlight the widespread issue of low Hb as a leading cause of deferral, emphasizing the need for preventive measures and treatment strategies in donor recruitment efforts. Elsafi[14] reported a 4.8% deferral rate due to recent donations, while Malhotra and Negi[12] noted a lower rate of 1.2%. These variations underscore the need for further research to address the demand-driven nature of blood donation systems and improve donor management strategies. The varying malaria-related deferral rates—3.0% in the current study compared to 0.6% Saba et al.[3] and 0.79% (Okoroiwu and Asemota)—highlight the impact of geographical location and malaria prevalence on donor eligibility. Seasonal transmission patterns, control measures, and population demographics further contribute to these regional disparities, emphasizing the complex factors influencing deferral practices. The need for continuous surveillance and screening is underscored by the wide variation in syphilis prevalence and deferral rates, which range from 7.6% in the current study to 14.1% (Saba et al.) and 0.15% (Okoroiwu and Asemota). These variations are probably caused by changes in population demographics, screening procedures, and regional epidemiological factors.

This study of pre-donation deferrals, aligns with global trends and highlights several crucial areas for enhancement in donor screening and education. The implementation of the donor history questionnaire (DHQ) is crucial for screening ineligible donors before blood donation, hence ensuring safety for both the donor and the recipient. This study aligns with the research undertaken by Al Shaer et al. (2017),[15] which analyzed donor deferral trends in Dubai, revealing that a significant number of temporary deferrals is attributable to low hemoglobin levels and recent medication use. These were also the most common causes in our pool of donors which is why health education is necessary to potential donors especially in the low- and middle-income countries. Another relevant aspect, which was based on the findings of Alsalmi et al. (2019),[16] showed that blood donation behavior was significantly influenced by knowledge, attitude, and practice (KAP) in Saudi Arabian health profession.[13] In this regard, it may be

argued that once particular awareness efforts are conducted among the population, more deferral cases can be avoided and that, from a long-term viewpoint, donor retention will improve overall.

Misconceptions about the reasons behind deferral may subsequently discourage the donor. In order to enhance blood safety, Gillet Neijens (2018)[17] underlined the importance of carefully evaluating donor questionnaires and deferral rates. Their results are consistent with our study's use of structured DHQs to narrow down important deferral factors, namely recent donations and hepatitis C. This demonstrates the value of routine questionnaire audits to improve the precision and reliability of donor screening. Comparing our study to the experience of the tertiary care hospital in Pakistan, as described by Khalid et al. (2018)[18], we found that anemia, underweight, and recent illnesses were the main reasons for temporarily delaying care. Although there are regional differences, these similarities further support the idea that hospital-based blood banks' donor deferral patterns typically center on a comparable spectrum of non-preventive health-related issues. According to the study by Neugebauer et al. (2022),[19] DHQs conducted before the donation visit are a very effective strategy to improve blood safety because they provide donors the time they need to accurately disclose and self-defer. The creation of a system to submit the DHQ prior to the appointment should be the next step of intervention in order to minimize last-minute losses in terms of accuracy and quality. The amount of adequate information in our current approach of completing the DHQ on the same care day may be relatively low. Offer geld and Heiden (2017) reported the problem of developing a universal, but culturally adjustable DHQ in Germany. In the same regard, our research offers a revision to existing DHQ at Jinnah hospital to display local deferral patterns, so as to promote an effective screening and an improved donor retention by using culturally authentic questions.[20] The discussion highlights the complexity of blood donation eligibility criteria, with studies like Malhotra and Negi and Elsafi identifying medication usage (e.g., antiplatelet drugs, anticoagulants, aspirin) as a significant deferral cause.[12,14] This underscores the need for thorough medical screening to ensure donor safety. While our study validates the efficacy of our screening methods, comparative analysis reveals geographical variations in deferral causes, offering insights to optimize blood donation protocols. Further research and collaboration among blood donation organizations are essential to refine screening practices and improve donor management.

CONCLUSION

The study identified a significant gender disparity in blood donation, with 97.6% male donors, highlighting the need for targeted female recruitment. Hepatitis C was the leading cause of deferral, emphasizing the challenge of transfusion-transmissible infections. Recent donations and low hemoglobin levels, particularly in females, also contributed to deferrals. These findings underscore the need for improved screening, donor management, and recruitment strategies to ensure a safer and more sustainable blood supply

LIMITATION OF THE STUDY

This study's findings are limited by a sample size of 550 donors, which may not fully represent the broader population. The significant gender disparity, with a majority of male donors, could introduce bias in deferral reasons. Conducted at a single regional blood center, the results may not be generalizable to other locations with different donation practices. The study's temporal scope does not account for changes in donor behaviors over time. Additionally, variations in screening protocols across different centers may affect data consistency and interpretation.

CONFLICT OF INTEREST

No conflict of interest is declared by authors.

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None

AUTHOR'S CONTRIBUTIONS

TF: Concept, Supervision of Data Collection
UF: Manuscript writing and Data Collection
HAS: Manuscript writing and Data Collection
SB: Revision of Manuscript
MN: Methodology and Data Analysis
RN: Methodology and Data Analysis

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