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BARRIERS TO BENEVOLENCE: EXPLORING THE REASONS FOR BLOOD DONOR DEFERRALS IN THE SOUTHERN ODISHA REGION

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ABSTRACT

Background

The blood donor selection is vital for the safety of donors and recipients as well as for maintaining an adequate blood supply. A detailed evaluation of various causes of blood donor deferral may help medical personnel limit the barriers that disrupt blood donation.

Aims & objective

To analyze various causes of blood donor deferral among blood donors. The primary objective is to estimate the various reasons for donor deferral during the screening process before and after blood donation.

Method

This is a prospective observational study for six months, from July 2024 to December 2024, at the Odisha Blood Centre, MKCG Medical College and Hospital (MKCG MCH), Berhampur, Odisha. This study includes all deferred blood donors, both predonation deferral during the screening process and post-donation deferral during the specified period.

Results

During the study period, 20708 blood donors were screened. 20267 donors were accepted for blood donation, and 441 no. of donors were deferred on predonation screening, and 620 no. of donors were deferred on post donation from the selected blood donors.Among 441 predonation deferrals, 411(93.2%) were temporary deferrals and 30(6.8%) were permanent deferrals. Deferred due to low

hemoglobin108 (26.27%), Tattoos 65 (15.81%), and 50 (12.16%) due to underweight were the leading causes for temporary predonation deferral.30 donors (6.4%) were permanently deferred; the most common cause was endocrine disorders, 17(3.85%), predominantly due to thyroid dysfunction, 9(30%), and uncontrolled diabetes mellitus, 8(26.66%) during predonation screening. In postdonation deferral 620 donors (3.05%) were deferred due to detection of transfusion-transmissible infections (TTIs) as follows: HBV 392 (1.93%), Syphilis (VDRL) 173 (0.85%), HIV 32 (0.15%), HCV 20 (0.09%), were deferred permanently and Malaria parasite 3 (0.01%) were deferred for a temporary period.

Conclusion

To significantly improve donor eligibility and retention rates, we must decisively tackle modifiable deferral causes-especially low hemoglobin levels, underweight status, and tattoo-related exclusions. By investing in targeted pre-donation education, focused interventions, and enhanced community outreach, we can create a more inclusive and effective donor environment that benefits everyone involved.

Keywords: Voluntary Blood Donor, Predonation, Postdonation, Temporary Deferred, Permanently Deferred.

INTRODUCTION

Blood safety is a critical issue in transfusion medicine around the world. Safe blood donors represent the foundation of secure blood transfusion services.[1] In contemporary medical and surgical practice, blood transfusion is considered an important life-saving measure in medicine, especially in medical emergencies.[2] Blood transfusion services (BTS) collect blood only from donors at low risk for infectious diseases that could be transmitted by transfusion and who would be unlikely to jeopardize their health by donating blood. Therefore, a careful process for evaluating the suitability of potential blood donors is essential to ensure the blood supply's safety and sufficiency and protect the health of transfusion recipients and blood donors. At the same time, it must be ensured that suitable donors are not unnecessarily deferred.[3]

A report from the National AIDS Control Organization (NACO) indicate that only 7.4 million people donate blood annually in India, while the annual requirement is 10 million units. World Health Organization statistics (WHO) indicate that over 81 million units of blood are collected annually, but developing countries, which contain about 82% of the world's population, contribute only 39% of this figure.[4] The BTS plays an important role in ensuring a supply of safe blood when needed. Therefore, it is important to ensure that an adequate supply of safe blood is available. It is also important to ensure that blood collection does not harm either the donor or the recipient.[5]

Blood safety is ensured through the selection of appropriate donors, donor screening, testing of donated units, and efficient blood transfusion practices under the Drugs and Cosmetics Act of 1940.[6] However, donor selection can have a concomitant negative impact on the blood supply, as many deferred donors may not be willing to donate again. Therefore, an evidence-based donor selection process is needed to avoid unnecessary deferral of donors, especially voluntary donors.[7-9]

Donor deferrals may be classified as either permanent or temporary. Temporary deferrals arise when potential donors have factors that can be reversed, such as low blood hemoglobin levels, which can be managed by regular iron intake, and a permanent deferral suggests that potential donors have ongoing health issues that make them unfit to donate, and as a possibility of spreading transfusion-transmissible infections (TTIs) such as HIV (Human immunodeficiency virus).[10]

For this reason, blood donor selection is vital for the safety of donors and recipients as well as for maintaining an adequate blood supply. In this study, both pre-donation and post-donation blood donors are included. A detailed evaluation of various causes of blood donor deferral may help medical personnel limit the barriers that disrupt blood donation. This study aimed to analyze the deferral rate due to various causes in blood donors to achieve 100% acceptance.

MATERIALS AND METHODS

This is a prospective observational study for six months, from July 2024 to December 2024, at the Odisha Blood Centre, MKCG Medical College and Hospital (MKCG MCH), Berhampur, Odisha. Before this study commenced, ethical clearance was obtained from the Institutional Ethical Committee of MKCG MCH, as documented in No. 029/Chairman-IEC, M.K.C.G. Medical College, Berhampur. This study includes all deferred blood donors who presented during the specified period for blood donation at the blood center and in voluntary blood donation (VBD) camps. The donor selection process involved a pre-donation assessment, which included a donor questionnaire, a physical check-up, and hemoglobin level measurement as per the standard operating procedure (SOP) of the blood center. Blood donations were permitted for those who were healthy, while deferred blood donors were prohibited from donating. All debarred blood donors were recorded in the blood donor deferral record as either permanent or temporary deferred blood donors, as specified by the Drugs and Cosmetics (Second Amendment) Rules, 2020, issued by the Government of India in the Ministry of Health and Family Welfare (MoHFW), New Delhi (India) on March 11, 2020.[11] Data on post-donation deferral was collected from TTI reactive records. All TTI-reactive donors were permanently deferred except for Malaria infection, and all the collected blood units were discarded. All TTI-reactive donors are counselled and referred to a physician based on their disease conditions, as outlined in the SOP of the Blood Centre. Donors of apheresis were not included in the study. Data of deferred donors were collected in terms of age, sex, donor type, and reasons for deferral, which were further divided into permanent and temporary categories and entered in MS Excel.

RESULTS

A total of 20708 blood donors were screened during the study period. **[Table-1].** Out of which 20267 donors were accepted for blood donation and 441 no. of donors were deferred on predonation screening, and 620 (3.06%) of donors were deferred on post donation from the selected blood donors.

Total Donor Screened	Donor Deferred During Pre-Donation	Donor Accepted for Blood Donation	Donor Deferred After Postdonation
20708	441 (2.13%)	20267 (97.87%)	620(3.06%)
Table 1: Total deferred blood donors out of total screened donors			

Out of 20267 blood donors, 13300(65.62%) were voluntary and 6967(34.38%) were replacement donors. Among the 13300 voluntary donors, 12714 (62.73%) were males and 586 (2.89%) were females. Of the 6,967 replacement donors, 6929 (34.19%) were males and 38(0.19%) were females.**[Table -2].**

Voluntary		Replacement		Total
13300 (65.62%)		6967 (34.38%)		20267
Male	Female	Male	Female	
12714 (62.73%)	586 (2.89%)	6929 (34.19%)	38 (0.19%)	
Table 2: Blood donation by gender distribution				

In this research, predonation deferrals are classified into two types: temporary deferrals and permanent deferrals, which are then subdivided into various conditional categories to enhance data collection and analysis as general conditions (like deferred due to age or weight or hemoglobin etc.), liver diseases, heart related diseases, respiratory diseases, on medication, any surgery, vaccination, physiological status for women, CNS (Central Nervous System) diseases & psychiatric diseases, endocrine diseases and other infectious diseases.

There were 441 pre-donation deferrals and 620 post-donation deferrals. Among 441 pre-donation deferrals, 411(93.2%) were temporary deferrals and 30(6.8%) were permanent deferrals. Out of 411

temporary deferrals, 274 were male and 137 were female, and out of 30 permanent deferrals, 28 were male and 2 were female donors. Out of 620 post-donations deferrals, 617 were permanently deferred, and 3 were deferred temporarily. All 617 post donation deferrals were males**.[Table-3]**

		TYPE OF DEFERRALS	MALE	FEMALE	TOTAL	
PREDONATION DEFERRAL	TEMPORARY DEFERRAL	General condition	108(24.48%)	104(23.58%)	212(48.07%)	TOTAL = 441
		Physiological status for women	0	21 (4.76%)	21 (4.76%)	
		Respiratory Diseases	11(2.49%)	1(0.22%)	12(2.72%)	
		Heart-related diseases	10(2.26%)	3(0.68%)	13(2.97%)	
		Liver Diseases	61(13.83%)	5(1.13%)	66(14.96%)	
		Vaccination	22(4.98%)	1(0.22%)	23(5.21%)	
		Medication	31(7.02%)	1(0.22%)	32(7.25%)	
		Any Surgery	25(5.66%)	1(0.22%)	26(5.89%)	
		Other infectious diseases	6(1.36%)	0	6(1.36%)	
		TOTAL	**274**	**137**	**411**	
	PERMANENT DEFERRAL	Respiratory Diseases	2(0.45%)	0	2(0.45%)	
		Heart-related diseases	6(1.36%)	0	6(1.36%)	
		CNS & Psychiatric Diseases	4(0.9%)	1(0.22%)	5(1.13%)	
		Endocrine Disorders	16(3.63%)	1(0.22%)	17((3.85%)	
		TOTAL	**28**	**2**	**30**	
POST DONATION DEFERRAL	TEMPORARY DEFERRAL	MP	3(0.48%)	0	3(0.48%)	TOTAL =620
		TOTAL	**3**	**0**	**3**	
	PERMANENT DEFERRAL	HIV	32(5.16%)	0	32(5.16%)	
		HCV	20(3.22%)	0	20(3.23%)	
		HBV	392(63.22%)	0	392(63.23%)	
		VDRL	173(27.9%)	0	173(27.9%)	
		TOTAL	**617**	**0**	**617**	

Table 3: Pre- and post-donation deferrals with gender distribution

The 441 pre-donation blood donor deferrals were further categorized as deferrals due to general condition 212, liver diseases/hepatitis infection 66, medication related 32, any surgical procedure 26, vaccination 23, physiological status for women 21, heart related diseases 19, endocrine disorders 17, respiratory or lungs related diseases 14, other infectious disease 6 and CNS / psychiatric diseases 5**.[Fig-1].**

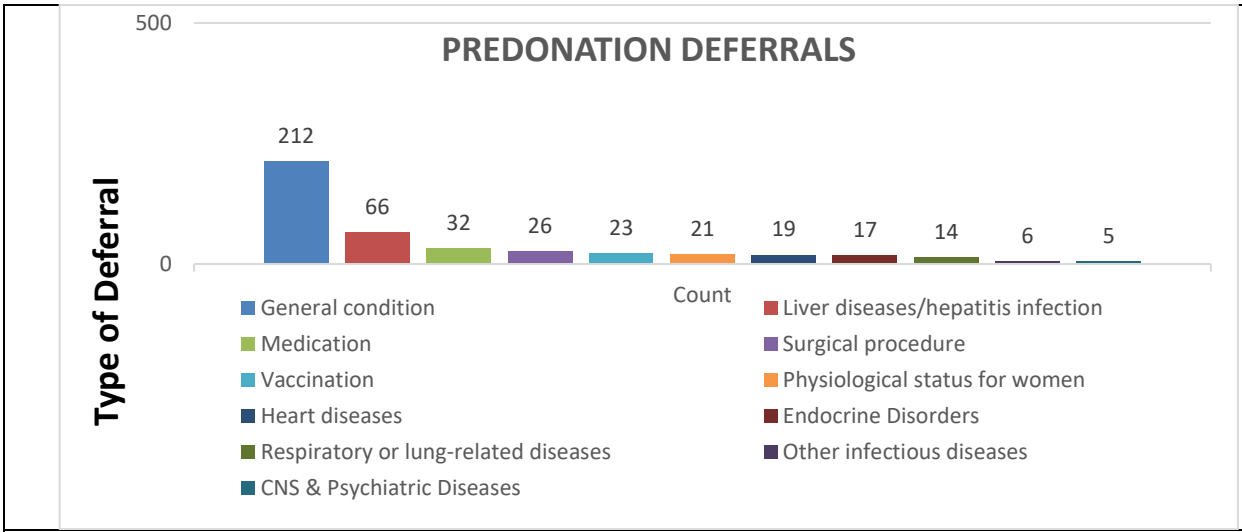

Figure 1: Type of pre-donation deferral

From 620 post donation deferrals, which include Hepatitis B Virus (HBV) infection was 392, Syphilis infection tested by Venereal disease research laboratory (VDRL) test was 173, Human immunodeficiency virus (HIV) infection was 32, Hepatitis C Virus (HCV) was 20 and lastly, for Malaria parasite (MP) was 3**.[Table – 3]**

From 411 predonation temporary deferrals, 212 (48.07%) deferred due to general conditions, from which 108 (26.27%) deferred due to low hemoglobin, 50 (12.16%) due to underweight, 17 (4.13%) due to donation interval less than 3 months, 15 (3.64%) due to age less than 18 years, 10 (2.43%) due to foreign travel and residential history,7(1.7%) due to alcohol intoxication, 4(0.97%) due to infected donation site and 1(0.24%) for not prominent vein in both arm. In the category of Liver Diseases 66 (14.96%), which included recent tattoo history 65 (15.81%) and 1 (0.24%) due to a recent history of jaundice 1 (0.24%). Under category on Medication 32 (7.25%), which included deferral due to use of antibiotics 24 (5.83%), 4 (0.97%) due to antifungal, and 2 (0.48%) each for medication for skin care as for acne and 2 (0.48%) medication of unknown origin were deferred. For Surgical procedure 26 (5.89%), deferred due to major surgery 19 (4.62%), minor surgery 4 (0.97%), dental procedure as tooth extraction under anesthesia 3 (0.72%). Vaccination 23 (5.21%), deferred due to rabies vaccination & immunoglobulin 12 (2.91%), non-live vaccine & toxoid 9 (2.18%), and live vaccine is 2 (0.48%). Category that is only for women, as physiological status for women 21 (4.76%), were deferral due to menstruation 20 (4.86%), and only 1 (0.24%) for breastfeeding. In Heart-related diseases 13 (2.97%), uncontrolled blood pressure or recent change in medication was 10 (2.43%), and deferral due to hypotension was 3 (0.72%). Deferred due to catagorised under respiratory diseases 12 (2.72%), where for recent cold, cough, and acute sinusitis 11 (2.67%), and one (0.24%) for tuberculosis after 1 year completion of antitubercular medication. Lastly, the other infectious diseases were 6 (1.36%), where history of malaria infection was 2 (0.48%), dengue was 2 (0.48%), and chicken pox was 2 (0.48%) were under predonation temporary deferral. **[Table-4]**

General Condition	**Male**	**Female**	**Total**
Low hemoglobin	10(2.43%)	98(23.84%)	108(26.27%)
Weight	44(10.7%)	6(1.45%)	50(12.16%)
Donation interval	17(4.13%)	0	17(4.13%)
Age	15(3.64%)	0	15(3.64%)
Travel and residence	10(2.43%)	0	10(2.43%)
Alcoholic	7(1.7%)	0	7(1.7%)
Donor skin	4(0.97%)	0	4(0.97%)
Vein status	1(0.24%)	0	1(0.24%)
Liver diseases/hepatitis infection			
Tattoos	60(14.59%)	5(1.21%)	65(15.81%)
Jaundice	1(0.24%)	0	1(0.24%)
Medication			
Antibiotics	23(5.59%)	1(0.24%)	24(5.83%)
Antifungal	4(0.97%)	0	4(0.97%)
Medication for skin care	2(0.48%)	0	2(0.48%)
medication for other causes	2(0.48%)	0	2(0.48%)
Surgical procedure			
Major	18(4.37%)	1(0.24%)	19(4.62%
Minor	4(0.97%)	0	4(0.97%)
Dental procedure with anaesthesia	2(0.48%)	0	2(0.48%)
Tooth extraction	1(0.24%)	0	1(0.24%)
Vaccination			
Anti-rabies & Immunoglobulins	12(2.91%)	0	12(2.91%)
Non-live vaccine & toxoid	8(1.94%)	1(0.24%)	9(2.18%)
Live attenuated vaccine	2(0.48%)	0	2(0.48%)

Physiological status for women			
Menstruation	0	20(4.86%)	20(4.86%)
Breast feeding	0	1(0.24%)	1(0.24%)
Heart diseases			
Uncontrol HTN	10(2.43%)	0	10(2.43%)
Hypotension	0	3(0.72%)	3(0.72%)
Respiratory or lung-related diseases			
Cold, cough, acute sinusitis	10(2.43%)	1(0.24%)	11(2.67%)
Tuberculosis	1(0.24%)	0	1(0.24%)
Other infectious diseases			
Recent Malaria infection	2(0.48%)	0	2(0.48%)
Measles, mumps, chickenpox	2(0.48%)	0	2(0.48%)
Dengue	2(0.48%)	0	2(0.48%)
Total	**274 (66.66%)**	**137 (33.34%)**	**411**

Table 4: Pre-donation temporary deferral category with gender distribution

Among the 30 permanent deferrals during predonation were as follows: for endocrine diseases 17 (3.85%), which deferred due to thyroid disorder 9 (30%) and uncontrolled diabetes 8 (26.66%), for heart-related diseases 6 (1.36%), where permanent deferred due to cardiac medication 3 (10%) and 3 (10%) for CAD (Coronary Artery Disease), for category under CNS & Psychiatric Diseases 5 (1.13%) where permanent deferral due to convulsion 2 (6.66%), epilepsy 2 (6.66%) and for unknown medication for from which deferred due to unknown psychosis medication 1 (3.33%), and lastly for permanent deferral due to respiratory-related diseases 2 (0.45%) as asthmatic on steroid.**[Table-4 & Table- 5].**

Category	**Male**	**Female**	**Total**
Endocrine Disorders			
Thyroid Disorder	8(26.66%)	1(3.33%)	9(30%)
Uncontrolled Diabetes	8(26.66%)	0	8(26.66%)
Heart diseases			
Cardiac medication	3(10%)	0	3(10%)
CAD	3(10%)	0	3(10%)
CNS & Psychiatric Diseases			
Convulsion	2(6.66%)	0	2(6.66%)
Epilepsy	2(6.66%)	0	2(6.66)
Medication for psychosis	0	1(3.33%)	1(3.33%)
Respiratory Diseases			
Asthmatics on steroids	2(6.66%)	0	2(6.66%)
Total	**28 (93.34%)**	**2 (6.66%)**	**30**

Table 5: Pre-donation permanent deferral category with gender distribution

The maximum number of deferrals from age group 21-30 years was 203(46.03%), followed by 130 (29.47%) in age group 31-40 years, 47 (10.65%) in the below-20 years age group, 44 (9.97%) in the 41-50 years age group, 51-60 years was 11 (2.49%), and above 61 years was 6 (1.36%) as first-time donors.

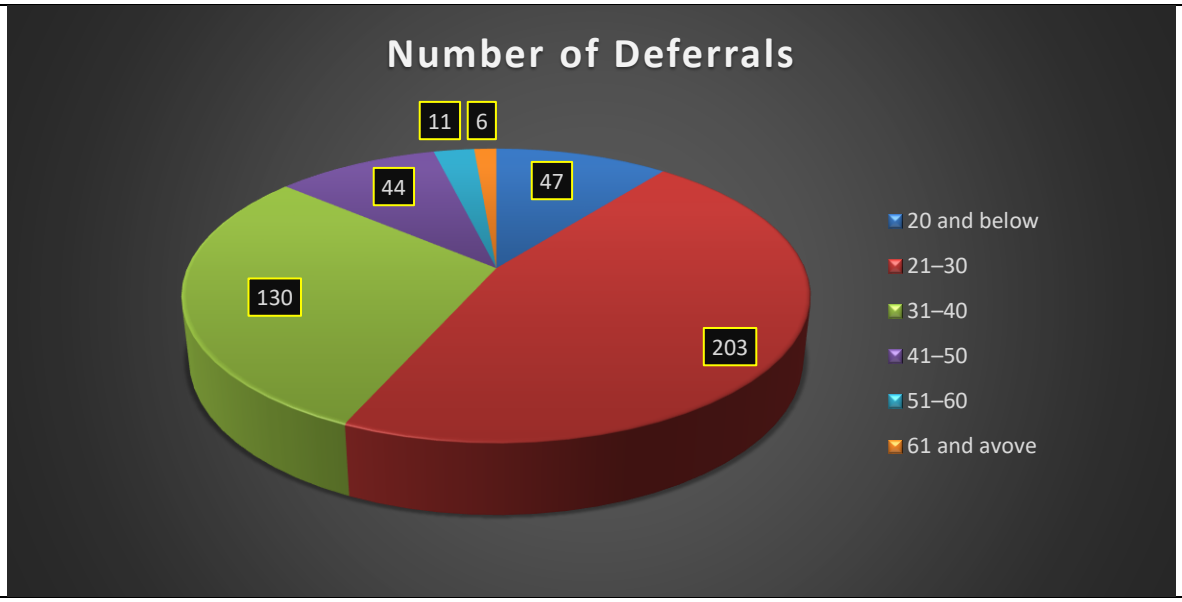

Figure 2: Age distribution with number of deferrals

DISCUSSION

In the present study, both pre-donation and post-donation deferrals were analyzed to evaluate donor eligibility and safety. The pre-donation deferral rate was found to be 2.13%, which is considerably lower compared to findings from some recent studies, where they reported deferral rates as 14.6 % by Lamba et al.,[12] 11.25% by Sharma et al.,[13] and 4.87 % in Sharma SK et al.,[14] donors were deferred depending on the study population, donor selection criteria, and geographic location. A similar rejection rate or deferral rate of 2.09% was reported by Duvvuri PSR et al.[15] The highest deferral rate of 33% seen in another study by Shah R et al.,[16] in Western India. In our study, the donor deferral rate is relatively low, which reflects more stringent donor pre-screening processes or a healthier donor population.

Out of a total of 20,267 blood donors included in the present study, 13,300 (65.62%) were voluntary donors, whereas 6,967 (34.38%) were replacement donors. A National Level Cross-Sectional Study by Asirvatham ES et al.,[17] reported voluntary blood collection, in the west region reported to have 82.5%, followed by the south (77.3%), the east (68.9%), the northeast (55.5%), and the north (52.5%). This indicates steady progress toward self-sufficiency in blood collection. This distribution suggests a positive inclination toward voluntary blood donation, which is generally associated with improved safety and sustainability of the blood supply. Voluntary donors are typically better informed and motivated by altruism rather than compulsion, which reduces the risk of transfusion-transmissible infections.

A closer examination of gender distribution among donors revealed a marked predominance of male participants in both categories in our study. Among the 13,300 voluntary donors, 12,714 (62.73% of total donors) were males, and only 586 (2.89%) were females. Similarly, among the 6,967 replacement donors, 6,929 (34.19%) were males and 38 (0.19%) were females. These statistics clearly demonstrate that male donors overwhelmingly outnumber female donors in both voluntary and replacement groups.

Female participation in blood donation, particularly in the replacement category, is low due to physiological factors (like lower hemoglobin levels and iron deficiency) and sociocultural barriers (such as misconceptions and lack of awareness). This trend is consistent with findings in India and other developing countries, highlighting ongoing challenges despite efforts to encourage inclusivity.[18]

Among 411 (93.6%) temporary predonation deferred donor were the some of the major deferral criteria during this study were as follows: Low hemoglobin level 108 (26.27%), Tattoos 65 (15.81%), Underweight 50 (12.16%), on Antibiotics 24 (5.83%), Menstruation 20 (4.86%), Major surgery 19 (4.62%), Donation interval 17 (4.13%), Age (too young or old) 15 (3.64%), Anti rabies

vaccination, and Immunoglobulins 12 (2.91%), Cold, cough, acute sinusitis 11 (2.67%), and Uncontrolled HTN (hypertension) 10 (2.43%).

In the present study, temporary pre-donation deferrals constituted a significant proportion (93.6%) of all deferrals, highlighting a pressing need to address and mitigate modifiable deferral factors. The most common reason for temporary deferral was low hemoglobin 108 (26.27%), including both male and female, where female participation was about 98(23.84%), which was the highest among all temporary deferrals. Similar findings from other Indian and International studies, where female deferrals were highest due to low haemoglobin level. In one of the studies by Kandasamy et al.,[19] the deferral rate against total donation events was higher among female donors than male donors, primarily due to low hemoglobin level (70.08%), followed by underweight (8.14%), medicine intake (3.68%), and others. In this present study, low haemoglobin 98(23.84%), menstruation 20 (4.86%), underweight 6(1.45%), recent tattoo 5(1.21%), and hypotension 3(0.72%) were the leading causes of pre-donation temporary female donor deferral. Another study by Agnihotri et al.,[20] and Kumari et al.,[21] similarly, anaemia was identified as the leading cause of deferral, particularly among female donors, where iron-deficiency anaemia remains prevalent. Anaemia was the leading cause of deferral among young female donors, reinforcing the importance of nutritional interventions and iron supplementation campaigns among prospective donors, especially women of reproductive age.

One of the studies by Nishioka et al.,[22] concluded that an unequivocal risk of transmission of several infectious diseases by tattooing. Any procedure involving skin penetration in unsterile conditions, as in tattooing, carries the risk of blood-borne infections, especially HIV, hepatitis B, and hepatitis C.[23] In our study, recent tattoos accounted for 15.81% of deferrals. This is notably higher than data from other studies, where tattoo-related deferrals were varied from study to study, as 1.03 % in Kujur et al.,[24] and needle exposure (acupuncture) /tattooing (12.25%) were temporary deferrals in Kaur et al.[25] One of the studies by Arjunan et al.,[26] detected seroprevalence of TTI among the tattooed and nontattooed groups, where they concluded that the donor return rate was found to be 45.8%. This difference may reflect regional variations in tattooing practices and public awareness of blood safety policies post-body art. This need for clearer public education on waiting periods post-tattooing is evident to reduce avoidable deferrals.

Underweight donors (weight <45 kg) comprised 12.16% of deferrals in the present study. One of the studies by Bahadur et al.,[27] underweight was the second leading cause (26.6%), among blood donors and had a similar deferral rate in gender distribution, where males were more in number compared to the current study. Underweight status was a common barrier, especially among young first-time donors. This underscores the need for focused health awareness and nutritional improvement, particularly among college-aged populations, and also efforts to promote healthy BMI and better targeting of outreach camps to eligible donor demographics could help improve deferral rates in this group.

Antibiotic use (5.83%), menstruation related deferral in female (4.86%), recent surgery (4.62%), donation interval violations (4.13%), age ineligibility (3.64%) by the means of too young or too old, and recent rabies prophylaxis or immunoglobulin use (2.91%), were also notable causes of temporary deferral in this present study. Less frequent, but still notable, included respiratory tract infections (2.67%) and uncontrolled hypertension (HTN) (2.43%). Through follow-up and proper donor awareness information, education, and communication (IEC) with donors using social media, various awareness programs regarding blood donation can decrease the predonation temporary deferrals.

In this study, predonation permanent deferrals, though less frequent than temporary ones, but it play a crucial role in ensuring the safety of both donors and recipients. 30 donors (6.4%) were permanently deferred. The most common cause was endocrine disorders 17(3.85%), predominantly due to thyroid dysfunction, 9(30%), and uncontrolled diabetes mellitus 8 (26.66%). Cardiac-related conditions accounted for 1.36% of deferrals in this study, with equal proportions for those on cardiac medications and those with coronary artery disease. Under CNS and psychiatric conditions, 1.13% of donors were permanently deferred, mainly due to epilepsy, convulsions, and ongoing

psychotropic medication. Lastly, respiratory disorders, particularly steroid-dependent asthma, accounted for 0.45% of permanent deferrals. The use of systemic steroids and the risk of respiratory distress during or post-donation warrant exclusion, as supported by donor eligibility standards outlined by the National Blood Transfusion Council (NBTC) and WHO guidelines.[28] The pre-donation permanent deferral in other studies may vary, as by Chaurasiya et al.,[29] common causes of permanent deferrals among females were chronic hypertension, 14.6% and among males were diabetes requiring insulin, accounting for 12.5%.

One of the studies by Ahmed et al.,[30] reported permanent deferral due to high-risk behavior (50%). In this present study, less information regarding risk behavior due to overcrowding and a lack of privacy in outdoor voluntary blood donation camps. Another study by Gupta et al.,[31] permanent deferrals were (6.8%) leading reason was high-risk behavior, followed by asthma.

In this present study covering 20,267 blood donations, 620 donors (3.05%) were deferred after post-donation due to the detection of transfusion-transmissible infections (TTIs). The breakdown was as follows: HBV 392 (1.93%), Syphilis (VDRL) 173 (0.85%), HIV 32 (0.15%), HCV 20 (0.09%), and Malaria parasite 3 (0.01%), the latter being a temporary deferral per the D&C Act owing to endemicity and eligibility for re-entry post-recovery. A recent study by Thakur SK et al.,[32] showed a total of 345(2.038%) blood donors were positive for TTIs. Prevalence of HBV, HCV, HIV-I/II, syphilis and MP were 188(1.111%), 73(0.431%), 34(0.201%), 49(0.29%) and 1(0.006%) respectively. HBV remains the most common TTI. Syphilis infection was (0.85%) in the present study. One of the recent studies by Joshi et al.,[33] the seroprevalence of TTI was 3.05%, of which HBV, HCV, HIV, Syphilis, and malaria among all donors were 0.73%, 0.15%, 0.12%, 2.06%, and 0%, respectively. The prevalence rate was highest for Syphilis, followed by HBsAg, HCV, and HIV in decreasing order. This suggests an ongoing reservoir of untreated infection and emphasizes the need for targeted sexual health interventions and to intensify the donor questionnaire about behavioural history taking, which is sometimes avoided during donor selection due to lack of privacy in public sectors.

Malaria positivity (0.01%) in this study was low but consistent with findings from other Indian regions, where reported rates range from 0.0005% to 0.12% among blood donors by Mahapatra S et al., and Mukherjee S et al.,[34,35] As malaria is classified under temporary deferral by the Drugs & Cosmetics (D&C) Act and national guidelines, affected donors may be eligible for re-entry after complete recovery and symptom-free status.[11,36] Establishing clear post-treatment re-entry protocols is crucial for donor retention, particularly in malaria-endemic regions, where such temporary deferrals could otherwise lead to unnecessary loss of eligible donors. In our study, the highest number of blood donor deferrals was seen in the 21–30 years age group (46.03%), followed by the 31–40 years age group (29.47%). Similar findings were reported in recent studies from India, where most deferrals occurred in younger donors, mainly due to low hemoglobin, underweight, and other temporary causes.[37,38] The <20 years age group also showed notable deferrals (10.65%), often due to borderline health parameters as underweight and lack of knowledge regarding blood donation. Fewer deferrals were seen in older age groups, 41–50 years (9.97%), 51–60 years (2.49%), and >61 years (1.36%), possibly because older donors are more selective and health-conscious when presenting for donation.

CONCLUSION

The above results firmly underscore the urgent necessity for enhanced public health initiatives, including universal hepatitis B virus (HBV) vaccination for newborns, heightened awareness campaigns for syphilis, proactive HIV prevention strategies, and more effective hepatitis C virus (HCV) testing. Moreover, it is essential to implement comprehensive donor education, rigorous pre-donation counseling, and robust post-donation referral systems. These measures are critical not only to safeguard recipients but also to strengthen donor retention and eligibility in accordance with the D&C Act. The findings from this study resonate strongly with numerous regional and national studies, revealing a consistent pattern of deferral reasons across similar demographics and geographical locations. To significantly improve donor eligibility and retention rates, we must

decisively tackle modifiable deferral causes, especially low hemoglobin levels, underweight status, and tattoo-related exclusions. By investing in targeted pre-donation awareness at educational institutions for younger blood donors, focused interventions for donor motivation, and enhanced community participation, which can create a more inclusive and effective healthy voluntary donor environment that benefits everyone.

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