

Profile of Blood Donors and Reasons for Deferral at a District Hospital in North Goa

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Abstract

Introduction: A blood transfusion is a life-sustaining procedure in several medical and surgical conditions. It is vital that an adequate inventory of safe blood is established by implementing stringent donor selection criteria and screening for transfusion transmitted infections by ultrasensitive methods of detection. Despite a huge population, scarcity of blood lingers nationwide and it is important to analyse the varied reasons of deferrals in order to lessen the deferrals in the future.

The aim of this paper is to scrutinise the demographic profile of blood donors and evaluate the patterns and reasons for donor deferral at North Goa District hospital, India.

Materials and Methods: This is a retrospective study carried out at the Blood Centre, North Goa District hospital, India. All those who registered for donation between June 2022 till May 2023 were included in the study. The donors were screened by a questionnaire followed by medical examination and were selected or deferred based on the guidelines laid down by Drugs and Cosmetics Act, 1940 and Directorate General of Health Services, MoHFW, Govt of India. Data was collected using a proforma and analysed by SPSS software wherever indicated.

Results: During this time period, 2611 donors registered for blood donation, out of which 425 donors were deferred due to diverse reasons. Most of the donors were voluntary donors (98.3%) of which majority were males (86.4%). The commonest cause of deferral in males was high BP (24%) and high Hb (11.3%) whereas the commonest cause of deferrals in females was low Hb (46.9%). Most of the donors were rejected due to temporary reasons (97.1%). The commonest reason of permanent deferrals was a medical history of uncontrolled DM.

Keywords: Blood donors, deferral, temporary, permanent, North Goa, anemia, hypertension, polycythemia, DM.

Introduction

Safe blood donors form the pivot of blood transfusion system. Blood donors could be voluntary donors or replacement donors. The safety of the

blood supply is secured through a series of steps from donor selection to safe transfusion of blood and blood products. Donor screening through a questionnaire and medical examination is still stressed upon despite the availability of ultrasensitive techniques

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for screening for transfusion-transmitted infections to avoid undue harm to the donor, healthcare workers and recipients. Based on stringent donor selection criteria some of the donors are temporarily or permanently deferred. In spite of a large population, the demand-supply gap for blood units still lingers in many healthcare facilities across the country. As of 2022 the annual shortage of blood is projected to be roughly one million units.³ Therefore it is essential that every donor be treated as precious and avoid undue deferrals. Numerous studies are carried out in different parts of the world to evaluate the rates of blood deferral and its common causes.

Materials and Methods

This is a retrospective study carried out at the Blood Centre of North Goa District hospital, India for a period of 1 year from June 2022 to May 2023. Data was collected from Blood Centre records. Donor selection was carried out with the help of donor questionnaire which is formulated based on Drugs and Cosmetics Act, 1940 and Directorate General of Health Services, MoHFW, Govt of India^{1,2} followed by a thorough medical examination. The demographic details of the donors were recorded which included their gender, type of donation -

voluntary / replacement donor, number and type of deferral (permanent and temporary); and the reason of deferrals.

Individuals aged between 18 and 65 years were accepted for blood donation. First time donors should not be over 60 years of age. Donors having weight of 45 kg or more and hemoglobin (Hb) of 12.5 g/dl or more and below 16.5 in females and 17.5 in males were presumed fit for blood donation. Donors were screened for Hb by HemoCue. For regular donors, interval between two donations should be at least 3 months for males and at least 4 months in females. The deferred donors were motivated to come back for donation at a later date when they would be fit for donation. Those donors with low Hb, high BP or high Hb were referred to the physician for further management.

Results

A total of 2611 donors registered for donation during the study period. 2186 donors were found to be fit for donation and 425 donors were deferred (deferral rate - 19.7%). (**Table 1**) Deferral rate was significantly higher in females compared to males.

Table 1: Distribution of blood donation and deferral by gender

	MALE	FEMALE	TOTAL	P-value
Number of donors registered	2226	385	2611	
Donors selected	1950	236	2186	
deferred	276	149	425	0.001***
% deferred	12.3%	38.7%	19.7%	

P-value by Chi-Square test (Fisher's exact probability test).

P-value < 0.05 is considered to be statistically significant

Out of the 2186 donors who donated, 2151 were voluntary donors and 35 were replacement donors. The percentage of voluntary blood donors was 98.3%. (**Table 2**)

Table 2: Demographic profile of the donors

TYPE OF DONOR	NUMBER	PERCENTAGE
Voluntary	2151	98.3%
Replacement	35	1.7%

Majority of the donors were males (85.2%) with a male to female ratio of 5.8:1. Of the 425 deferred

donors, 276 (64.9%) were males while 149 (35.1%) were females, (male: female = 1.8:1)

The most common reasons for deferral in males were high BP (24%) and high Hb (11.3%) whereas the commonest cause of deferrals in females was low Hb (46.9%). Majority of the deferrals, i.e., 413 (97.1%) were temporary, while 12 (2.9%) were permanent. The most common reason of permanent deferrals was a medical history of uncontrolled DM. **Table 3**

Table 3: Reasons for temporary and permanent deferral according to gender

Reason	Male (n=276)		Female (n=149)		Total (n=425)		P-value
	n	%	n	%	n	%	
Temporary deferral							
Age<18yr	3	1.1	0	0.0	3	0.7	0.555 ^{NS}
Low Hb	10	3.6	70	46.9	80	18.8	0.001 ^{***}
High Hb	31	11.2	0	0.0	31	7.3	0.001 ^{***}
Low BP	20	7.2	19	12.7	39	9.2	0.061 ^{NS}
High BP	66	23.9	12	8.1	78	18.3	0.001 ^{***}
Alcohol consumption	12	4.3	0	0.0	12	2.8	0.010 ^{**}
Medication	20	7.2	9	6.0	29	6.8	0.638 ^{NS}
Tattoo/piercing	18	6.5	9	6.0	27	6.3	0.846 ^{NS}
Underweight	2	0.7	4	2.7	6	1.4	0.190 ^{NS}
Smoking	11	3.9	0	0.0	11	2.6	0.010 ^{**}
Rabies vaccine	10	3.6	0	0.0	10	2.3	0.017 [*]
Dengue fever	6	2.2	0	0.0	6	1.4	0.095 ^{NS}
Tooth extraction	7	2.5	0	0.0	7	1.6	0.102 ^{NS}
Cough/cold/fever	13	4.7	6	4.0	9	4.5	0.745 ^{NS}
Not slept well	8	2.9	0	0.0	8	1.9	0.055 ^{NS}
Donated recently	5	1.8	0	0.0	5	1.2	0.167 ^{NS}
Abnormal pulse rate	3	1.1	3	2.0	6	1.4	0.427 ^{NS}
Recent surgery	5	1.8	0	0.0	5	1.2	0.167 ^{NS}
Recent vaccination	5	1.8	0	0.0	5	1.2	0.167 ^{NS}
Other medical causes	12	4.3	2	1.3	14	3.3	0.152 ^{NS}
Exceeding age limit	4	1.4	0	0.0	4	0.9	0.302 ^{NS}
Menstruation	--	--	8	5.4	8	1.9	--
Breastfeeding	--	--	2	1.3	2	0.5	--
Recent miscarriage	--	--	2	1.3	2	0.5	--
Permanent deferral							
Uncontrolled DM on insulin	2	0.7	2	1.3	4	0.9	0.615 ^{NS}
Jaundice unknown cause	2	0.7	0	0.0	2	0.5	0.544 ^{NS}
Convulsions	1	0.4	0	0.0	1	0.2	0.999 ^{NS}
Hypothyroidism not in euthyroid state	--	--	1	0.7	1	0.2	0.351 ^{NS}

P-value by Chi-Square test (Fisher's exact probability test). P-value<0.05 is considered to be statistically significant. *P-value<0.05, **P-value<0.01, ***P-value<0.001, NS - Statistically non-significant.

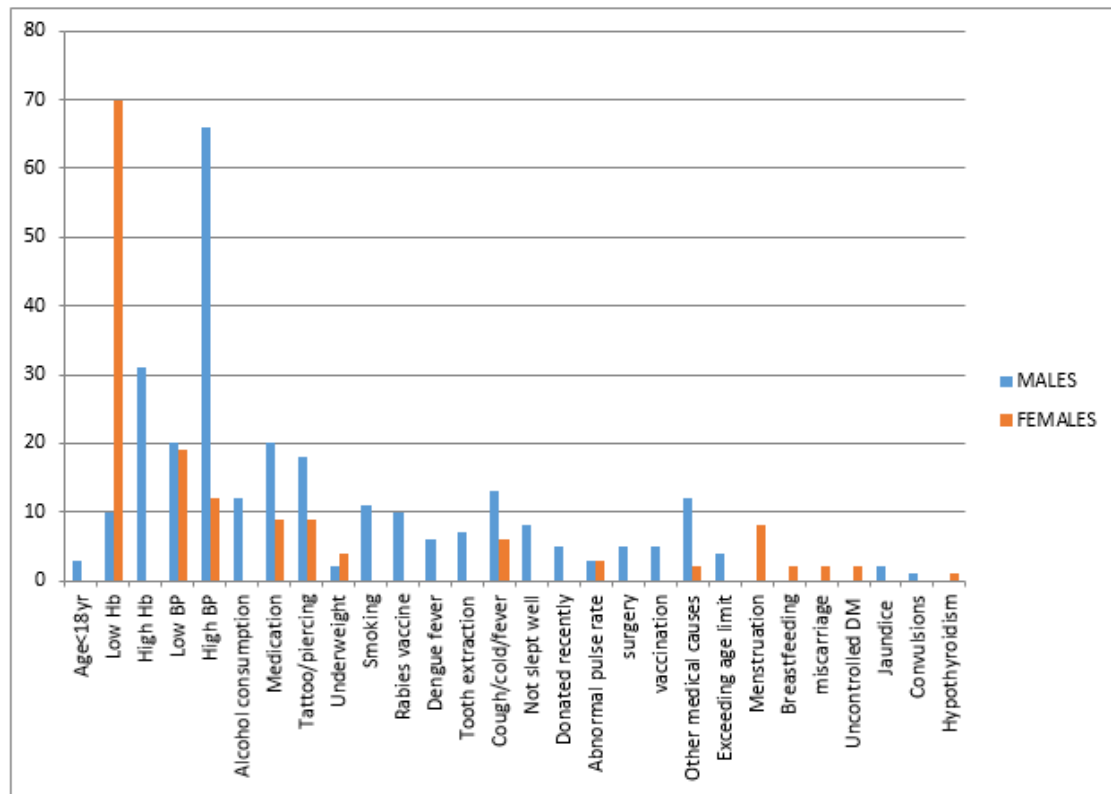


Fig 1. Reasons for deferral according to gender

Discussion

Evaluation of blood donor deferrals in a demographic area is quintessential to understand the regional aspects while devising national policies. There are no comparative studies till date conducted to evaluate the nature of donor deferrals in the state of Goa. Our study attempts to evaluate the pattern of blood donation and deferrals in a blood Centre in North Goa which may be beneficial whilst revising national policies.

The proportion of voluntary non remunerated blood donation in our study is 98.3% which is comparatively higher to national level estimate (80%)³ and other studies across India viz Unnikrishnan B et al (22.8%), Malhotra et al (46%)^{4,5}. This may be due to extensive efforts to motivate and mobilize voluntary donors by altruistic local and regional non profit organizations.

Males formed majority of our donor population (85.2%) which is comparable to the study by Unnikrishnan B et al (95%), Sundar et al (88.7%) and other studies across India.⁴⁻¹⁰ There is a need to

exercise concentrated efforts to bust myths regarding blood donation and allievate anxiety amongst females in order to attract and recruit more females to regular donor registry.

The donor deferral rate was 19.7% at our center which iscomparable to other centers in the country. Studies from North India have shown deferral rates to be around 11-18%^{5,7,8}. Studies from Southwestern India have shown variable deferral rates viz 5.20% (Unnikrishnan B et al), 6% (Sundar et al), 11.6% (Agnihotri et al), 20% (Jashnani et al).^{4,6,9,10}

Studies from across the world have deduced the donor deferral rate to be in the range of 10%-30%. Ngoma et al in a study conducted in Japan found deferral rate to be 14%. In a study by Wim de Kort et al conducted at various European and North American blood establishments in 2012 the deferral rates varied from 3%-25%. In a study by Leila Kasraian et al carried out in Iran in 2013 the deferral rate was about 30.9%.

In our study majority of the deferrals, i.e., 413 (97.1%) were temporary, while 12 (2.9%) were permanent. In a study by Sundar et al temporary

deferrals constituted 84% and permanent 16% of the deferrals. Kusum D. Jashnani et al reported 6.8% permanent deferrals and rest (93.2%) short term and long term temporary deferrals.^{6,9} This implies that there is ample scope to further diminish the deferral rate by managing the temporary reasons.

In our study the most common reasons of deferral was low Hb (18.8%), high BP(18.3%) ,high Hb(7.3%) and low BP(9.2%). The most common reason of deferral in males was high BP(24%) and high Hb(11.2%) whereas the commonest cause of deferrals in females was low Hb (46.9%). In a study by Shrivastava, et al low hemoglobin accounted for majority of the deferrals(55.8%) followed by an abnormal blood pressure(11.1%) and ongoing medications (6.9%) .⁸

The deferral rate was thrice as higher in females compared with males i.e. slightly more than one third of female donors were deferred(38.7%). This is due to high prevalence of anemia in females in our region.¹¹ In several studies it is noted that the commonest cause for deferral is anemia, even in western communities. As per DGHS manual required hemoglobin is 12.5 gm/l both for male and female, for blood donation .In Canada, 8% to 10% of regular donors are deferred citing low hemoglobin levels¹². Anemia is the leading cause for deferral in America too, accounting for 10% of rejections.¹³In developing countries the proportion is higher as pointed out by our study(18.8%) and various other studies from different parts of India⁵⁻¹⁰. Thus it is essential to integrate anemia prevention and treatment programmes particularly in adolescents and females to donor recruitment activities to develop and sustain a healthy donor pool.

High blood pressure accounted for a substantial number of deferrals(15.5%) leading to deferral in as many as one in five male donors. This is possibly due to high prevalence of hypertension in the State¹¹. It needs to be determined whether these donors are true hypertensives by recording their blood pressure on three different occasions after adequate rest or their bp was elevated due to anxiety of phlebotomy/ white coat hypertension. In any case there is need to exert concentrated efforts to organize mass screening for hypertension in the general population so that they get adequate treatment and can be motivated to become regular donors once their blood pressure

is controlled with medications . There is ample scientific evidence which states that regular blood donation can help in reducing both systolic and diastolic blood pressure. Hypertension per se is not a contraindication for blood donation provided it is controlled with medication and there is no evidence of organ dysfunction.

As per DGHS guidelines, the minimum hemoglobin requirement for blood donors is equal to or more than 12.5 g/dL for both male and female donors .However, no upper limit for Hb for blood donation is stated. The upper limit cut-off criteria tends to vary amongst the blood centers across the nation ranging from 17 to 18.5 g/dL based on the reference range described in the literature. Blood donors with high Hb are often deferred for the potential risk of polycythemia vera. As per WHO 2016, Hb>16.5 g/dl in men and >16 g/dl in women is a major criteria to diagnose polycythemia vera. In our study significant number of donors (7.3%) had polycythemia as opposed to findings of D.Kandasamy et al. (1.58%),Malhotra et al(3%) .^{3,14}Owing to high burden of polycythemia in the state there is a need to investigate the nature of polycythemia as well as to include the higher Hb cut off in the donor deferral criteria by the policy makers in order to justify to the donors.It is also essential that qualitative methods of Hb estimation viz Copper sulphate method needs to be replaced by quantitative methods to avoid missing out these cases.

A substantial number of temporary deferrals were due to alcohol consumption, smoking and due to consumption of medications. This in our view can be avoided if few days prior intimation is given to the organisers of the donation camps and educational material is distributed to the voluntary donors to adhere to the abstinence period.

The most common reason of permanent deferrals in our study was a medical history of uncontrolled DM(33% of permanent deferrals and 1% of total deferrals). This is opposed to other studies wherein the most common reason of permanent deferrals was a history of jaundice^{5,15} and cardiac problems⁷. This maybe due to the high burden of DM in the state as Goa has the maximum population of diabetics in the country i.e. over 26.4 per cent of the population.²⁰ However the results of our study may still be an

underestimate as a lot of diabetics may not come forward to donate citing poor health or they maybe biased to the myth that diabetics cannot donate blood. Also a lot of donors may not be aware of their glycemic levels as blood sugar estimation has not been included in the donor selection criteria . In a study by Agarwal, et al. the incidental prevalence of diabetes in blood donors was found to be 3.97%²⁰. On account of the high disease burden policy makers may need to ponder over the idea of inclusion of random blood sugar estimation as part of donor medical examination. Infact blood donation drives may serve a golden opportunity to screen for prediabetes and diabetes for better community health.

Conclusion

Males constitute the major population among the donors. This maybe due to anxiety of phlebotomy among women. There is a need for widespread education about benefits of blood donation among females so as to build a sustainable donor pool. Also a lot of females are deferred due to anemia. Focussed strategies to diagnose, treat and prevent anemia in regular blood donors such as intermittent iron therapy needs to be implemented.

Temporary deferrals comprise the vast majority of the deferrals. Analysis of rejection patterns helps in healthcare personnel to focus on treating the cause, creating awareness and continuous education about pre requisites for blood donation. Such donors after managing temporary reasons need to be motivated to return and be recruited to the donor registry as rejection can negatively affect the psychology of the donor.

High number of polycythemics found in this study needs consideration by policy makers to set upper limits for Hb for deferral as further evaluation of such donors is needed.

High prevalence of DM in the study needs to be pondered upon by the policy makers whether to include point of care test i.e. random blood sugar level as part of donor medical examination. Blood donation drives can serve as a golden opportunity to screen for diabetes mellitus in the population. Larger studies need to be undertaken to analyse the same.

Limitations:

Donors with polycythemia were labelled as temporary deferral for the time being as polycythemia vera couldn't be established without detailed investigation viz serum erythropoietin levels and JAK2 mutation. Several patients couldn't afford the JAK 2 mutation analysis due to high cost.

Donors with high blood pressure too were labeled as temporary deferral as it needs to be ascertained whether they are true hypertensives by checking their BP on three different occasions or they had high BP due to anxiety/white coat hypertension. Follow up studies are needed for the same.

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Conflicts of interest: There are no conflicts of interest.

Ethical clearance has been taken from institutional ethics committee.

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