

Original Research

Analysis of prevalence and causes of rejection rate of blood donors

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ABSTRACT

Background: Blood is an important requirement in different medical and surgical conditions with half of all donations are from developing countries. Present study aimed to assess the prevalence and causes of blood donor rejection in a particular area. **Materials and methods:** The study was conducted in the Department of General Pathology of Mulayam Singh Yadav Medical College, Meerut. A total of 400 volunteers were screened for the blood donation. The primary screening of the donors was done before the collection of the blood. Primary screening included body weight measurement, blood pressure, pulse rate, and hemoglobin screening. **Results:** A total of 400 registered for the blood donation camp and were screened for donation. Out of these 400 blood donors, 224 donors were rejected and 172 were accepted. The selected blood donors included 128 males and 48 females. Out of the rejected blood donors, 164 were females and 60 were males. The deferral of males and female donors were mainly due to and low hemoglobin level, low body weight, uderage. **Conclusion:** Careful selection of blood donors is an important aspect of any blood transfusion service. This can be concluded that similar to other areas, the rate of deferral for blood donors is more for female candidates than male candidates. **Key words:** Anemia, blood donation, blood donor, blood transfusion.

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INTRODUCTION

Blood is an important requirement in different medical and surgical conditions with half of all donations are from developing countries. Blood donation is considered as an important life-saving practice in medicine, especially in cases of medical emergency. The need for blood is universal; however, millions of patients who may need transfusion do not have timely access to safe blood, and there is a major imbalance between the developing and developed countries in access to safe blood. Safe blood transfusion is a major concern that needs the application of science and technology to blood processing and testing, as well as social efforts to promote blood donation by sufficient numbers of volunteers who are healthy and are at low risk of infections that can be transmitted to the recipients of their blood.¹⁻³

Blood safety has received major attention from the point of view of transfusion-transmitted infections, but it has been argued that the most important advancement in this area of medicine has been the collection of blood from non

remunerated repeat voluntary blood donors in the past 50 years instead of paid professional donors.^{1,2}

This process of blood donation involves voluntary and non remunerated blood donors coming forward to donate blood willingly and the choice when and where to donate is dependent on blood donors' positive action.³ However, the transfusion services have a process of donor selection based on criteria of subjecting donors to a questionnaire, physical examination, and hemoglobin testing before blood donation, and only those who meet the requirements qualify as blood donors.⁴

The WHO Global Database indicated that >92 million blood donations are collected annually from 164 different countries around the world. Around 1.6 million units were discarded due to the presence of infections such as hepatitis B and C, HIV, herpes and syphilis. In addition, at least 13 million donors were deferred due to having the risk of infection that could be transmitted through blood, a preexisting medical disease or anemia.³ Due to this, blood donor selection is a cornerstone for blood transfusion

safety, designed to safeguard the health of both donors and recipients.⁴ Blood donor eligibility is determined by medical interview, based on national guidelines for donor selection.

In 2003, a study on availability, safety and quality of the blood used for transfusions in the Americas showed that Brazil had an annual transfusion rate of 16.1 per 1000 inhabitants. This figure is relatively low compared to the 53.8 donors in Cuba, 45.9 in the United States, 32.7 in Canada, and 35.0 in Uruguay. Because of the increasing elderly population, better access of the general population to healthcare and the complexity of procedures, lack of blood becomes a clear concern.^{5,6}

Therefore, programs aiming to improve blood collection by selecting volunteer donors from low-risk populations on a fidelity basis are needed. Hence, the present study was aimed at estimating the prevalence of blood donor.

MATERIALS AND METHODS

This study was conducted in the Department of General Pathology of Mulayam Singh Yadav Medical College, Meerut, Uttar Pradesh. The ethical clearance for study protocol was obtained from ethical committee of the institution.

The signature of donor was obtained as consent for blood donation and declaration of genuinity of details. The primary screening of the donors was done before the collection of the blood. Primary screening included body weight measurement, blood pressure, pulse rate, and hemoglobin screening. The donors with weight more than 45 kg were accepted for the blood donation. And the cut off for hemoglobin was at 12.0 g/dL. Donors with diastolic

blood pressure in the range of 60-90 mmHg and systolic blood pressure in the range of 100-160 mmHg were selected for blood donation. The donors were cleared for blood donation by the medical officer after thorough medical check up and their medical history.

All those who came forward to donate blood at Blood donation camps were listed. All details required for eligibility for blood donation were recorded in the standard format. This included relevant history, brief physical examination and hemoglobin estimation. Those who were considered unfit for blood donation for any reason were included in the study. Those who were found to be eligible for blood donation at registration level were excluded from the study. The rejection rate was calculated. The reasons for donor deferral were listed and analysed. Suggestions to further reduce the rejection rate are given.

The statistical analysis of the data was done using SPSS version 11.0 for windows. Chi-square and Student's t-test were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistical significant.

RESULTS

A total of 400 registered for the blood donation camp and were screened for donation. Out of these 400 blood donors, 224 donors were rejected and 172 were accepted. The selected blood donors included 128 males and 48 females (Table 1). Out of the rejected blood donors, 164 were females and 60 were males. (Graph 1) The deferral of males and female donors were mainly due to and low hemoglobin level, low body weight, uderage (Table 2).

Graph 1: Gender distribution of deferred blood donors

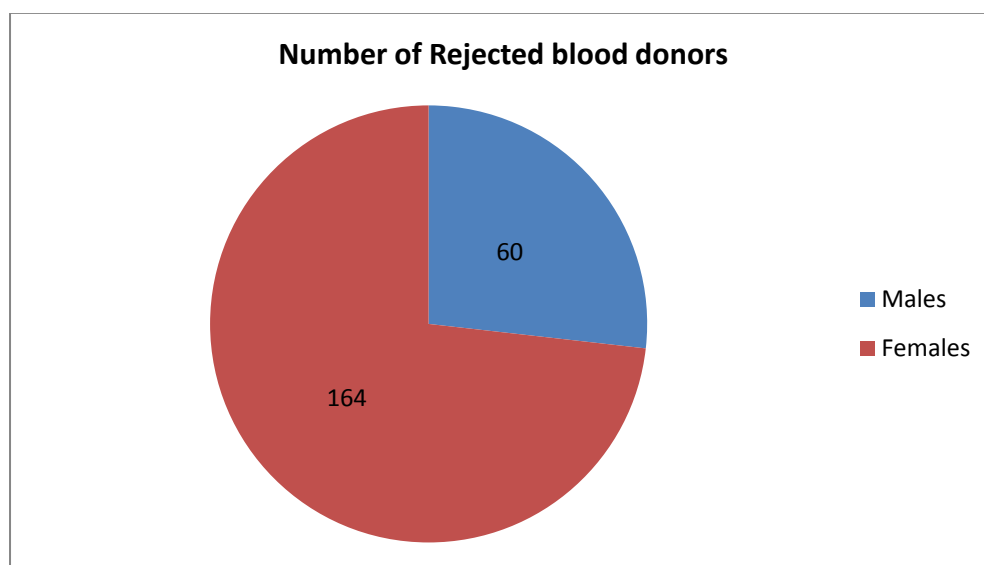


Table 1: Number of accepted and rejected blood donors on the basis of sex

| Parameters | Number of subjects |
|-----------------------------------|--------------------|
| Total number of registered donors | 400 |
| Number of donors accepted | 172 |
| Number of donors rejected | 224 |
| Number of male donors accepted | 128 |
| Number of female donors accepted | 48 |
| Number of male donors rejected | 60 |
| Number of female donors rejected | 164 |

Table 2: Deferral of female volunteers for blood donation

| Various parameters for deferral | Number of subjects |
|---------------------------------|--------------------|
| Low haemoglobin | 82 |
| Menstruation | 22 |
| Low body weight | 48 |
| Lactating | 4 |
| Body piercings | 8 |
| Total | 164 |

Table 3: Deferral of male volunteers for blood donation

| Various parameters for deferral | Number of subjects |
|---------------------------------|--------------------|
| Low haemoglobin | 24 |
| Recent alcohol intake | 8 |
| Low body weight | 4 |
| Underaged | 14 |
| Dematologic disease | 2 |
| History of major surgery | 6 |
| Jaundice history | 2 |
| Total | 60 |

DISCUSSION

The purpose of setting criteria for eligibility to donate blood is to ensure donor as well as patient safety. However, rejection of blood donors for failure to meet the required criteria could make them less motivated to return to donate blood at a later date. Therefore, it is important to decrease the donor deferral rate as much as possible. For this, the reasons for deferral have to be studied and analyzed carefully so that appropriate steps can be taken to ensure the same. In most cases, the deferred donors need to be “educated” about the reason for deferral and suitable remedies, if any.

In the present study, we observed out of 400 registered candidates for blood donation, 224 were rejected because of different parameters. Majority of deferred candidates were females. The results were statistically non-significant. The results were compared with previous similar studies in the literature. Shrivastava M evaluated and analyzed the blood donor deferral pattern and its causes among blood donors in a tertiary care hospital blood bank and to review

its influence on blood safety. The data available as donor deferral record over a period of 13 years from 2001 to 2013 was analyzed. The blood donor deferral rate was 11.5%, the deferral rate in various categories was 4.8%, 4.7%, 1.6%, and 0.3% in Category 1, Category 2, Category 3, and Category 4, respectively. The majority of deferrals were temporary deferrals (62.8%) of young donors. The maximum number of donors deferred (28.2%) due to a history of jaundice (permanent) followed by 19.4% due to low hemoglobin (temporary). History of malaria, intake of medicines, infections, underweight, last blood donation within 3 months (temporary deferral), and history of heart and lung diseases, diabetes, and with suspicious identity (permanent deferral) were other major causes identified. They concluded that the pattern of donor deferral identified is an important tool for blood safety and also provides key areas to focus on a region or policy formulation nationally for donor selection as well ensure donor safety. The value of determining donor deferral pattern by the categories described is in calling back donors deferred due to

temporary reasons and can help retain pool of motivated blood donors. Zou S et al⁸ analyzed actual deferral and return donation data from the American Red Cross to further assess the impact of donor deferral on donor availability. Voluntary blood donors who presented between 2001 and 2006 were included in this study. Deferred donors were classified into three groups according to their history of presentation during the prior 2 years: Group 1 with no prior donation or deferral, Group 2 with prior donation but no deferral, and Group 3 with prior deferral. Temporarily deferred donors in Groups 1 and 2 who did not return during the next 3 years were considered lost donors. All indefinitely deferred donors were lost donors. A mean of 12.8 percent of a total of 47,814,370 donor presentations between 2001 and 2006 resulted in a deferral. While majority of the deferrals were related to donor safety reasons, deferrals for recipient safety reasons accounted for 22.6 percent of deferrals or 2.9 percent of total presentations. Temporary and indefinite deferrals for recipient safety-related reasons collectively caused an estimated loss of 647,828 donors during the 6 years. An additional 1,042,743 donors were lost due to deferrals for donor safety-related reasons during the same period. It was concluded that the results on donor loss after deferral call attention to the impact of donor deferrals on donor availability and the need to monitor and assess the necessity and effectiveness of such deferrals.^{7,8}

Al Shaer L et al⁹ defined donor pre-donation deferral rates, causes of deferral, and characteristics of deferred donors in Dubai. This retrospective study was conducted on all donors who presented for allogeneic blood donation. The donation and deferral data were analyzed to determine the demographic characteristics of accepted and deferred donors, and frequency analyses were also conducted. Among 142,431 individuals presenting during the study period, 114,827 (80.6%) were accepted for donation, and 27,604 (19.4%) were deferred. The overall proportion of deferrals was higher among individuals less than 21 years old, females (44% were deferred compared to 15% of males), and first-time donors (22% were deferred vs 14% of repeat donors). The main causes for a temporary deferral were low hemoglobin and high blood pressure. The deferral rate among blood donors in Dubai is relatively high compared to the internationally reported rates. This rate was higher among first-time donors and females, with low hemoglobin as the major factor leading to a temporary deferral of donors. Strategies to mitigate deferral and improve blood donor retention are urged in Dubai to avoid additional stress on the blood supply. Khurram S et al¹⁰ determined the frequency and reasons for donor deferral prior to the blood donation process in our population. A cross-sectional study was carried out at the blood bank department in our hospital from January 2012 to December 2014. All the blood donors who visited our department in the study period were included in this study. A total of 25 901 potential donations were recorded during the study

period, comprising 24 309 (93.8%) replacement and 1592 (6.2%) voluntary donations. Females accounted for only 222 (0.9%) of potential donations. Deferral occurred in 3156 (12.2%) of attempts; 280 (1.1%) were permanently deferred, while 2876 (11.1%) were temporarily deferred. The most common reason for permanent deferral was a history of hepatitis B infection (n=147, 4.7% of all deferrals). Major reasons for temporary donor deferral were low levels of haemoglobin (n=971, 30.76%), low levels of platelets (n=611, 19.35%) and previous history of jaundice (n=192, 6.1%). They concluded that a fairly similar pattern of donor deferrals as in other regional studies. Low haemoglobin levels and a history of hepatitis B infection were the most common factors for temporary and permanent donor deferrals, respectively.^{9,10}

Study conducted by Balaji PM et al revealed that of the 64 deferrals, 34 were males (53%) and 30 were females (47%). The number of permanent deferrals was only 10(15.62%) and a good majority(54) were temporary deferrals(84.38%).Among the 23 cases rejected for hemoglobin level being lesser than 12.5g/dL,19 were females(82.6%) and only 4 were males(17.4%).In addition 5 females(7.82%) were menstruating and hence deferred. 17 subjects(26.57%) were deferred for being under 18 years of age. Of these,13 were males(76.5%) and 4 were females(23.5%).All the 5 subjects who were rejected for recent alcohol intake were males(100%).Both subjects with Thyroid disease were males(100%).All the 4 deferred for weighing lesser than 45kg were males(100%).Both rejects with recent jaundice and both asthmatic rejects were all males (both 100%). Of those rejected for having undergone major surgery,1 each were male and female. The single epileptic and the lone deferral having dermatological disease were both males.¹¹

Most of those rejected for low Hb are amenable to treatment after finding the cause. Appropriate measures to be taken by them could be explained. Those who were under aged should be appreciated for having come forward to donate blood and that they could do so as soon as they attain eighteen years of age. Those rejected on groups of "periods" could be advised to come back after a week or so later to donate blood. So also, those who were under weight could be suggested steps to increase their weight to more than 45kg so that they will be eligible for blood donation. Thus, sparing extra time to attend to permanent rejects could comfort them while chances of temporary rejects returning at a later date for blood donation(after remedial steps have been taken) can be improved. Proper donor education on risk factors is important for safe transfusion practice 4, 5 . This also improves donor motivation.^{12,13}

CONCLUSION

From the results of the present study, this can be concluded that similar to other areas, the rate of deferral for blood donors is more for female candidates than male candidates. Careful selection of blood donors is an important aspect of

any blood transfusion service. This is the first step of filtration of prospective donors to ensure safe blood transfusion. Studies over a much longer period are required to assess the rejection rate accurately.

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