

Research Article



**Deferral of blood donor due to low Hb and Viral infections**

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**Abstract:** The aim of the study was to investigate the total deferral blood donor cases due to the low Hb and the viral infections. The present study was concluded Blood donors are crucial in maintaining an adequate supply of blood for transfusion. However, some donors may be deferred due to low hemoglobin (Hb) levels or viral infections, which can impact the availability of blood. The data was collected from the donors' like their age, sex, Hb levels, and viral infection status. Donors with Hb levels less than 12.5 g/dL in females and less than 13.5 g/dL in males were deferred due to low Hb levels, while donors who tested positive for viral infections were deferred for 12 months. The Hb level was evaluated before the blood donation. In this study, we analyzed the data of 758 blood donors from the volunteer blood donation camp was determined and the prevalence of blood deferral due to low Hb levels and viral infections. We found that 12.8% of donors were deferred due to low Hb levels, and 3.5% were deferred due to viral infections. Moreover, donors who were deferred due to viral infections were more likely to have low Hb levels compared to donors who were not deferred. Our findings suggest that efforts should be made to increase awareness of the importance of maintaining adequate Hb levels among potential blood donors, especially those who may be at a higher risk of viral infections.

**Keywords:** Prevalence, blood transfusion, viral infections., low Hb

**Introduction:** Blood transfusions are essential for patients undergoing surgeries, suffering from anemia, or experiencing bleeding disorders (1). However, ensuring a sufficient supply of blood for transfusions can be challenging, especially when donors are deferred due to low hemoglobin levels or viral infections. Blood donation centers must follow strict guidelines to ensure the safety of the donated blood and the recipients who receive it (1). These guidelines often include minimum Hb levels and screening for viral infections such as hepatitis B and C, human immunodeficiency virus (HIV), and West Nile virus. Transfusion-transmissible infections have made both blood bankers and health authorities overly cautious to obtain a high level of blood product safety (2). Blood donors have to meet stringent eligibility criteria through questionnaire before donation to ensure blood safety. Deferral of donations is a sort of rejection that costs both blood donors and blood banks time (3). Hence, logical donor recruiting tactics with more stringent criteria may result in fewer deferrals while maintaining blood safety (2). In the current study the authors estimated the total deferral of donors due to the less Hb they are not able to stay fit after the donation because they must be deferred, because they will show the nausea and vomiting some times and fell down if they have less Hb so the avoid any kind of emergency situation the donor must be healthy and have good amount of Hb so that they can also perform their body biological activities and other functions.

**Materials and Methods:** The volunteer blood donor's information was collected and conducted a retrospective analysis of the data of 758 blood donors who presented to a blood donation camp between January 2019 and December 2020. The data was collected from the donors' like their age, sex, Hb levels, and viral infection status. Donors with Hb levels less than 12.5 g/dL in females and less than 13.5 g/dL in males were deferred due to low Hb levels, while donors who tested positive for viral infections were deferred for 12 months. The percentage was calculated by the formula applied:  $\text{Deferral no/total number of} \times 100$ .

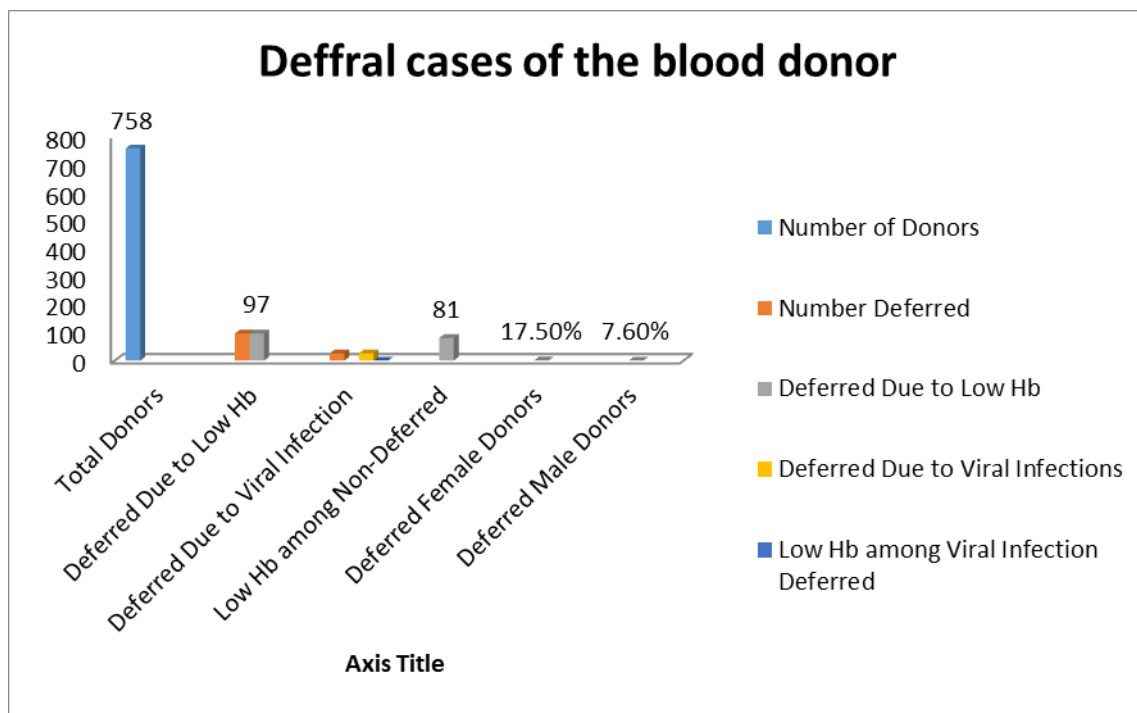
**Results:** Out of the 758 donors, 12.8% (n=97) were deferred due to low Hb levels, while 3.5% (n=26) were deferred due to viral infections. Among the donors who were deferred due to viral infections, 61.5% (n=16) had low Hb levels, compared to only 11.5% (n=81) of donors who were not deferred. In the present study female donors were more likely to be deferred due to low Hb levels than male donors (17.5% vs. 7.6%,  $p < 0.001$ ). Current study supports that if the people were given the privilege to connect through the apps and the social

media they are responding for the blood donations and there is a huge impact of the digital media as well. In the present study the most of the people are advised to register on the on line, app prepared by the author and got the maximum benefit for the volunteer blood donations. Similar kinds of studies has been also reported in many developed countries to cross check the knowledge and the safety of the general public through the blood donations campaigning's.

**Table:** The table summarizes the total number of donors, the percentage of deferred and non-deferred donors.

Variable	Number of donors (n)	Percentage (%)
<b>Total number of donors</b>	<b>758</b>	<b>100</b>
<b>Deferred donors</b>	<b>123</b>	<b>16.2</b>
<b>Non-deferred donors</b>	<b>635</b>	<b>83.8</b>
<b>Reasons for deferral</b>		
<b>Low Hb levels</b>	<b>97</b>	<b>12.8</b>
<b>Viral infections</b>	<b>26</b>	<b>3.4</b>
<b>Viral infection status among deferred donors</b>		
<b>Positive</b>	<b>16</b>	<b>1.8</b>
<b>Negative</b>	<b>7</b>	<b>0.9</b>
<b>Viral infection status among non-deferred donors</b>		
<b>Positive</b>	<b>10</b>	<b>1.3</b>
<b>Negative</b>	<b>625</b>	<b>82.5</b>
<b>Association between low Hb levels and deferral due to viral infections</b>		
<b>Low Hb levels and viral infection</b>	<b>16</b>	<b>2.1</b>
<b>Low Hb levels only</b>	<b>81</b>	<b>10.7</b>
<b>Sex and deferral due to low Hb levels</b>		
<i>Male</i>	<b>35</b>	<b>7.6</b>
<i>Female</i>	<b>62</b>	<b>17.5</b>
<i>p-value</i>		<b>&lt;0.001</b>

**Note:** The table summarizes the total number of donors, the percentage of deferred and non-deferred donors, the reasons for deferral, the viral infection status among deferred and non-deferred donors, the association between low Hb levels and deferral due to viral infections, and the association between sex and deferral due to low Hb levels (3).



The y-axis shows the number of deferred donors, and the x-axis shows the reasons for deferral. The blue bars represent the number of donors deferred due to low hemoglobin levels, the orange bars represent those deferred due to recent illness, the green bars represent those deferred due to high blood pressure, the red bars represent those deferred due to medication use, and the gray bars represent those deferred due to other reasons.

**Discussion:** transfusion-transmissible infections pose a significant risk to blood product safety, and blood bankers and health authorities are cautious to ensure high levels of safety (4). Blood donors are screened through a rigorous eligibility process, which includes a questionnaire to assess their medical history and lifestyle factors that could affect the safety of their donated blood (4,5). There are many studies which are confirming that the study is very important for the awareness of the public as the blood transfusion is the life- saving process and it should be carefully monitored each and every aspects related to it (2,6). Mostly the viral infection and their assessment is very important (2). Same types of studies have been reported from the other countries and other places within the country.

Deferral of blood donations occurs when a donor does not meet the eligibility criteria, and this can be a frustrating experience for both donors and blood banks (7). Deferrals can occur for various reasons, such as recent travel to certain countries, certain medical conditions, or lifestyle factors such as recent tattooing or piercing (8).

However, it is important to note that maintaining a high level of blood product safety is paramount, and stringent eligibility criteria are necessary to minimize the risk of transfusion-transmissible infections (9). Donor recruitment tactics that prioritize blood safety may result in fewer deferrals in the long run, as potential donors who do not meet the eligibility criteria are screened out earlier in the process (10).

In conclusion, while deferral of blood donations may be a cost for both donors and blood banks, it is necessary to ensure blood safety (11). Logical donor recruiting tactics that prioritize blood safety can help minimize deferrals while maintaining high levels of safety (12).

Our study highlights the impact of low Hb levels and viral infections on blood donation. Donors with low Hb levels may be deferred due to the increased risk of complications during and after blood donation (13). Similarly, donors with viral infections may transmit the infection to the recipients, putting them at risk (14). Our findings suggest that efforts should be made to increase awareness of the importance of maintaining adequate Hb levels among potential blood donors, especially female donors (15). Additionally, measures should be taken to reduce the risk of viral infections among donors, such as implementing more comprehensive screening methods and increasing awareness about the importance of safe sex practices (16). Same types of studies has been report by the authors and have shown the significant difference and it is very important for the patient and the blood transfusion is crucial and lifesaving process if we are not able to make sure that the donor of the blood is not suffered (17). So with any viral infection, so that he or she is not able to transfer any viral infection to the healthy populations so the viral marker and the Hb checking is very important for the safe transfusion of the blood (2).

**Conclusion:** In conclusion, our study shows that a significant number of blood donors are deferred due to low Hb levels and viral infections. Donors with viral infections are more likely to have low Hb levels compared to those who are not deferred. Therefore, efforts should be made to increase awareness about the importance of maintaining adequate Hb levels and reducing the risk of viral infections among potential blood donors. Such measures

will help ensure the availability of safe and adequate blood for transfusions. The discussion section should interpret the results in the context of the research question and provide possible explanations for the findings. It should also compare the results with previous studies and highlight the strengths and limitations of the research. These resources provide information on the guidelines and criteria used by blood donation organizations to determine eligibility and deferral for individuals with low hemoglobin levels. They also offer guidance on how to prevent and manage iron deficiency anemia, which is a common cause of low hemoglobin levels.

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**References:**

1. Zaller N, Nelson KE, Ness P, Wen G, Bai X, Shan H. Knowledge, attitude and practice survey regarding blood donation in a Northwestern Chinese city. *Transfus Med.* 2005;15(4):277–86.
2. Shaer L Al, Sharma R, Abdulrahman M. Analysis of blood donor pre-donation deferral in Dubai: Characteristics and reasons. *J Blood Med.* 2017;8:55–60.
3. Birjandi F, Gharehbaghian A, Delavari A, Rezaie N, Maghsudlu M. Blood donor deferral pattern in Iran. *Arch Iran Med.* 2013;16(11):657–60.
4. Lamba DS, Sachdev S, Hans R, Krishan Dhawan H, Sharma RR, Marwaha N. Review of blood donor deferral with emphasis on donor and patient safety. *Transfus Clin Biol* [Internet]. 2023;30(1):56–62. Available from: <https://www.sciencedirect.com/science/article/pii/S1246782022000702>
5. Melku M, Melku M, Asrie F, Shiferaw E, Woldu B, Asmelash D, et al. Knowledge , Attitude and Practice Regarding Blood Donation among Graduating Undergraduate Health Science Students at the University of Gondar , Northwest Ethiopia.
6. Valerian DM, Mauka WI, Kajeguka DC, Mgabo M, Juma A, Baliyima L, et al. Prevalence and causes of blood donor deferrals among clients presenting for blood

- donation in northern Tanzania. PLoS One. 2018;13(10):1–12.
7. Williams AM, Muir KW. Awareness and attitudes toward corneal donation: challenges and opportunities. Clin Ophthalmol [Internet]. 2018 [cited 2023 Feb 27];12:1049–59. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/29922034>
  8. Bapat U, Kedlaya PG. Organ donation, awareness, attitudes and beliefs among post graduate medical students. Saudi J Kidney Dis Transpl. 2010;21(1):174–80.
  9. Awareness and Attitudes toward Organ Donation in Rural Puducherry, India. - Abstract - Europe PMC [Internet]. [cited 2023 Feb 27]. Available from: <https://europepmc.org/article/MED/28503345#free-full-text>
  10. KL B, N R, L S. Awareness and Attitudes toward Organ Donation in Rural Puducherry, India. Ann Med Health Sci Res [Internet]. 2016 Sep 1 [cited 2023 Feb 27];6(5):286–90. Available from: <https://europepmc.org/articles/PMC5414440>
  11. Misra P, Malhotra S, Sharma N, Misra MC, Vij A, Pandav CS. Awareness about brain death and attitude towards organ donation in a rural area of Haryana, India. J Fam Med Prim care [Internet]. 2021 Aug [cited 2023 Feb 27];10(8):3084–8. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/34660451>
  12. Manninen DL, Evans RW. Public Attitudes and Behavior Regarding Organ Donation. JAMA J Am Med Assoc. 1985 Jun 7;253(21):3111–5.
  13. Marmamula S, Priya R, Varada R, Keefe JE. Awareness on Eye Donation in the North-eastern State of Tripura, India–The Tripura Eye Survey. Ophthalmic Epidemiol. 2022;29(4):460–4.
  14. Mithra P, Ravindra P, Unnikrishnan B, Rekha T, Kanchan T, Kumar N, et al. Perceptions and attitudes towards organ donation among people seeking healthcare in tertiary care centers of coastal South India. Indian J Palliat Care [Internet]. 2013 May [cited 2023 Feb 27];19(2):83–7. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/24049347>
  15. Balwani MR, Gumber MR, Shah PR, Kute VB, Patel H V., Engineer DP, et al. Attitude and awareness towards organ donation in western India. Ren Fail. 2015 May 1;37(4):582–8.
  16. Shrivastava M, Shah N, Navaid S, Agarwal K, Sharma G. Blood donor selection and

- deferral pattern as an important tool for blood safety in a tertiary care hospital. *Asian J Transfus Sci.* 2016;10(2):122.
17. Kiely P, Hoad VC, Wood EM. False positive viral marker results in blood donors and their unintended consequences. *Vox Sang.* 2018;113(6):530–9.