

Analysis of Blood Donor Deferral Pattern during COVID-19 Pandemic at a Tertiary Care Hospital-based Blood Centre, Jammu and Kashmir, India: A Cross-sectional Study

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ABSTRACT

Introduction: Blood donor deferral is vital for ensuring safe blood transfusion. However, with the unfolding Coronavirus Disease-2019 (COVID-19) pandemic, significant changes were made in donor screening and blood donation criteria, resulting in a shift in the pattern of donor deferrals.

Aim: To estimate the blood donor deferral patterns during the COVID-19 pandemic.

Materials and Methods: A retrospective cross-sectional study was conducted in the Department of Transfusion Medicine at SMHS Hospital/GMC Srinagar, Jammu and Kashmir, India. The study spanned two years, from March 2020 to February 2022. All blood donors were screened in accordance with the Ministry of Health and Family Welfare (MOHFW), National Acquired Immune Deficiency Syndrome (AIDS) control organisation (National blood transfusion services) 2017 guidelines. The data was analysed in Microsoft Excel, considering factors such as age, gender, type of deferral, and reasons for deferral.

Results: Deferred blood donors were most common in the age group of 18-33 years. During the study period, a total of 19,895 blood donors (19493 males and 402 females) were registered for blood donation. Out of these, 3441 donors (17.30%) were deferred, with a male donor deferral rate of 3258/19493 (16.71%) and a female donor deferral rate of 183/402 (45.52%). Temporary blood donor deferrals accounted for 3272 (95.09%) cases, while permanent deferrals were 169 (4.91%). The most common cause of deferral was low haemoglobin, accounting for 991/3441 (28.80%) cases, followed by deferrals due to reasons attributable to the COVID-19 pandemic (786/3441, 22.84%) and hypertension (653/3441, 18.98%).

Conclusion: The study observed a substantial increase in the total donor deferral rate, as well as a change in the donor deferral pattern during the COVID-19 pandemic.

Keywords: Coronavirus disease-2019, Haemoglobin, Hypertension, Severe acute respiratory syndrome coronavirus 2

INTRODUCTION

Novel coronavirus, Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), emerged from Wuhan city in China in December 2019. The rapid human-to-human transmission of the virus led the World Health Organisation (WHO) to declare it a global pandemic [1]. The pandemic strained healthcare systems globally, including severe shortages of transfusable blood [2]. Primarily a respiratory virus, SARS-CoV-2, the causative agent of COVID-19, efficiently spreads through respiratory droplets [3]. Current knowledge does not support the possibility of transmission of these viruses through blood products; however, a few studies have detected the presence of viral Ribonucleic Acid (RNA) in the plasma or serum of COVID-19 patients [2,4,5]. With the evolving pandemic and much unknown about the disease, new guidelines relating to blood donation and deferral strategies were issued by various governing bodies to ensure the safety of both donors and recipients [6,7]. The National Blood Transfusion Council (NBTC), MOHFW, Government of India, implemented a firm donor screening procedure with new donor deferral guidelines [8].

Transfusion of blood is a life-saving measure on many occasions, requiring an ample supply of safe blood, which can be ensured by selecting blood donors based on donor selection criteria [9]. Blood donor deferral is not a positive experience for the blood donor or the blood centre screening the donor. Donors who are deferred from a blood centre may have apprehensions about the blood donation process and are unlikely to return for future blood donations [10]. According to the WHO, if 1% of the population in

a country donates blood, it will help fulfill the demand for blood products for safe transfusion [11]. Therefore, a careful assessment of donor selection through structured questionnaires is important and effective in ensuring blood safety and protecting the health of both donors and recipients [12,13]. While donor deferral is not uncommon, the COVID-19 pandemic has significantly affected the donor deferral pattern [14]. One of the main concerns during the COVID-19 pandemic was the potential for asymptomatic donors to transmit the virus. To reduce this risk, blood centres implemented special screening measures to identify donors who may have been exposed to the COVID-19 virus or had contact with individuals who tested positive for COVID-19 [15]. With the introduction of COVID-19 vaccines, there has been a significant impact on donor deferral patterns, as blood centres have re-evaluated their deferral criteria for donors who have received the vaccine [16].

The current study was conducted with the objectives of estimating the blood donor deferral rate and patterns during the COVID-19 pandemic in a Tertiary Care Hospital. This information may help identify the target donor population and plan donor recruitment strategies in future pandemic crises.

MATERIALS AND METHODS

A retrospective cross-sectional study was conducted in the Department of Transfusion Medicine at SMHS Hospital/GMC Srinagar, Jammu and Kashmir, India. The study spanned two years, from March 2020 to February 2022.

Inclusion and Exclusion criteria: As far as inclusion and exclusion criteria's are concerned all blood donors were screened according to the guidelines of the Ministry of Health and Family Welfare, National AIDS control Organisation 2017. Those blood donors who fulfilled the above guidelines were allowed to donate whereas rest of the blood donors were deferred and study was conducted.

Study Procedure

All blood donors were screened according to the guidelines of the MOHFW, National AIDS Control Organisation 2017 [17]. Each donor was asked to fill out a structured questionnaire and underwent a medical examination, including recording age (18-65 years), body weight (>45 kg), blood pressure (100-140 mmHg systolic, 60-90 mmHg diastolic), pulse (60-100 beats/minute), temperature (afebrile; 37°C/98.5°F), and Haemoglobin (Hb) (≥ 12.5 g/dL). Informed written consent was obtained from all blood donors. During the COVID-19 pandemic, new deferral criteria issued by the MOHFW, National AIDS Control Organisation were followed. Consequently, donors with a history of close contact with confirmed or suspected COVID-19 patients, as well as those with domestic or international travel history, were deferred for 28 days. Similarly, donors who had recently received the COVID-19 vaccine were deferred for a period of 28 days, as recommended by NBTC [18].

STATISTICAL ANALYSIS

The relevant data and information of the deferred donors were retrieved and analysed from the donor deferral register using Microsoft Excel. The results were presented as numbers (n) and percentages (%).

RESULTS

A total of 19,895 blood donors were registered for blood donation during the study period. Out of these, 19,493 (97.98%) were males and 402 (2.02%) were females. Among all registered blood donors, 3,441 (17.30%) were deferred, with a male donor deferral rate of 3,258/19,493 (16.71%) and a female donor deferral rate of 183/402 (45.52%) [Table/Fig-1]. Deferred blood donors were most common in the age group of 18-33 years, with 1,491 (43.33%), followed by the 34-49 age group with 1,194 (34.70%), while it was least common in the age group of 50-65 years with 653 (18.98%) [Table/Fig-2]. Temporary blood donor deferrals accounted for 3,272 (95.09%), while permanent deferrals were 169 (4.91%).

Donors	Male n (%)	Female n (%)	Total n (%)
Registered donors	19493 (97.98)	402 (2.02)	19895 (100)
Deferred donors	3258 (94.68)	183 (5.32)	3441 (100)
Deferred donors* (%)	16.71	45.52	17.30

[Table/Fig-1]: Profile of donor deferral according to gender.
(*deferred donors/registered donors X 100)

Age (in years)	n (%)
<18	50 (1.45)
18-33	1491 (43.33)
34-49	1194 (34.70)
50-65	653 (18.98)
>65	53 (1.54)
Total	3441 (100)

[Table/Fig-2]: Age-wise distribution of deferred donors.

In the present study, the most common cause of deferral was low Hb, accounting for 991/3,441 (28.80%), followed by deferrals related to reasons attributable to the COVID-19 pandemic, with 786/3,441 (22.84%). Among these, 419/3,441 (12.18%) were due to COVID-19/flu-like illness, and 367/3,441 (10.67%) were due to COVID-19 vaccination. The third most common cause was hypertension, with 653/3,441 (18.98%), followed by donation within three months with

398/3,441 (11.57%), being underweight (<45 kg) with 143/3,441 (4.16%), being on antibiotics and other medications with 139/3,441 (4.04%), age <18 years with 50/3,441 (1.45%), history of jaundice with 37/3,441 (1.08%), polycythemia with 35/3,441 (1.02%), surgical causes with 19/3,441 (0.55%), and miscellaneous causes with 21/3,441 (0.61%). Among the causes of permanent donor deferrals, the most common was age >65 years, with an overall deferral rate of 53/3,441 (1.54%), followed by cardiovascular diseases with 39/3,441 (1.13%), diabetes on insulin with 36/3,441 (1.05%), chronic renal disease with 15/3,441 (0.44%), history of Hepatitis B Virus (HBV)/Hepatitis C Virus (HCV) with 12/3,441 (0.35%), history of asthmatic attacks/asthmatics on steroids with 11/3,441 (0.32%), and epilepsy/convulsions with 3/3,441 (0.09%) [Table/Fig-3,4].

Causes of deferral	Males n (%)	Females n (%)	Total n (%)
(A) Temporary			
Low haemoglobin (<12.5 g/dL)	923 (28.33)	68 (37.16)	991 (28.80)
COVID-19/flu-like illness and COVID-19 vaccination	767 (23.54)	19 (10.38)	786 (22.84)
Hypertension	634 (19.46)	19 (10.38)	653 (18.98)
Donation within three months	396 (12.15)	2 (1.09)	398 (11.57)
Underweight (<45 kg)	117 (3.59)	26 (14.21)	143 (4.16)
On antibiotics and other medications	133 (4.08)	6 (3.28)	139 (4.04)
Age <18 years	42 (1.29)	8 (4.37)	50 (1.45)
H/o jaundice	28 (0.86)	9 (4.92)	37 (1.08)
Polycythemia	35 (1.07)	0	35 (1.02)
Misc. (typhoid, TB, malaria, h/o vaccination other than COVID-19)	18 (0.55)	3 (1.64)	21 (0.61)
Surgical causes	16 (0.49)	3 (1.64)	19 (0.55)
(B) Permanent			
Age >65 years	53 (1.63)	0	53 (1.54)
Cardiovascular diseases	31 (0.95)	8 (4.37)	39 (1.13)
Diabetes on insulin	27 (0.83)	9 (4.92)	36 (1.05)
Chronic renal diseases	15 (0.46)	0	15 (0.44)
H/o HBV/HCV	11 (0.34)	1 (0.55)	12 (0.35)
Asthmatic attacks/asthmatics on steroids	9 (0.28)	2 (1.09)	11 (0.32)
Epilepsy/convulsions	3 (0.09)	0	3 (0.09)
Total	3258 (100)	183 (100)	3441 (100)

[Table/Fig-3]: Causes of temporary and permanent donor deferrals.
h/o: History of; TB: Tuberculosis; HBV: Hepatitis B virus; HCV: Hepatitis C virus

Deferrals due to COVID-19	Males n (%) (N=3258)	Females n (%) (N=183)	Total n (%) (N=3441)
COVID-19/flu-like illness	409 (12.55)	10 (5.46)	419 (12.18)
COVID-19 vaccination	358 (10.99)	9 (4.92)	367 (10.67)
Total	767 (23.54)	19 (10.38)	786 (22.84)

[Table/Fig-4]: Deferral due to COVID-19 pandemic.

DISCUSSION

Ensuring an ample supply of safe blood is vital, and it is equally important to ensure that the process of blood collection does not harm the donor, as well as, the recipient. This is achieved by following donor selection criteria [19]. Donor deferral serves to protect both the blood donor and the recipient from harm. The rate and reasons for deferral can vary from region to region and from one centre to another. Donor deferral rates in blood centre range from 5% to 24%, resulting in significant losses in terms of available units for transfusion [20]. In the present study, the overall deferral rate among blood donors was 17.30%, which is higher than the median deferral rate of 12% reported in the global WHO report of 2017 [21], and higher than the author's previous study from the same department (10.23%) [22]. The deferral rates in the present study were also higher than those found in several other

studies conducted in different parts of the country. For example, Unnikrishnan B et al., reported a deferral rate of 5.2%, Shrivastava M et al., reported 11% from central India, Agnihotri N reported 11.6% from western India, Kulkarni N reported 4.27%, Sharma T et al., reported 5.1%, Bahadur S et al., reported 9%, Sundar P et al., reported 5.84%, and Malini P et al., reported 11.1% from southern India [9,13,19,23-27]. This difference could be attributed to the fact that the authors conducted the study during the pandemic, and a large number of deferrals were due to COVID-19/flu-like illness or COVID-19 vaccination.

The current study observed a higher percentage of deferrals in female donors (45.52%) compared to male donors (16.71%), which is consistent with other studies conducted by Sabari Priya E and Chauhan DN et al., [28,29]. The study also revealed that the majority of deferred donors (43.33%) were in the age group of 18-33 years, followed by the 34-49 age group (34.70%). The deferral rate in the 50-65 years age group was 18.98%, which is consistent with the findings of Alok K et al., [30]. The most common cause of donor deferral in the present study was low haemoglobin, accounting for a 28.80% deferral rate. Deferral due to low haemoglobin was more common in females (37.16%) than in males (28.33%). This is known to be a major cause for deferral in various parts of India, due to the high prevalence of nutritional iron deficiency anaemia in the general population, especially in the childbearing age group [21]. In males, low haemoglobin is generally associated with increased age, low body weight, and regular blood donation [31]. Efforts are required to address the issue of anaemia among prospective blood donors at the regional, state, and national levels [32]. To minimise the donor deferral due to low haemoglobin in the blood centre, education of donors about iron supplementation, extending the donor interval, and promoting changes in dietary habits were implemented.

The second most common cause of deferral in the present study was reasons attributable to the COVID-19 pandemic (22.84%), with a deferral rate of 12.18% due to COVID-19/flu-like illness and 10.67% due to COVID-19 vaccination. During this pandemic, the extended donor deferral period from 7 to 28 days for flu-like symptoms and contact history resulted in an increased deferral rate due to COVID-19-related reasons. Vaccine-related deferral was observed in the later half of the pandemic with the introduction of COVID-19 vaccination starting from January 2021 [33]. To minimise the loss of blood donations during the COVID-19 pandemic, measures such as maintaining the donor registry, reiterating the rational use of blood components, and strict adherence to the first in, first out policy were adopted.

The third most common cause of donor deferral in the present study was hypertension (18.98%), which is similar to the findings of the study conducted by Bobati SS et al., [34]. The probable reasons for a short-term increase in blood pressure among donors can be the sight of blood, first-time donation, and fear of phlebotomy [30]. However, there are also donors who have underlying hypertension but are unaware of it, and they are diagnosed for the first time during the screening process for various reasons, including blood donation. With the implementation of the Joint National Committee (JNC) 7 guidelines for hypertension (140/90 mmHg) as the cutoff for blood donor selection (previously 160/100 mmHg), hypertension is becoming an increasingly critical factor in donor deferral [19,35].

Other common causes of donor deferral in the present study were donation within three months (11.57%), being underweight (4.16%), and being on antibiotics and other medications (4.04%). Donors with diabetes on insulin (1.05%) were permanently deferred, while donors with diabetes on oral antidiabetic drugs were accepted for donation if there had been no alteration in the dose within the last four weeks.

Interestingly, a history of jaundice was not a common cause of deferral in the present study (1.08%), unlike in studies conducted

in several other parts of India, such as the study by Shrivastava M (28.2%) and Shah A et al., (35.71%) [13,36].

To date, very few studies have highlighted the changes in donor deferral patterns during the COVID-19 pandemic in the Indian context [16,37]. The present study will contribute to a better understanding of the changes in donor deferral patterns in the donor population during the COVID-19 pandemic.

Limitation(s)

It was a retrospective single-centre study, so it cannot be generalised to all conditions and different settings.

CONCLUSION(S)

In the present study, an effort has been made to highlight the varying causes for the blood donor deferral pattern during the COVID-19 pandemic. The most common cause for deferral was low Hb, followed by deferral due to reasons attributable to the COVID-19 pandemic, which resulted in an overall higher deferral rate.

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PLAGIARISM CHECKING METHODS: [Jain H et al.]

- Plagiarism X-checker: Feb 24, 2023
- Manual Googling: Jun 09, 2023
- iThenticate Software: Jun 15, 2023 (16%)

ETYMOLOGY: Author Origin**EMENDATIONS:** 6**AUTHOR DECLARATION:**

- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? NA
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **Feb 04, 2023**Date of Peer Review: **Apr 20, 2023**Date of Acceptance: **Jun 16, 2023**Date of Publishing: **Jan 01, 2024**