Evaluación de las principales causas de incapacidad clínica para la donación de sangre en Belo Horizonte: análisis retrospectivo

Evaluation of the main causes of clinical ineligibility for blood donation in Belo Horizonte: a retrospective analysis

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Abstract

Background. Although rigorous donor selection is essential to blood safety, the deferral process can have negative impacts on the blood supply. Many deferred donors do not return, often due to negative feelings associated with being deferred. Deferral rates and the reasons for deferral vary across different blood centers. An understanding of these deferral rates and underlying reasons can help in designing more effective recruitment strategies and alleviate blood shortages, which are critical for the treatment of many patients.

Objective. This study aimed to investigate the rates and reasons for donor deferral.

Methods. A retrospective study (2019-2022) was conducted at a homonucleus. Donor deferrals were analyzed based on demographic characteristics.

Results. Among 98827 candidates, 18974 (19,16%) were deferred. Temporary deferrals accounted for (88,8%), permanent for 8,20%, and withdrawals for 2,74%. The most prevalent causes were divided into the following groups: HIV/hepatitis-related risk factors (38,9%), general ineligibility (22,1%), medical conditions (14,6%), medication use (12,9%), and other infection risks (11,3%). An association was identified between an unfit donor and his origin (P<0.001). **Conclusion.** Temporary deferral is the primary cause preventing donation, highlighting the need for strategies to encourage return visits. Disseminating information about deferral causes is essential for increasing donor return rates and ensuring a stable blood supply.

Background

Blood donation in Brazil is regulated by the decree of the Ministry of Health No. 158, dated February 4, 2016. It is a voluntary, anonymous, and unpaid act of citizenship. Donor disqualification, either temporary or permanent, ensures transfusion safety, with criteria established by legislation but subject to

stricter local regulations. Those rules in the screening of blood are important to prevent diseases or harms to the patient and to the donor too. Conditions like inadequate food consumption prior to the donation, inadequate weight or rest can affect the safety of those as well. Despite the social recognition of blood donation, public awareness of deferral reasons remains limited, potentially reducing return rates among temporarily deferred individuals[1]. Despite Brazil being one of the countries where blood donation is highly valued socially, the population has limited knowledge about the main reasons for disqualification, further complicating the evaluation process for potential donors.

Although rigorous donor selection is essential to blood safety, the deferral process can have negative impacts on the blood supply. Many deferred donors do not return, often due to negative feelings associated with being deferred. Deferral rates and the reasons for deferral vary across different blood collection centers. A better understanding of these deferral rates and underlying reasons can help in designing more effective recruitment strategies and alleviate blood shortages, which are critical for the treatment of many patients. For those reasons, the current study investigated donor deferral rates and the reasons in Belo Horizonte, Minas Gerais, Brazil, according to demographic characteristics to better understand and identify factors that influence the blood donation process.

Methods

Data collection and classification

This retrospective cross-sectional study was conducted from January 2019 to December 2022 - Blood Transfusion Center in Belo Horizonte, Minas Gerais. The Institutional Ethics Committee approved the study protocol CAAE 71110923.9.0000.5134. Donors between 16 and 69 years of age were eligible for donation. All donor candidates underwent registration and clinical screening, assessing medical history and risk factors. Deferral reasons were classified into five categories:

1. **HIV/hepatitis-related risk factors:** high-risk sexual behavior, intravenous drug use, history of hepatitis or transfusions, tattoos, sexually transmitted infections (STIs), and recent incarceration.
2. **Medical conditions:** chronic diseases (e.g., anemia, cardiovascular disease, autoimmune disorders), epilepsy, malignancies, and surgery history.
3. **Medication use:** drug treatments, vaccinations, or hormone therapies.
4. **General ineligibility:** weight, age restrictions, pregnancy, lactation, and unsuitable phlebotomy conditions.
5. **Other infection risks:** recent infections, travel to malaria-endemic areas, or recent dental procedures.

After clinical screening, the candidate is referred to blood donation. Blood screening included tests for hepatitis B and C, syphilis, HTLV-1/2, HIV-1/2, and Chagas disease. The records of individuals who had come for blood donation were analyzed to estimate the types of deferral (permanent or temporary). The most common reasons for deferral were determined according to the demographic characteristics (sex, age and city of origin).

Statistical analysis

Data was compiled in Microsoft Excel and analyzed using R software. Categorical variables were presented as absolute and relative frequencies, while numerical variables were expressed as mean ± standard deviation or median (1st-3rd quartile). Associations were evaluated using the Chi-square test, and numerical variables were compared with the Kruskal-Wallis test and Nemenyi post-hoc analysis. The significance level was set at 5%.

Results

Between January 2019 to December 2022 the Vita Hemoterapia - Blood Transfusion Center, of the current study received 98827 candidates for blood donation. Of those, 18974 were considered incapable of donating blood, which consists of a 19,16% rate of the total attendances. Temporary deferral with 16850 (88,8%), definitive deferral with 1592 (8.20%) and withdrawals being 532 (2.74%). The deferral rates and characteristics of the donors are summarized in Table 1. The deferral rate was similar between men and women (17,3% versus 19,0%) The age groups of the individuals who came for blood donation with most attendees were from 31 to 50 (62.9 - 58.2%), 30 or less (20.740 - 19.4%) and followed by 51 or over (15.833 - 14.8%). However, the total number of deferrals was different, attendances made by people from 21-30 followed by people from 31-40 years old were the ones with most deferrals (36,5%).

Considering the group of causes of blood deferral, the current study divided the causes in 5 main categories (Table 2). Being the most prevalent in a crescent order approximately: HIV/Hepatitis-related risk factors (38,9%; 95% CI 38,2% – 39,6%), medical conditions (14,6%; 95% CI 14,2% – 15,2%), medical use (12,9%; 95% CI 12,4% – 13,4%), general ineligibility (22,1%; 95% CI 21,5% – 22,7%), other infections risk (11,3%; 95% CI 10,9% – 11,8%).The most prevalent causes without groups by total number of deferrals were: sexual contact (2687); risky behavior (2379); medical drugs use (1987); acupuncture, piercing or tattoo (1494); safety exclusion (1175) (Table 2).

Table 1. Characteristics of the individuals who came for blood donation

Total number of potential donors	Total Number : 98827
Men	52478 (53.1%)
Women	46349 (46.9%)
Age groups	
16-30	20.740 (19.4%)
31-50	62.254 (58,2%)
51 or over	15.833 (14,8%)
Total number of deferrals	18974
30 years or less	7575 (39,9%)
31 to 50 years	8327 (43,8%)
51 years or more	3072 (16,2%)

Table 2. Main causes of blood deferral

Categories	Causes	Total
HIV/hepatitis-related risk factors	Sexual contact, Steady partner for less than 6 months, STIs, Transfusion STIs, Acupuncture, Piercing or Tattoo, Previous Blood transfusion, Illicit drugs use	7386 (38,9%; CI 38,2% – 39,6%)
Medical conditions	Recent surgery, Low hemoglobin or hematocrit , Injury, Arterial Hypotension, Flu-like symptoms, High body temperature, Headache, Tachy or Bradycardia,Anemia, Hematologic diseases, Dermatologic diseases, Cardiovascular diseases, Autoimmune diseases, Hypertension, Hyper or Hypothyroidism, Cancer, Gastrointestinal diseases, Epilepsy, Lung diseases, Neurologic diseases, Arrhythmia, Human spongiform encephalopathy, Endocrinologic diseases, Nephrologic diseases, Gout, Stroke, Psychiatric diseases, Superficial thrombophlebitis, Alcohol use, Chronic Alcoholism, Severe allergy, active allergy manifestation, Allergy desensitization,	2785 (14,6%; CI 14,2% – 15,2%)
Medical use	Vaccination, medical drugs use	2450 (12,9%; CI 12,4% – 13,4%)
General Ineligibility	Endoscopic procedure, dental treatment, Dermatologic procedure, Safety exclusion, Withdrawal, Inadequate food consumption prior to the donation, Inadequate weight, inadequate rest, Gap between donations, detention or prison, birth or abortion, pregnancy, Breastfeeding, Others.	4196(22,1%; CI 21,5% – 22,7%)
Other Infection Risks	Infectious diseases, Malaria epidemiology concerns, Human spongiform encephalopathy epidemiology concerns, West Nile Virus epidemiology concerns, Chagas disease epidemiology concerns	2157 (11,3%; CI 10,9% – 11,8%)

Table 1. Characteristics of the individuals who came for blood donation

Referring to the regions, the potential donors were divided by those from the capital city, Belo Horizonte, the other cities considered metropolitan and the countryside cities. Those characteristics were analyzed with the year of attendance and with the five main causes of blood deferral. The order of main causes of deferral in the blood donors from the capital city were: sexual contact; risky behavior; medical drugs use; acupuncture, piercing or tattoo; safety exclusion. People of the metropolitan region were: sexual contact and risky behavior with the same number; medical drugs use; acupuncture, piercing or tattoo; safety exclusion. Whereas the order of the main causes from the countryside cities blood donors deferrals were: sexual contact; risky behavior; acupuncture, piercing or tattoo; medical drugs use; safety exclusion. When associating the donor's city of origin and the unfit donor, the analysis suggests that donors from the capital had a higher rate of unfitness to donate blood (P<0.001). (Table 3)

Discussion

The eligibility criteria for blood donors are to strengthen the safety of both donor and recipient; however, failure to meet this criterion leads to negative effects for donors as well as blood bank centers[2].

Therefore, it is crucial to reduce the rejection rate as much as possible. For this, the etiological distribution of donor rejection has to be studied and analyzed carefully so that appropriate measures can be taken to reduce it. The eligibility criteria for blood donors are defined by the institutional agencies, with the aim of protecting the donors as well as the patient[3].

Our study demonstrated the unfitness for blood donation between January 2019 and December 2022 at the Blood transfusion center was 18,974 (19.2%) out of a total of 98,827 total attendances. This percentage is also observed in other analyses, such as the study by Roque[4], which reported an unfit rate of 15.38% among candidates, and the study by Rohr[5], which indicates a Brazilian average of 20% unfitness between 2005 and 2010.

The unfitness cases described in this study were

Table 3. Characteristics of deferral patents by city of origin

Characteristics	Total N N = 19,423[1]	Capital N = 10,964[1]	Country-side N = 2,607[1]	Metropo-litan N = 5,852[1]	p[2] value
Year					**<0.001**
2019	5,124 (26%)	2,800 (26%)	845 (32%)	1,479 (25%)	
2020	4,928 (25%)	2,949 (27%)	563 (22%)	1,416 (24%)	
2021	4,981 (26%)	2,750 (25%)	671 (26%)	1,560 (27%)	
2022	4,390 (23%)	2,465 (22%)	528 (20%)	1,397 (24%)	
Cause of deferral					**<0.001**
Acupuncture, piercing or tattoo	1,494 (15%)	770 (14%)	170 (13%)	554 (19%)	
Risky behavior	2,379 (24%)	1,270 (24%)	402 (30%)	707 (24%)	
Safety exclusion	1,175 (12%)	681 (13%)	139 (10%)	355 (12%)	
Sexual contact	2,687 (28%)	1,452 (27%)	402 (30%)	833 (28%)	
Medical drugs use	1,987 (20%)	1,229 (23%)	232 (17%)	526 (18%)	

[1]n (%); Median (Q1, Q3)
[2]Chi-square test; Kruskal-Wallis Test

mainly identified as temporary deferrals, with 16850 cases (88.8%). This is corroborated by the study by Mingrone[6], in which the author states that these participants do not return to donate once they become eligible again. Thus, a large percentage of people are motivated to donate blood, but due to a lack of information during their first attempt, they do not return to complete the process.

The main clinical reason for unfitness among blood donors at the Hemonucleos center was HIV/ hepatitis- related risk factors, with 7,386 unfit individuals (38,9%) out of the entire population studied. This data showed that those behavioral reasons to blood deferral were more relevant than in Roque's study[4], which indicates the significant representation of inappropriate sexual contact for donation, accounting for 15.98% of all unfit individuals, suggesting an important factor that should be investigated at all stages of donation, from the clinical interview to serological markers that may change due to sexual behavior.

The study had some limitations. Usually, the first cause of deferral identified in a potential donor is credited as the sole reason for ineligibility for blood donation. For this reason, rarer causes of blood deferral, which are asked about later, could be underestimated. Since this is an observational study using regional data, the article can be considered to have low external validity. However, it describes important epidemiological data from one of the most economically significant regions of Brazil and contains relevant information that can contribute to the literature and influence new studies.

In addition, the findings of the study are consistent with other published studies. For this reason, the data analyzed in the current article are important for further consolidating findings in the field of hemotherapy.

Conclusion

By analyzing the data from the Vita Hemotherapy Blood Center, it was possible to conclude that temporary deferral constitutes the majority of cases that prevent blood donation. This fact indicates the need to create strategies to encourage temporarily unfit individuals to return to the service once they become eligible again, and to engage this group in order to establish regular donations.

The most prevalent causes, when not grouped by the total number of deferrals, can only be addressed by providing individuals with information about what qualifies them for donation. Therefore, it is vital to increase the dissemination of information about blood donation in Brazil by healthcare professionals, who often perform actions that result in individuals becoming unfit, such as administering vaccines, prescribing medications, and other procedures, as well as by knowledge dissemination institutions, educational centers and media outlets, for example.

Furthermore, the clinical and laboratory screening of donors is an extremely important process for ensuring safe blood transfusions. In order to improve this process, it is necessary for blood centers to conduct a thorough analysis of their donor data to more specifically identify the profile of this group, increasing the number of donations from those who are eligible and excluding those who are unfit.

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