

ORIGINAL ARTICLE

Profile of blood donors in a hemotherapy institution in Midwestern Brazil *Perfil dos doadores de sangue em uma instituição hemoterápica no Centro-Oeste do Brasil*

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KEYWORDS

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ABSTRACT

Objective: To describe the profile of blood donors in a hospital in the Midwest of Brazil with its own blood bank to have a diagnostic view of the establishment and enable the planning of improvements in services.

Methods: This is a descriptive, retrospective study with a quantitative approach. A proportional stratified sampling technique was used, with a confidence level of 95% and a margin of error of 5%, to represent and characterize the study population, obtaining a sample of 363 donors. Subsequently, a proportional allocation was performed in the established groups (fit donors, unfit donors, and platelet apheresis donors).

Results: The profile of eligible donors in the institution studied was composed of married (55.2%), male (63.7%), aged between 20 and 30 years (40.4%), with O RhD+ blood (46.7%) and A RhD+ (29.6%) more prevalent. Apheresis platelet donors (50%) are single, female (81.3%), and aged between 31 and 40 years (43.8%). As for unfit donors, 94.8% are temporary-unfit donors, married donors (53.2%), female (54.5%), and between 20 and 40 years old (54.6%), with the categories of health condition and lifestyle being the most prevalent reasons for disability.

Conclusion: There is a hegemony for replacement and first-time donors, showing the effectiveness of the solidarity policy implemented in the institution, but it shows the low effectiveness in the loyalty of these donors.

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PALAVRAS-CHAVE

Banco de sangue
Doadores de sangue
Epidemiologia
descritiva
Serviço de hemoterapia

RESUMO

Objetivo: Descrever o perfil dos doadores de sangue em um hospital no Centro-Oeste do Brasil com banco de sangue próprio, para se ter uma visão diagnóstica do local e possibilitar o planejamento de melhorias nos serviços.

Métodos: Trata-se de um estudo descritivo, retrospectivo, de abordagem quantitativa. Foi utilizada a técnica de amostragem estratificada proporcional, com grau de confiança de 95% e margem de erro de 5%, a fim de representar e caracterizar a população do estudo, obtendo-se uma amostra de 363 doadores. Posteriormente foi realizada uma alocação proporcional nos grupos estabelecidos (doadores aptos, doadores inaptos e doadores de plaquetas por aférese).

Resultados: O perfil dos doadores aptos na instituição estudada é composto por doadores casados (55,2%), sexo masculino (63,7%), com faixa etária entre 20 e 30 anos (40,4%), com sangue O RhD+ (46,7%) e A RhD+ (29,6%) mais prevalentes. Os doadores de plaquetas por aférese (50%) são solteiros, sexo feminino (81,3%), faixa etária entre 31-40 anos (43,8%). Já os doadores inaptos, 94,8% são inaptos temporários, doadores casados (53,2%), do sexo feminino (54,5%), entre 20 e 40 anos (54,6%), sendo as categorias condição de saúde e estilo de vida os motivos de inaptidão mais prevalentes.

Conclusão: Existe uma hegemonia por doadores de reposição e primeira vez, mostrando a eficácia da política de solidariedade implantada na instituição, porém evidencia a baixa efetividade na fidelização destes doadores.

INTRODUCTION

Hemotherapy is a therapeutic resource that uses blood transfusions and blood components to treat diseases. It is a widely recognized practice due to its efficacy in clinical treatments, transplants, oncological procedures, and surgeries¹. Although significant progress in health research and treatment has been made, there is not yet a replacement for therapeutic human blood once this tissue is essential to life².

Blood donation in Brazil is regulated by the Ministry of Health (MS) Consolidation Ordinance nr. 5/2017, which emphasizes that donating blood should be altruistic, free of any benefits or rewards³, supported by the 1988 Federal Constitution⁴. It is also regulated by the National Health Surveillance Agency (ANVISA) by the Collegiate Board Resolution (RDC) nr. 34/2014, which provides good blood cycle practice⁵.

The blood donation procedure is simple, fast and safe. The candidate must undergo a rigorous clinical and hematological screening for donation eligibility, complying with the health criteria in force⁴. Educational actions are performed on the candidates regarding the risks of infections, which are subsequently tracked by several questions that help to temporarily, permanently, or indefinitely postpone donors who may have acute or chronic infections, aiming at assuring the donated blood quality and maintaining the donor's general health condition after withdrawal of the volume established for donation⁶.

The World Health Organization (WHO) recommends 3%-5% rates of voluntary donation by the population per year⁷. A global analysis of blood component donation shows that 40% of the global donations occur in high-income countries, where 16% of the world population resides. A marked discrepancy is also seen in donations among countries according to income, reaching 31.5 donations/1,000 inhabitants in high-income and 5 donations/1,000 inhabitants in low-income countries⁸.

In Brazil, in 2019, there were 4,567,763 candidates for blood donation, still below the WHO

recommendations, as Brazil reached an average of 17.1 donations/1,000 inhabitants. Only 322,101 were candidates from the Midwest region, a poor number compared to other geographical regions in the country (Northeast 1,009,780, North 322,942, Southeast 2,153,491 and South 759,449)⁹.

A difficulty faced by the Hematology Services (HS) is the blood bank replacement to a sufficient level that can supply the population demands, including rare phenotypes, and blood components availability promptly, consonant to the blood rational use guidelines. Also, Brazilian law states that blood is a product that cannot be commercialized¹⁰. For such, interventions for maintaining the donors are deemed necessary, as well as increasing the number of voluntary donors, aiming to ensure both the quality and quantity of collected and transfused blood¹¹.

Another challenge the HS faces is the lack of scientific literature regarding the profile of blood donors in national and international institutions. By searching the literature, it is possible to note the need for more publications related to the topic. Thus, this study describes the profile of blood donors in a Brazilian Midwest high-complexity hospital with its own blood bank. The objective is to provide hemotherapy institutions with the information obtained so they can plan improvements regarding recruitment strategies and increase donations to supply transfusion demands.

METHODS*Description of the study*

This is a descriptive, retrospective study with a quantitative approach.

Place and Time

The research was conducted in the blood bank of a high-complexity hospital in Goiânia (Goiás), which only

receives patients from the Unified Health System (SUS) and is licensed by the Ministry of Health as a high-complexity healthcare facility (UNACON) with HS. This study was conducted between January and December 2019.

Exclusion and Inclusion Criteria

The inclusion criteria was those who voluntarily donated blood to the establishment in 2019. The exclusion criteria were duplicate donors, keeping only one registry in each group established.

Sample

The facility had a total of 7,567 donors in 2019. After exclusion criteria, the study obtained 6,494 viable donors, divided into Eligible Donors (G1), Ineligible Donors (G2), and Apheresis Platelet Donors (G3).

A proportionate stratified sampling technique was used to represent and define the study population with a 95% confidence level and a margin of error of 5%. Thus, a sampling of 363 donors was established. The donors were proportionally allocated according to the groups' population quantity (Table 1).

After numerical identification of eligible donors in each group, simple random sampling was conducted using software R, version 4.0.3 (R Core Team, 2016), in which specific programming codes were applied to select the donors randomly.

Table 1 – Proportional allocation distribution of blood donors, Goiás, 2021.

Strata	Population	Proportion	Sample
G1 - Eligible Donors	4,821	74%	270
G2 - Ineligible Donors	1,379	21%	77
G3 - Apheresis Donors	294	5%	16
Total	6,494	100%	363

Ethical Aspects

The ethical research aspects followed Resolution Nr. 466, dated December 12, 2012, of the National Health Council (CNS), and was approved by the Research Ethics Committee at Universidade Federal de Goiás, under decision nr.: 3.978.208 and CAAE (Certificate of Submission for Ethical Appreciation) nr.: 30522320.1.0000.5078.

Data Collection

Information was extracted from the institution's computerized system, developed through a partnership between Information Technology (IT) and blood bank teams. The system was developed to computerize data and guarantee traceability for blood cycle

confidentiality in the hospital.

Once data were collected regarding variables such as sex, age group, and marital status, the donation history for donor type was checked. Thus, the classification was established as the following: Frequent donor (who donates blood twice or more throughout 12 months), First-time donor (donates blood for the first time), and Occasional donor (who donates blood only once in 12 months). After checking if the donation was voluntary or replacement, information regarding each donor's blood type was verified (A RhD+, A RhD-, B RhD+, B RhD-, AB RhD+, AB RhD-, O RhD+, O RhD-).

It is essential to explain that voluntary donation is considered altruistic without describing the possible recipient. The replacement donation is characterized as the one arising from the need to care for a specific patient and is usually performed by family members and companions to replace the stock of the hemotherapy service used.

In G2, the blood type was not analyzed once the blood component collection from such individuals was not performed due to their ineligibility during clinical screening. However, an analysis was conducted for permanent or temporary ineligibility and to investigate possible reasons, which were divided into Diseases (infectious diseases, coagulation disorders, malaria, Chagas disease, neurological disease); Lifestyle (alcohol user, drug user, risk behavior for sexually transmitted infections - STIs); Health condition at the moment of donation (low or high hematocrit levels, hypotensive, hypertensive, menstrual period, cold, fever, sustained fasting) and Other.

Data Analysis

Data were analyzed via simple descriptive statistics, organized in Microsoft® Excel® spreadsheets, and evaluated and quantified according to their specificity by the authors.

RESULTS

A representative sample of 270 donors was identified as G1, 77 as G2, and 16 as G3. There was a higher prevalence of eligible male donors (63.7%), married (55.2%), and aged between 20 and 30 years (40.4%). Those who least donated were aged less than 20 years (1.4%) and more than 60 years (2.5%). In G2, most donors were married (53.2%), with more than half (54.5%) female donors, predominantly aged between 20 and 30 years (27.3%) and 30-40 years (27.3%). In G3, half of the sample was single, predominantly female (81.3%), and aged between 31 and 40 years (43.8%) (Table 2).

In all groups being studied, there was a prevalence of replacement donors being 58.1% in G1, 65% in G2, and 75% in G3, and higher prevalence of first-time donations, 68.5% in G1, 74.1% in G2, and 62.5% in G3. The frequent donors represented a minority, as described in Table 3.

The prevailing blood type was O RhD+ (46.7%) in G1 and (43.8%) in G3. However, blood type B RhD- (0%) was the minority in both groups, and in G3, A RhD- and

B RhD+ were identified as less prevailing blood types. In the ineligibility group, no ABO/Rh system tests were conducted (Table 3).

As for G2 ineligibility, health conditions (33.8%) at the moment of clinical screening were prevailing, followed by lifestyle (16.9%), which could be explained by the use of illegal substances or risk behavior and, in

35.1%, due to other reasons, such as vaccines, use of medications, withdrawals, surgeries and invasive procedures that temporarily prevented donation. Regarding ineligibility time, there was a prevalence of temporary donations in 94.8% of the analyzed sample, as shown in Figure 1.

Table 2 – Percentage (%) and absolute distribution of blood donors sociodemographic characteristics (N = 363). Goiás, 2019.

Variables	G1		G2		G3		Total	
	(n = 270)	(%)	(n = 77)	(%)	(n = 16)	(%)	(n = 363)	(%)
Sex								
Male	172	63.7	35	45.5	3	18.8	210	57.8
Female	98	36.3	42	54.5	13	81.3	153	42.2
Marital Status								
Single	106	39.3	33	42.9	8	50	147	40.5
Married	149	55.2	41	53.2	7	43.8	197	54.3
Divorced	13	4.8	2	2.6	1	6.3	16	4.4
Widower	2	0.7	1	1.3	0	0	3	0.8
Age Group								
< 20 years old	3	1.1	2	2.6	0	0	5	1.4
20-30 years old	109	40.4	21	27.3	4	25	134	36.9
31-40 years old	85	31.5	21	27.3	7	43.8	113	31.1
41-50 years old	46	17	18	23.4	4	25	68	18.7
51-60 years old	22	8.1	11	14.3	1	6.3	34	9.4
>60 years old	5	1.9	4	5.2	0	0	9	2.5

Table 3 – Percentage (%) and absolute distribution of blood donors, as per reason for donation, type of donation and blood type (N = 363). Goiás, 2019.

Variables	G1		G2		G3		Total	
	(n = 270)	(%)	(n = 77)	(%)	(n = 16)	(%)	(n = 363)	(%)
Reason for donation								
Volunteer	113	41.9	27	35.1	4	25	144	39.7
Replacement	157	58.1	50	65	12	75	219	60.3
Blood Donor Type								
First-time blood donor	185	68.5	57	74.1	10	62.5	252	69.4
Occasional blood donor	64	23.7	16	20.8	3	18.8	83	22.9
Frequent blood donor	21	7.8	4	5.2	3	18.8	28	7.7
Blood Type								
A+	80	29.6	-	-	5	31.3	85	23.4
A-	8	3.0	-	-	0	0	8	2.2
Ab+	4	1.5	-	-	2	12.5	6	1.6
Ab-	1	0.4	-	-	1	6.3	2	0.5
B+	28	10.4	-	-	0	0	28	7.7
B-	0	0	-	-	0	0	0	0
O+	126	46.7	-	-	7	43.8	133	36.6
O-	23	8.5	-	-	1	6.3	24	6.6

DISCUSSION

The outcomes of this study reveal considerable data for characterizing the profile of blood donors in the said hemotherapy institution and allow discussions between health knowledge and society in connection to

the current status of blood and blood component donation.

Analyzing the profile of blood donors in the Brazilian northeast region¹², as well as in 11 countries of Sub-Saharan Africa¹³, it is perceptible the hegemony of male donors, considering that according to current

Brazilian legislation, the time interval for males between donations is every two months, which allows only four donations a year. For women, the interval is every three months, allowing a maximum of three annual donations.

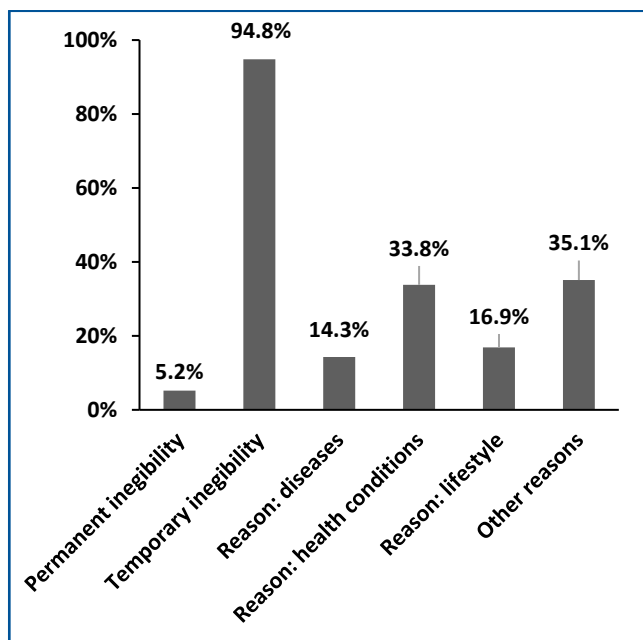


Figure 1 – Percentage (%) distribution of ineligible blood donors, according to the type and reason of ineligibility (n = 77). Goiás, 2019.

In research conducted in the United States in 2019, 65.9% of all ineligibility belonged to women. Such differences were mainly regarded as ineligibility due to low levels of hemoglobin/hematocrit, other non-medical reasons, abnormal blood pressure, or pulse, piercings, tattoos, and other reasons¹⁴. Women are prone to anemia because of lower iron storage compared to men, due to the menstrual period¹⁵, which hinders eligibility to blood donations.

The institution studied has a solidarity policy as a strategy for prospecting donors, in which admitted patients are educated on the blood cycle and the importance of blood donations. There is a request for voluntary help to seek donors to replace the institution's blood supply, and the companions are invited to donate blood.

It is worth saying that there is a predominance of women as patients' companions in health facilities¹⁶, which may explain our findings in apheresis platelet donations. Once the minimum interval between two plateletpheresis is 48 h, the same donor can donate a maximum of 4 times a month and 24 times a year.

In the Eastern Province of Saudi Arabia, between 2016 and 2020, in a teaching hospital with 27,414 donors, 94.9% were males, commonly aged between 25 and 40 years (54.8%), and volunteers as the primary source of blood (61.5%), followed by replacement donors (37.1%)¹⁷. In the 8th Brazilian Hemotherapy Production Bulletin in 2019, 83.69% were spontaneous donations, and 54% were frequent donors in the Midwest region.

The discrepancy with our findings regarding the

type of donor and reason for donation may be justified by the prospection policy implemented in the study facility, as the number of replacement donations tends to be higher than that of voluntary donations. First-time donors are the majority, compared with occasional and frequent donors, because of the patient turnover.

In Lebanon, replacement donations are the most frequent type in the country, estimated to at 70% of all blood donations. However, this system can be questioned due to the significant bias of collected blood quality, as illegally recruited donors may be paid, such as Syrian refugees, Palestinians, or even the Lebanese population, when recruited by patients or family members. Voluntary donation is based on national solidarity, and replacement donation is based on intragroup solidarity¹⁸.

Whenever a blood component is given to a patient who needs a transfusion, donations are requested to the community by family members to restore the blood supply. It is pertinent to emphasize that patients admitted to the study facility are candidates for multiple transfusions as trauma, hematological, and oncological; onco-hematological patients are those who most demand blood components in transfusion practice¹⁹. The search for replacement donors imputes the family members to moral and social obligations of blood donation, even when at risk of transmitting infections or when the donation affects the donor's health conditions, as they feel responsible for prospecting donors when there is a lack of blood supply²⁰.

Regarding ABO and Rh factor systems, based on samples typed by pathology services in Australia, the blood group prevalence was as follows: O RhD+, 38.4%; O RhD-, 6.5%; A RhD+, 32.0%; A RhD-, 5.6%; B RhD+, 11.8%; B RhD-, 1.5%; AB RhD+, 3.7%; and AB RhD-, 0.5%²¹. In the Brazilian national territory, 43.15% had O RhD+ blood type, and 29.25% had A RhD+ blood type as the most prevailing ones, and blood types AB RhD- (0.4%) and B RhD- (1.29%) as minorities⁹, presenting similarities with our study, which may be related to the fact that the gene-determining Rh+ is dominant and the gene determining Rh- is recessive.

Regarding age groups, it was observed that young adults (20 to 30 years old) were the most prevalent donors in Brazilian literature²², which is similar to South Korea. Adolescents and individuals in the age range of 20 years are the main group of donors, responsible for around 65% of national blood donations²³. This group (young adults) is fundamental because they are usually in good health conditions, therefore being potential long-term donors who may maintain an adequate blood supply.

Among the reasons for ineligibility in Brazil in 2019, the most prevalent were anemia, STI risks, and other causes^{9,24}, similar to Northern Tanzania²⁵. Recently, society has gone through changes in sexual behavior. Thus, individuals now have more freedom, resulting in multiple partners, several sexual relationships and intercourse, and a decrease in the use of condoms. Such habits are frequent now, mainly among young adults²⁶. Understanding the causes of blood donation refusal is essential to create adequate preventive strategies for the identified conditions and promote collective health.

The profile of donors enlightened by this study diverges from that described in the 8th Brazilian Hemotherapy Production Bulletin in 2019⁹. According to the publication data, spontaneous donations prevailed in the Midwest, which differs from what was found in this work in the institution, prevailing replacement donors.

The divergence in the profile of the donors shown here may be related to poor promotions and campaigns seeking voluntary donations and donor fidelization. Considering that, encouragement to volunteer donors to prospection and their fidelization is crucial.

Campaigns and educational actions with donors positively impact the donations, aiding in the replacement and maintenance of such blood stock supply²⁷. Strategies such as participation in social media and digital marketing establish greater proximity and bond with the donor, providing more capillarity with the population regarding blood donation²⁸. However, it is worth mentioning that actions aiming at fidelization are more effective than those seeking new donors²⁹.

Therefore, thinking strategies are necessary to create a bond with the community and strengthen the culture of voluntary and periodic blood donation. Moreover, as a result, to reaching the portion of the population not being reached is shown by the small adherence, as well as their return, especially

those with rare blood phenotypes.

The limitations of this study were the non-identification of other sociodemographic variables and a longer interval to compare them annually. However, we consider that they have not interfered with the results found. An extension in the period analyzed is suggested to annually compare them, as well as research to identify the reasons why those donors are not frequent, aiming to create hypotheses and analyze operational issues, revealing the need for greater efforts when managing actions and strategies to increase the number of donations.

CONCLUSION

Blood donation maintenance is a constant need, and by understanding the profile of the donors attending the facility, the weak points become evident, which may help improve the search for quality donors. The solidarity policy implemented in the facility is effective as a way of restoring the blood bank. However, it shows the lack of effectiveness in maintaining those donors and the low impact of campaigns that promote the recruitment of blood donations.

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