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Clinical and epidemiological profile of blood donors at Montes Claros Regional Blood Center, Southeastern Brazil

Perfil clínico e epidemiológico dos doadores de sangue do Hemocentro Regional de Montes Claros, Sudeste do Brasil

Perfil clínico y epidemiológico de los donantes de sangre del Hemocentro Regional de Montes Claros, sudeste de Brasil

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Abstract
Objective: This study aims to analyze blood donation candidates' clinical and epidemiological profiles in Northern Minas Gerais, Brazil, from 2019 to 2022. *Methods*: We retrospectively searched clinical and epidemiological profiles in the donor data from Montes Claros' Hemotherapy Center/ Hemominas Foundation from January 2019 to December 2022. Clinical and epidemiological variables were assessed using a blood bank database. *Main Results*: Of the 81,195 donation candidates, the majority were female, over 29 years old, repeat donors, and replacement donations. Among them, 18.96% were deemed ineligible, with the majority being female, over 29 years old, repeat donors, and replacement donations. Key causes of ineligibility included STD-risk behavior, anemia, hypertension, and Chagas disease. Women showed higher rates of anemia, hypotension, and Chagas disease, while men had more STD-risk behavior, hypertension, alcoholism, and drug use. Among eligible donors, 2.43% had serological ineligibility, notably for hepatitis B, syphilis, and hepatitis C. *Conclusion*: The frequency of female and repeat donors in Montes Claros was higher than the national average, with disparities in ineligibility between genders and a possible higher prevalence of syphilis and Chagas disease in the local population.
Keywords: Blood Donation; Blood Donors; Epidemiology; Public Health; Brazil.

Resumo
Objetivo: Este estudo visa analisar os perfis clínico e epidemiológico dos candidatos à doação de sangue no Norte de Minas Gerais, Brasil, de 2019 a 2022. *Métodos:* Busca retrospectiva dos perfis clínico e epidemiológico nos dados dos doadores do Centro de Hemoterapia de Montes Claros de janeiro de 2019 a dezembro de 2022. As variáveis clínicas e epidemiológicas foram avaliadas utilizando um banco de dados de hemoterapia. *Resultados:* Dos 81.195 candidatos à doação, a maioria era do sexo feminino, maiores de 29 anos, doadores de repetição e doações de reposição. Desses,

18,96% foram considerados inaptos, sendo a maioria do sexo feminino, maiores de 29 anos, doadores de repetição e com doações de reposição. Dentre as causas, destacam-se: comportamento de risco para DST, anemia, hipertensão e Doença de Chagas. Mulheres tiveram mais anemia, hipotensão e Doença de Chagas, enquanto homens apresentaram mais risco para DST, hipertensão, alcoolismo e drogas. Entre os aptos, 2,43% apresentaram inaptidão sorológica, destacando-se hepatite B, sífilis e hepatite C. *Conclusão:* A frequência de doadoras e doadores de repetição em Montes Claros foi maior que a nacional, com disparidades de inaptidão entre gêneros e possível maior prevalência de sífilis e Doença de Chagas na população local.
Palavras-chave: Doação de Sangue; Doadores de Sangue; Epidemiologia; Saúde Pública; Brasil.

Resumen
Objetivo: Este estudio tiene como objetivo analizar los perfiles clínicos y epidemiológicos de los candidatos a donación de sangre en el norte de Minas Gerais, Brasil, de 2019 a 2022. *Métodos:* Se realizó una búsqueda retrospectiva de los perfiles clínicos y epidemiológicos en los datos de los donantes del Centro de Hemoterapia de Montes Claros, de enero de 2019 a diciembre de 2022. Las variables clínicas y epidemiológicas se evaluaron utilizando una base de datos de hemoterapia. *Resultados:* De los 81.195 candidatos a donación, la mayoría eran mujeres, mayores de 29 años, donantes de repetición y con donaciones de reposición. De estos, el 18,96% fueron considerados inelegibles, principalmente mujeres, mayores de 29 años, donantes de repetición y con donaciones de reposición. Entre las causas destacaron: comportamiento de riesgo para ETS, anemia, hipertensión y enfermedad de Chagas. Las mujeres presentaron mayor prevalencia de anemia, hipotensión y enfermedad de Chagas, mientras que los hombres mostraron más riesgo para ETS, hipertensión, alcoholismo y uso de drogas. Entre los aptos, el 2,43% presentaron inelegibilidad serológica, destacándose la hepatitis B, la sífilis y la hepatitis C. *Conclusión:* La frecuencia de donantes femeninas y de repetición en Montes Claros fue mayor que la media nacional, con disparidades de inelegibilidad entre géneros y una posible mayor prevalencia de sífilis y enfermedad de Chagas en la población local.
Palabras clave: Donación de Sangre; Donantes de Sangre; Epidemiología; Salud Pública; Brasil.

1. Introduction

In the past century, the demand for blood supply has surged owing to advances in medical procedures and the rise in life expectancy (Almeida Neto et al., 2012). However, concerns have emerged regarding potential challenges to blood availability due to the aging population and evolving donor screening criteria (Almeida Neto et al., 2012). Despite these concerns, there is optimism regarding an increase in the number of blood donors over time (Luz et al., 2022).

In Brazil, the expansion of the national public blood collection network, coupled with ongoing media campaigns and evolving hemotherapy legislation, has significantly promoted blood donation across the country (Luz et al., 2022). Additionally, improvements in selection criteria, an increase in voluntary donations, and a decline in individuals seeking blood donation for serological testing are expected to decrease seropositivity rates over time (Luz et al., 2022; Monich et al., 2017).

The mesoregion of Northern Minas Gerais, with a population of 1,722,156 inhabitants, according to the Brazilian Institute of Geography and Statistics (IBGE, 2023), is highlighted by Montes Claros as its largest city, with a population of 414,240 individuals, comprising 52% females and 48% males (IBGE, 2023). The Hemominas Foundation plays an important role as the official government hemotherapy service that coordinates the blood donation network across the state (Silva et al., 2016). Inside this network, the Montes Claros Hemotherapy Center, a part of Hemominas, specifically caters to the northern region of Minas Gerais (Silva et al., 2016).

The current study addresses the lack of actual data from blood donation in the region by showing epidemiological and sociodemographic peculiarities in the region. Hence, this study aimed to analyze blood donation candidates' clinical and epidemiological profiles in Northern Minas Gerais from 2019 to 2022.

2. Methodology

2.1 Procedures

It's a cross-sectional study of a quantitative nature (Pereira et al., 2018) using descriptive statistics (Shitsuka et al., 2014) and statistical analysis (Vieira, 2021), conducted at the Hematology and Hemotherapy Center of Montes

Claros/Foundation Hemominas, southeastern Brazil. Before commencing the study, ethical clearance was sought from the Hemominas Ethics Committee (number 5.926.762).

2.2 Statistics Analysis

Data management and analysis were carried out using GraphPad Prism 9 software (version 9.5.1), and a *p*-value less than 0.05 was considered statistically significant. Descriptive analyses were generated for all variables. The Shapiro-Wilk test was employed to assess data normality. Subsequentially, continuous variables underwent comparison using the student t-test, ANOVA One-way, and Tukey test when appropriate.

2.3 Limitations

Challenges arose during the collection of information about inaptitude, notably hindering an in-depth analysis of the causes of clinical inaptitude, mostly the "Others" category in Table 3. We encountered difficulty discerning specific clinical conditions within this group, limiting our ability to gain detailed insights. Also, the division of "Age" into "16-29 years" and ">29 years" was the only possibility provided by the database, posing constraints on capturing nuanced age-related patterns. Furthermore, the blood records lacked the information to explore potential relationships between seropositivity and epidemiological variables.

3. Results

From January 2019 to December 2022, 81,195 blood candidates attended the Montes Claros Blood Center, with a mean age of 33.26 (±10.42) years, donation candidates' yearly mean of 20,299 (±1.289), and a monthly mean of 1,692 (±213.7). Among them, 1,361 (1.68%) had the donation interrupted by withdrawal or reaction during collection, and 15,398 (18.96%) were deemed clinically ineligible. Of the candidates accepted for donation, 1,567 (2.43%) exhibited serological inaptitude.

Table 1 provides an overview of the blood donors' profile across epidemiological variables. As illustrated in the table, the majority of candidates were female, aged more than 29 years, and identified as repetition and replacement donors. While no significant difference was observed between the sexes, a positive correlation emerged between age, type of donor, and type of donation.

Interestingly, a significant interaction between years of donation was identified. Notably, 2019 recorded the highest number of candidates, while 2020 marked the lowest. Furthermore, a statistically significant decrease ($p = 0.0133$) in the monthly mean occurred between 2019 and 2020.

Table 1 – Blood donor candidates' profiles between 2019 and 2022.

Variable	Number (%)	Monthly Mean (SD)	*P* value
Sex [a]			
Male	39,674 (48.86%)	826.5 (±105.1)	$p = 0.0954$
Female	41,521 (51.14%)	865.0 (±118.4)	
Age (years) [a]			
16-29	35,319 (43.50%)	735.8 (±115.0)	$p < 0.0001$*
>29	45,876 (56.50%)	**955.8 (±121.2)**	
Type of donor [a]			
First time	23,486 (27.14%)	489.3 (±96.16)	$p < 0.0001$*
Repetition	57,709 (71.07%)	**1,202 (±13.31)**	
Type of donation [a]			
Voluntary	31,352 (38.61%)	653.2 (±131.1)	$p < 0.0001$*
Replacement	49,843 (61.39%)	**1,038.0 (±202.7)**	

Year of donation [b]			
2019	22,028 (27.13%)	1,836 (±187.6)	$p = 0.0133$**
2020	18,922 (23.30%)	1,577 (±182.2)	
2021	20,252 (24.94%)	1,688 (±268.5)	
2022	19,993 (24.63%)	1,666 (±130.1)	

Note: We considered p < 0.05 statistically significant.
SD: Standard deviation
a: Student's *t* test
b: ANOVA One-way and Tukey's test
***** Significant difference in Student's *t* test.
****** Significant difference between 2019 and 2020.
Source: Authors.

The results of the correlational analysis of sociodemographic variables and clinically inept blood donors are set out in Table 2. The findings indicate a higher deferral rate in females, aged over 29 years, first-time and replacement donors. Notably, 2019 had the majority of clinically inept individuals, and 2020 had the minority. Further, Table 2 reveals not only a statistical significance between the 2019 and 2020 monthly mean ($p = 0.02$) but also a significant difference between 2019 and 2022 ($p = 0.04$).

Table 2 – Sociodemographic variables of blood donors' clinical inaptitude between 2019 and 2022.

Variables	Number (%)	Monthly mean (SD)	*P* value
Sex [a]			
Male	6,967 (45.25%)	145.1 (±26.92)	$p < 0.0001$ *
Female	8,431 (54.75%)	**175.6 (±31.37)**	
Age (years) [a]			
16-29	7,580 (49.23%)	157.9 (±32.22)	$p = 0.4235$
>29	7,818 (50.77%)	162.9 (±28.06)	
Type of donor [a]			
First time	7,226 (46.93%)	150.5 (±31.34)	$p < 0.0017$ *
Repetition	8,172 (53.07%)	**170.3 (±28.43)**	
Type of donation [a]			
Voluntary	6,209 (40.32%)	129.4 (±34.52)	$p < 0.0001$ *
Replacement	9,189 (59.68%)	**191.4 (±45.52)**	
Year of donation [b]			
2019	4,316 (28.02%)	**359.7 (±41.52)**	$p = 0.02$**
2020	3,560 (23.12%)	296.7 (±52.04)	
2021	3,858 (25.06%)	321.5 (±63.88)	
2022	3,664 (23.80%)	305.3 (±36.55)	$p = 0.04$***

Note: We considered p < 0.05 statistically significant.
SD: Standard deviation
a: Student's *t* test
b: ANOVA One-way and Tukey's test
***** Significant difference in Student's *t* test
****** Significant difference between 2019 and 2020.
******* Significant difference between 2019 and 2022.
Source: Authors.

Table 3 compares the intercorrelations among causes of deferral and sex. Firstly, we can see the most important causes of clinical inaptitude, STD-risk behavior emerges as the most significant of all (27,0%). Additionally, "Others" represents a set of diseases and conditions that didn't fit any of the medical deferral categories used in the blood center. Also, they had minor importance individually compared with the other presented causes.

Secondly, 54.75% of the clinical inaptitude happened in female candidates, demonstrating statistical significance when compared to men (p<0.0001). Notably, hypertension, alcoholism, STD-risk behavior, and drug use are more common in men, while anemia, hypotension, and Chagas' Disease, are more prevalent in women. Moreover, a significant positive correlation was found in almost all causes, except for hepatitis, and malaria, where such a correlation wasn't observed.

Table 3 – Clinical inaptitude assessed during clinical triage by sex.

Cause	Man	Woman	Total (%)	*p* value [a]
Anemia	102	**1,281**	1,383 (8.98%)	***p* < 0.0001***
Hypertension	**384**	278	662 (4.30%)	***p* = 0.0066***
Hypotension	11	**42**	53 (0.34%)	***p* = 0.0008***
Alcoholism	**39**	6	45 (0.29%)	***p* < 0.0001***
STD-risk behavior	**2,378**	1,776	4,154 (27.00%)	***p* <0.0001***
Drug use	**30**	12	41 (0.26%)	***p* =0.0151***
Hepatitis	2	2	4 (0.03%)	*p* >0.9999
Chagas' Disease	213	**288**	501 (3.25%)	***p* =0.0076***
Malaria	166	134	300 (1.95%)	*p* =0.2402
Others	3,642	**4,612**	8,254 (53.60%)	***p* <0.0001***
Total of clinical inaptitude (%)	6,967 (45.25%)	**8,431 (54.75%)**	15,398 (100%)	***p* <0.0001***

Note: We considered p < 0.05 statistically significant.
a: Student's *t*-test
***** Significant difference in Student's *t*-test.
Source: Authors.

The quantity and annual seropositivity rate per pathogen were tested in the blood bag samples (Table 4). First, it's important to analyze the type of tests performed for each pathogen. From 2019 to 2022 was used chemiluminescence as the chosen serological test, and for HIV, hepatitis B, and C, the Nucleic Acid Amplification Test (NAT) was also performed. At the bottom, the table includes the quantity of blood bags tested by year. Generally, Hepatitis B (0.82%) was the most common pathogen found, followed by Syphilis (0.79%), Hepatitis C (0.31%), Chagas' disease (0.27%), HIV (0.13%), and HTLV I and II (0.11%). However, after 2019 until the end of the analysis, a notable shift occurred, with Syphilis surpassing Hepatitis B in seropositivity rates. Similarly, from 2019 to 2020, there was a significant reduction in seropositivity for all pathogens except Syphilis. This difference may be attributed to the significant variation of blood donor candidates shown in Table 1.

Table 4 – Number and annual rate of seropositivity per pathogen tested in blood samples.

Pathogens	2019 n (%)	2020 n (%)	2021 n (%)	2022 n (%)	Total n (%)
Chagas' Disease	64 (0.37%)	35 (0.23%)	39 (0.24%)	34 (0.21%)	**172 (0.27%)**
HIV	**24 (0.14%)**	21 (0.14%)	25 (0.15%)	16 (0.10%)	**86 (0.13%)**
Syphilis	112 (0.65%)	**140 (0.93%)**	117 (0.72%)	142 (0.89%)	**511 (0.79%)**
Hepatitis B	203 (1.18%)	**90 (0.59%)**	106 (0.66%)	127 (0.79%)	**526 (0.82%)**
Hepatitis C	108 (0.63%)	11 (0.07%)	26 (0.16%)	53 (0.33%)	**198 (0.31%)**
HTLV I e II	**38 (0.22%)**	11 (0.07%)	12 (0.07%)	13 (0.08%)	**74 (0.11%)**
Discarded blood bags (%)	549 (3.20%)	308 (2.03%)	325 (2.01%)	385 (2.40%)	**1.567 (2.43%)**
Blood bags tested	17,147	15,130	16,144	16,015	**64,436**

Source: Authors.

4. Discussion

This study found that 18.96% of the 81,195 blood donor candidates were deemed clinically ineligible. Notably, this rate aligns closely with national trends observed between 2015 and 2020, which ranged from 16.76% to 20.14% (Ministério da Saúde, 2021), as well as with rates reported in other regions, such as Minas Gerais (19.9%) (Silva et al., 2016), São Paulo city (19%) (Martins et al., 2019), and the Brazilian Amazon (19.12%) (Luz et al., 2022). Previous research had identified Montes Claros as having the highest deferral rate in Minas Gerais, with 26.2% of candidates deemed ineligible (Silva et al., 2016). However, a promising trend of reduction in ineligibility rates over the years has been observed, attributed largely to continuous improvements in donor screening questionnaires designed to enhance the selection of lower-risk donor profiles (Martins et al., 2019).

While a higher percentage of female donor candidates was observed in this study, no statistically significant differences were found between sexes. This finding contrasts with global trends, where approximately 67% of blood donations are made by men (World Health Organization [WHO], 2021). Interestingly, prior research in Brazil has consistently shown men as the predominant donors, with male participation ranging from 76% in Recife to 54.1% in Santa Catarina (Luz et al., 2022; Monich et al., 2017; Silva et al., 2016; Martins et al., 2019; Rocha et al., 2018), closely aligning with the national average of 56% in 2020 (Ministério da Saúde, 2021). Conversely, in other regions, such as the Eastern Mediterranean, female donors make up a much lower proportion, averaging around 6% (WHO, 2021).

Regarding age distribution, the findings of this study are consistent with both national and global data, showing that most donations are made by individuals aged 25–44 years (Luz et al., 2022; Ministério da Saúde, 2021; WHO, 2021; Martins et al., 2019). However, a study conducted at the University Hospital of Santa Catarina identified a higher percentage of younger donors, particularly those aged 18–29 years (Rocha et al., 2018). This could reflect demographic differences or targeted initiatives like Hemominas' "Projeto Doador do Futuro," which promotes blood donation awareness among young people (Hemominas, 2020).

Additionally, this study revealed statistically significant rates of repeat and replacement donors, aligning with previous research (Almeida Neto et al., 2012; Ministério da Saúde, 2021; Rocha et al., 2018). A strong relationship between these groups has been reported, as voluntary donors are more likely to donate again and become repeat donors (Almeida Neto et al., 2012). In the current study, 61.39% of donors were classified as replacement donors, and 71.07% were repeat donors, reflecting the effectiveness of donor retention strategies implemented by public centers.

Perhaps the most striking finding is the significant reduction in blood donations and clinical ineligibility from 2019 to 2020. The emergence of the COVID-19 pandemic profoundly impacted global blood production, with Minas Gerais experiencing notable repercussions. The escalation of COVID-19 cases in March 2020 significantly affected the production and transfusion of blood components. Additionally, the implementation of lockdown measures in April further exacerbated the decline in donations (Santos et al., 2021; WHO, 2020; Ministério da Saúde, 2020).

During this period, not only did the number of donor candidates decrease, but the incidence of ineligibility due to flu-like symptoms increased substantially (Silva et al., 2021). Despite mitigation efforts, such as the suspension of elective procedures in early 2020, the demand for blood components also dropped considerably (Martins et al., 2021; Rocha et al., 2021). Consequently, national blood component production fell below the average levels of prior years. Although the transfusion system managed to meet demand, donation rates in 2022 had not yet returned to pre-pandemic levels. This highlights the need for renewed strategies to recruit new donors and encourage repeat donations to address ongoing challenges faced by blood centers.

As expected, our analysis identified significant differences in ineligibility between female and replacement donors, consistent with previous studies on the sociodemographic aspects of deferred blood donors at both national and international levels (Martins et al., 2019; Luz et al., 2022; WHO, 2021). However, a surprising trend emerged: repeat donors demonstrated higher rates of ineligibility compared to first-time donors, contradicting conventional expectations. This may be due to the

disproportionately high prevalence of repeat donor candidates at the Montes Claros Hemotherapy Center. Our analysis also found no significant age-based differences in ineligibility. However, factors such as income and regional sociodemographic disparities likely influence variability in ineligibility rates (WHO, 2021; Almeida Neto et al., 2012).

An examination of clinical ineligibility causes reveals notable gender disparities, with almost every analyzed factor showing significant differences between sexes, except for malaria and hepatitis. Risky sexual behavior, anemia, and hypertension were significant contributors to ineligibility, in line with national references (Ministério da Saúde, 2021; Martins et al., 2019). Notably, anemia was markedly more prevalent in women, likely influenced by pregnancy, menstruation, and breastfeeding. These findings suggest potential underdiagnosis of anemia in the community, underscoring the importance of interventions addressing iron depletion (Luz et al., 2022; WHO, 2021). Conversely, risky sexual behavior was nearly twice as prevalent in men, potentially reflecting a tendency toward immediate gratification over long-term consequences among young males. This highlights the need for targeted education strategies to raise awareness about the risks of unsafe sexual practices, particularly among male populations (Silva et al., 2021).

An intriguing finding is the notably higher prevalence of Chagas disease among blood donors during clinical triage compared to recent national data (0.07%) (Agência Nacional de Vigilância Sanitária, 2023). This observation is particularly noteworthy given the historical significance of Chagas' Disease in Minas Gerais, where the parasite was first discovered and remains prevalent across the state (Silva, Oliveira & Martinez, 2016). Despite significant efforts in epidemiological surveillance and control programs, particularly through the National Program for Chagas Disease Control, the northern regions of Minas Gerais continue to experience higher rates of Chagas Disease due to persistent socioeconomic challenges in rural areas (Silva, Oliveira & Martinez, 2016; Costa *et al.*, 2020).

Further, Chagas Disease exhibited approximately twice the detection rate of HIV throughout the four-year study period, a finding that diverges from the expected prevalence patterns. This stark difference becomes particularly pronounced when comparing our findings to other regions within Minas Gerais, except Diamantina, which also exhibited notably higher rates of Chagas Disease (Silva, Oliveira & Martinez, 2016). In contrast, several reports from another Brazilian regions, such as São Paulo, Pernambuco, and Santa Catarina, as well as nationally, have shown lower rates of Chagas Disease among blood donors (Agência Nacional de Vigilância Sanitária, 2023; Jaques, Saldanha & Moraes, 2020; Slavov et al., 2017). Similar trends have been observed in endemic areas like Ceará, further highlighting the unique epidemiological landscape of Chagas Disease in northern Minas Gerais (Costa *et al.*, 2020).

Additionally, our study found a seroprevalence of hepatitis B (0.82%) below the national average for Brazil in 2020 (1.19%) (Agência Nacional de Vigilância Sanitária, 2023), as well as lower rates compared to other regions such as Bahia, Curitiba, and Santa Catarina (Luz *et al.*, 2022; Monich *et al.*, 2017; Jaques, Saldanha & Moraes, 2020). Despite this, the prevalence in our study remains higher than the state average (0.46%) (Agência Nacional de Vigilância Sanitária, 2023). Furthermore, the seroprevalence of Syphilis (0.79%) in our study aligns with global data but is lower than the national average (1.08%) and previous seroprevalence rates in Minas Gerais (0.98%) (Silva, Oliveira & Martinez, 2016; Agência Nacional de Vigilância Sanitária, 2023). However, variations exist, with regions like Curitiba and Santa Catarina reporting lower positivity rates than our findings (Monich *et al.*, 2017; Jaques, Saldanha & Moraes, 2020).

Hepatitis C, the third most common pathogen in our study (0.31%), also displayed variations compared to previous studies in Minas Gerais and national seroprevalence rates (Silva, Oliveira & Martinez, 2016; Agência Nacional de Vigilância Sanitária, 2023). Notably, there is significant heterogeneity in the distribution of this pathogen across the country, indicating potential underdiagnosis of the disease in northern Minas Gerais.

Moreover, the prevalence of HTLV in our study was comparable or lower to previous national findings, with a trend toward an increase over time (Luz *et al.*, 2022; Miranda *et al.*, 2022). Interestingly, while previous studies have identified female

and replacement donors as the most significant groups in HTLV seroprevalence, this association wasn't confirmed in our study despite the importance of this population within the regional blood donor candidate pool. (Miranda *et al.*, 2022; Carneiro-Proietti *et al.*, 2012) This discrepancy underscores the complexity of HTLV epidemiology and also highlights how little this condition is known by the population.

While the proportions of seropositive donations varied globally, our study observed a significant decrease in seropositivity rates over the years, consistent with National Health Surveillance Agency (Agência Nacional de Vigilância Sanitária, 2023) and the World Health Organization (World Health Organization, 2023) data. However, it is important to note an increasing trend observed in 2019, primarily attributed to the impact of the COVID-19 outbreak (Agência Nacional de Vigilância Sanitária, 2023). This upward trend was particularly pronounced in syphilis seroprevalence from 2019 when compared to 2020 in our study, mostly because there was a disruptive effect of the pandemic on syphilis detection nationwide, resulting in reduced screening and treatment among the population (Ministério da Saúde, 2022).

5. Conclusion

This study underscores the clinical, epidemiological, and serological profile of blood donors in northern Minas Gerais. Moreover, our results highlight the need for initiatives to enhance the recruitment of new blood donors, mostly from those who are more likely to meet serological eligibility criteria. Continuous monitoring and evaluation of epidemiological data from blood donations are essential for informing blood donor recruitment strategies and guiding public health policies.

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