



Original article

Distribution of serological screening markers at a large hematology and hemotherapy center in Minas Gerais, Southeastern Brazil



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ABSTRACT

Objective: To assess the distribution of serological markers in blood donors at the blood banks of the Fundação Centro de Hematologia e Hemoterapia de Minas Gerais (Hemominas), Brazil, between January 2006 and December 2012.

Methods: This is a descriptive, retrospective study on blood donors screened using serological tests for markers of transmitted diseases at the state blood-banking network.

Results: Approximately 78.9% of the donors were considered eligible for the study after clinical screening. Repeat donors represented 68.2% of the total sample, with males being predominant as blood donors (66.8%). Total serological ineligibility was 3.05%, with total anti-HBc being the most common marker (1.26%), followed by syphilis (0.88%) and human immunodeficiency virus (0.36%). The prevalences of the markers for hepatitis C, Human T-cell lymphotropic virus, Chagas disease and HBs-Ag were 0.15%, 0.09%, 0.13% and 0.18%, respectively. The blood bank of Governador Valadares had the highest percentage of positive anti-HBc donors (2.41%). With regard to human immunodeficiency virus, the blood bank of Além Paraíba had the lowest percentage of positive donors while the blood banks of Juiz de Fora and Betim had the highest percentages. The blood bank in the city of Montes Claros had the highest prevalence of the marker for Chagas disease (0.69%).

Conclusions: Data on the profile of serological ineligibility by the blood banks of the Fundação Hemominas highlights the particularities of each region thereby contributing to measures for health surveillance and helping the blood donation network in its donor selection procedures aimed at improving blood transfusion safety.

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Introduction

In Brazil, up to the 1960s, transfusion procedures were mostly performed by private hospital blood banks with no governmental regulation. Paradoxically, the importance of blood as essential to the healthcare system was firstly noted with the Brazilian Revolution of 1964. The army, in view of the imminence of an armed conflict, found that stocks of blood and components would be insufficient to meet the needs in the event of armed combat.¹ It was at that time that the first public initiatives were taken in Brazil to try to normalize this activity.

The first governmental act was the creation of a national hemotherapy commission aimed at setting a policy to regulate the blood collection procedure, including storage and transfusion.² This commission formulated basic rules for donors and blood transfusion by establishing the mandatory serological screening tests needed for safe blood transfusions. In 1980, the Federal Government implemented the National Program on Blood and Blood Derivatives with the participation of the civil society, in order to define a policy for blood and its components in Brazil, thus ensuring the availability, safety and amount of these products.³

The regional blood-banking network of the state of Minas Gerais was thus established in June 1982 with the objective of implementing the policies proposed by the National Program on Blood and Blood Derivatives. In 1985, the blood-banking network of Minas Gerais was officially inaugurated, and became known as the Centro de Hematologia e Hemoterapia de Minas Gerais (Hemominas) and then Fundação Hemominas four years later.⁴ Today, Fundação Hemominas is one of the largest blood screening services in Brazil. It is comprised of 21 blood banks at the following sites: Além Paraíba, Belo Horizonte, Shopping Estação (Belo Horizonte), Betim, Diamantina, Juiz de Fora, Divinópolis, Governador Valadares, Patos de Minas, Sete Lagoas, Montes Claros, Uberlândia, Ituiutaba, São João Del Rei, Manhuaçu, Pouso Alegre, Hospital Júlia Kubitscheck (Belo Horizonte), Uberaba, Ponte Nova, Passos, and Poços de Caldas.⁵

Fundação Hemominas receives about 280,000 blood donors per year and accounts for 91% of blood transfusions in Minas Gerais. Epidemiological information on the diseases identified among blood donor candidates is important to gather data on the blood banks of Fundação Hemominas, thus enabling a reduction of the risks of disease transmission and ensuring the quality of donated blood.⁶ With the increase in transfusions, and consequently in the transmission of blood-borne diseases, hemotherapy services are not only developing blood banking services, but researching these diseases. Subsequently many developments occurred within a few years including a shift from paid to voluntary donation, and autologous blood donations. The improvement in serological screening tests, rigorous transfusion requirements and standardization of procedures have been essential for the safety of blood donation and transfusion.⁷

The transmission of infectious diseases through blood transfusion is characterized by a higher-risk of adverse reactions in the blood recipient. The identification of pathogens by means of serological tests is one way of preventing the dissemination of these infectious agents during transfusion.

In Brazil, the Ministry of Health established that serological tests must be performed for every blood donation regarding the following pathogens: hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus (HIV) types 1 and 2, human T lymphotropic virus (HTLV) types 1 and 2, *Trypanosoma cruzi*, *Treponema pallidum*, and *Plasmodium* in malaria-endemic areas (including molecular tests). Another important procedure adopted to minimize the risks of contamination is the clinical and epidemiological screening of the candidates' health status, habits, and risky behavior to help to determine possible risks of blood donation in respect to the health of donors and recipients.⁸⁻¹⁰ In order to standardize the serological screening procedures throughout the state of Minas Gerais, Fundação Hemominas created a serology center in May 2005 to serve all 21 blood banks, thus accounting for complementary serological screening and exams for both donors and patients. Today, this serology center is one of the largest donor screening laboratories in Brazil, performing about two million tests per year.⁵

The objective of the present study is to describe the prevalence of serological screening markers among blood donor candidates of the Fundação Hemominas between 2006 and 2012. The state of Minas Gerais is one of the 27 states of Brazil with approximately 20 million inhabitants distributed among 853 towns. With 586,522,122 km², the area of the state of Minas Gerais, the fourth largest state of Brazil, corresponds to 6.89% of the national territory; 2,525,800 km² are in urban areas. The city of Belo Horizonte, located in the central region, has a population of about 2.4 million people. The southern region of the state is more industrialized and economically developed, thus it has good social indicators. On the other hand, the northern region is one of the poorest regions in Brazil, because of the drought and lack of effective government policies, with inefficient environmental sanitary services and high child mortality and illiteracy rates.

Methods

Design

This descriptive retrospective study included all blood donors screened using serological tests for makers of blood-borne diseases at the Fundação Hemominas. The tests were mandatory during the period of the study from 2006 to 2012, even for repeat donors as prior negative serological tests do not spare them from possible serological ineligibility. The blood bank at Poços de Caldas was inaugurated in 2010. All data were collected from computerized records of the Fundação Hemominas.

The present study was approved in June 2013 by the Research Ethics Committee of the Hospital das Clínicas of the Faculdade de Medicina de Ribeirão Preto da Universidade de São Paulo (FMRP-USP: #356.616).

Serological screening tests

The serological screening tests of blood samples were performed in the serology center of the Fundação Hemominas. The assays and kits used were the following:

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