

## Sociodemographic and clinical characteristics of adolescent candidates for blood donation in a blood center

Características sociodemográficas e clínicas de adolescentes candidatos à doação de sangue em um hemocentro

Características sociodemográficas y clínicas de adolescentes candidatos a donación de sangre en un hemocentro

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**Abstract: Objective:** To know the sociodemographic and clinical characteristics of adolescents aged 16 and 17 years old who are candidates for blood donation in a Regional blood center in the state of Rio Grande do Sul. **Method:** A cross-sectional and descriptive study, developed based on the records of a hemotherapy service database from January 2012 to December 2016, according to the criteria for expanding the selection of donors in Ordinance No. 1,353/2011. **Results:** the total number of blood donation candidates between 16 and 17 years old was 473, with a predominance of candidates fit for donation (78.2%), female (57.5%), Caucasian (72.5%), who donated for the first time (86%) voluntarily. **Conclusion:** The possibility of blood donation, including adolescents, needs to be widely publicized, and marketing and health education actions used as strategies for raising awareness, attracting and retaining customers.

**Descriptors:** Blood donors, Donor selection, Hemotherapy service, Adolescent, Nursing

**Resumo: Objetivo:** conhecer as características sociodemográficas e clínicas de adolescentes de 16 e 17 anos candidatos à doação de sangue em um Hemocentro Regional do Estado do Rio Grande do Sul. **Método:** estudo transversal, descritivo, desenvolvido com base nos registros do banco de dados de um Hemocentro no período de janeiro de 2012 a dezembro de 2016, conforme critério de ampliação de seleção de doadores da Portaria nº 1.353/

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2011. **Resultados:** o total de candidatos à doação de sangue entre 16 e 17 anos foi de 473 pessoas, com predomínio de candidatos aptos à doação (78,2%), do sexo feminino (57,5%), de cor caucasiana (72,5%), que doavam pela primeira vez (86%) de forma voluntária. **Conclusão:** a possibilidade de doação de sangue, incluindo os adolescentes, necessita ser amplamente divulgada e ações de marketing e de educação em saúde utilizadas como estratégias para sensibilização, captação e fidelização.

**Descritores:** Doadores de sangue; Seleção do doador; Serviço de hemoterapia; Adolescente; Enfermagem

**Resumen: Objetivo:** conocer las características sociodemográficas y clínicas de los adolescentes de 16 y 17 años candidatos para donar sangre en un servicio de hemoterapia en el estado de Rio Grande do Sul. **Método:** estudio descriptivo y transversal, desarrollado en base a los registros de una base de datos del servicio de hemoterapia desde enero de 2012 hasta diciembre de 2016, de acuerdo con los criterios para ampliar la selección de donantes indicados en la Ordenanza N.º 1.353/2011. **Resultados:** la cantidad total de candidatos para donar sangre de 16 y 17 años de edad fue de 473, con predominio de candidatos aptos para la donación (78,2%), mujeres (57,5%), caucásicas (72,5%), y que donaban sangre por primera vez (86%) en forma voluntaria. **Conclusión:** la posibilidad de donar sangre, incluidos los adolescentes, debe publicitarse ampliamente y las acciones de marketing y educación sanitaria deben usarse como estrategias para crear conciencia, atraer y retener clientes.

**Descriptor:** Donantes de sangre, Selección de donantes, Servicio de hemoterapia, Adolescente, Enfermería.

## Introduction

The lack of blood components is a worldwide concern because there are no elements that can replace them. According to the Ministry of Health, it is estimated that approximately three million and six hundred thousand blood transfusions are performed in Brazil every year. Only 1.9% of the population donates blood regularly. In addition, it is believed that states with greater technological development, such as Rio de Janeiro, São Paulo, and Rio Grande do Sul have a higher demand for blood.<sup>1</sup> In this sense, in order to maintain stocks it is necessary that 3% to 5% of the population be a loyal donor.<sup>2-3</sup>

In order to encourage collective awareness of responsibility, commitment and solidarity, in 2011 and through the National Health Surveillance Agency (*Agência Nacional de Vigilância Sanitária*, Anvisa), the Ministry of Health issued Ordinance No. 1,353, dated June 13<sup>th</sup>, which expands the criteria for selecting donors allowing for the inclusion of adolescents aged 16 and 17, with the formal consent of their parents or legal guardians. This purpose aims to increase the contingent of donors of blood and blood products.<sup>4</sup>

Among the types of donation we can mention the following: voluntary or spontaneous, replacement, autologous and apheresis. Voluntary or spontaneous is characterized as donations of a blood unit or one of its components motivated by an altruistic act to maintain the stocks of the hemotherapy services without identifying the name of the possible recipient. Replacement is intended to restore the blood bank stock, made by individuals who donate for personal reasons, based on the need presented by a family member or acquaintance. The autologous type is performed by the donor for himself and the apheresis consists of the removal of only one component of the whole blood.<sup>2-3</sup>

Before proceeding to the blood collection, the candidates for donation undergo a clinical screening that consists of an assessment of the clinical and epidemiological history of the current state of health, habits and behaviors and diseases that may disable them as donors. This strategy helps to determine whether the candidate is in a position to donate blood without harming the health of the donor and of the recipient. For those considered fit, after collection, a laboratory blood analysis is also performed before the release of blood components for transfusion. These measures aim to protect and ensure the safety of the donor-recipient binomial and the consequent improvement in the quality of the blood to be transfused, thus reducing the risks inherent to the transfusion therapy and to the transmission of infectious diseases.<sup>2-3</sup>

The skills and duties of the nursing team in the hemotherapy services are supported by the Federal Nursing Council, through Resolution No. 306/2006 (CONFEN, 2006).<sup>5</sup> The nursing team has direct contact with the donation candidate, advising on all the stages of blood donation and on the possible adverse reactions during and after blood collection. It is up to the nurse, specifically, to perform the clinical screening by means of an interview with the probable donor to assess the background and the current state in a setting that guarantees the privacy and confidentiality of the information provided. In addition, the nurse plays an important role

in raising the awareness of the nursing staff for a humanized and safe care, which guarantees quality and trust to the donor in the process of attracting and encouraging donor loyalty.<sup>6</sup>

Therefore, considering that the possibility of 16 and 17-year-old adolescents donating blood is little publicized and that little is known about how these individuals have behaved after their inclusion in the ministerial regulation, the relevance is highlighted of studies that explore the participation of this population group in the context of blood donation. This kind of research is justified by the nurse's responsibility to act in the planning, execution, coordination, supervision and evaluation of procedures involving hemotherapy.<sup>5</sup> In this sense, its importance in the process aimed at raising awareness in the donors is highlighted, including proposing educational strategies that can encourage and better inform the target audience, favoring this exercise of solidarity and citizenship.<sup>7</sup>

Blood donation by adolescents aged 16 and 17 is still an incipient theme in Brazil. In a research carried out in an online database, via the regional portal of the Virtual Health Library (*Biblioteca Virtual em Saúde*, BVS) using the descriptors “adolescents and blood donors”, a production was located in the national context, showing a gap in knowledge, since the study sought to assess the impact of expanding the age range eligible for donation on the donor profile and the number of donations. The results obtained concluded that such a measure did not increase the proportion of donors in the population.<sup>8</sup> However, the sociodemographic and clinical characteristics of the donors were not considered in the investigation.

Therefore, the present investigation intends to answer the following question: What are the sociodemographic and clinical characteristics of adolescents aged 16 and 17 who are candidates for blood donation in a Regional Blood Center?

Thus, the objective is to know the sociodemographic and clinical characteristics of adolescents aged 16 and 17 who are candidates for blood donation in a Regional Blood Center of Rio Grande do Sul.

## Method

This is a cross-sectional and descriptive study, developed based on the records available in the electronic database of the Santa Maria Regional Blood Center (*Hemocentro Regional de Santa Maria*, HEMOVIDA), of candidates for donating blood and blood components between January 1<sup>st</sup>, 2012 to December 31<sup>st</sup>, 2016.

The information for carrying out this investigation was extracted from the HEMOVIDA database, considering the following available variables: year, gender, age, self-reported skin color, fit and unfit candidates, type of donor (first or repeat), type of donation (voluntary or spontaneous and replacement), and reasons for disability such as anemia, withdrawal, hypotension, inadequate venous access and other causes not specified in the available records. These data were collected in May 2017. Regarding the selection criteria, records of adolescents aged 16 and 17 years old were included and incomplete records were excluded.

It is worth mentioning that these data are self-reported by the candidates when they present themselves to donate blood, and are informed in the System by the professionals of the Blood Center. It is a standard form implemented in 2010 and used by all blood centers in Rio Grande do Sul, and the data available at HEMOVIDA refer to the state. However, for this study, only information related to the Santa Maria Regional Blood Center was made available.

Thus, from the extracted information of interest, the data were typed and organized in an electronic spreadsheet, in the *Microsoft Office Excel*<sup>®</sup> program 2010. The analysis of categorical and quantitative variables was performed using descriptive statistics (absolute numbers and percentages).

This research is part of a larger investigation, entitled “Recruiting blood and blood components donors: contributions from a multidisciplinary team”, which was approved by the Research Ethics Committee under Opinion number 1,189,482. This study was carried out at the Santa Maria Regional Blood Center and sought to evaluate the results of strategies implemented by a multi-professional team to expand the attraction of blood donors and blood components in general. In this study, a descriptive cut of data referring to adolescent donors aged 16 and 17 years old is presented, specifically.

It is noteworthy that all ethical principles governing research involving human beings were observed in accordance with Resolution 466/12 and that the study had the support and approval of the administrative management of the Regional Blood Center to be carried out.

## **Results**

In the records found from 2012 to 2016, the number of candidates for donation of whole blood between 16 to 69 years old was 55,346 individuals. Of these 47,401 (85.6%) were considered fit for donation and 7,945 (14.4%) unfit. In view of this, 473 records of those candidates for donation aged between 16 and 17 years old were included in this investigation. These represented 0.85% of the total donation candidates.

Sequentially, in Table 1, the distribution of candidates aged between 16 and 17 years old for blood donation considered fit and unfit is explained. It appears that the highest percentage in general is found among candidates eligible for blood donation with 78.2% (n=370).

**Table 1** - Candidates considered fit and unfit for blood donation, from 2012 to 2016. Santa Maria, RS, 2017.

Year	Donation candidates (16 and 17 years old)					
	Fit		Unfit		Total	
	n	(%)	n	(%)	n	(%)
2012	49	(75.4)	16	(24.6)	65	(100)
2013	67	(84.8)	12	(15.2)	79	(100)
2014	90	(79.7)	23	(20.3)	113	(100)
2015	91	(77.8)	26	(22.2)	117	(100)
2016	73	(73.7)	26	(26.3)	99	(100)
<b>Total</b>	<b>370</b>	<b>(78.2)</b>	<b>103</b>	<b>(21.8)</b>	<b>473</b>	<b>(100)</b>

Source: HEMOVIDA database of the Regional Blood Center of Santa Maria/RS

Table 2 shows the distribution of the donation candidates according to gender and to the adolescents' attendance period. Thus, it is possible to notice that the candidates who donated the most were female, with 57.51% (n=272).

**Table 2** - Distribution of the candidates according to gender and year of donation (2012 to 2016). Santa Maria, RS, 2017.

Year	Gender				Total	
	Female		Male			
	N	(%)	N	(%)	n	(%)
<b>2012</b>	39	(8.25)	26	(5.50)	65	(13.74)
<b>2013</b>	44	(9.30)	35	(7.40)	79	(16.70)
<b>2014</b>	58	(12.26)	55	(11.63)	113	(23.89)
<b>2015</b>	68	(14.38)	49	(10.36)	117	(24.74)
<b>2016</b>	63	(13.32)	36	(7.61)	99	(20.93)
<b>Total</b>	<b>272</b>	<b>(57.51)</b>	<b>201</b>	<b>(42.49)</b>	<b>473</b>	<b>(100)</b>

Source: HEMOVIDA database of the Regional Blood Center of Santa Maria/RS.

Table 3 shows the distribution of the candidates in relation to the type of donor and donation in the period from 2012 to 2016. When analyzing the candidates as to the type of donor, the individuals who donated the first time are predominant. Regarding the type of donation, the candidates who donated voluntarily or spontaneously stand out.

**Table 3** - Distribution of the candidates for donation according to the type of donor and donation in relation to the frequency of attendance of the donor. Santa Maria, RS, 2017

Year	Type of donor	Type of donation				Total	
		Voluntary (Spontaneous)		Reposition		n	(%)
		n	(%)	n	(%)		
2012	1 <sup>st</sup> time	50	(10.57)	9	(1.90)	59	(12.47)
	Repetition	5	(1.06)	1	(0.21)	6	(1.27)
	<b>Total</b>	<b>55</b>	<b>(11.63)</b>	<b>10</b>	<b>(2.11)</b>	<b>65</b>	<b>(13.74)</b>
2013	1 <sup>st</sup> time	59	(12.47)	16	(3.38)	75	(15.86)
	Repetition	4	(0.85)	-	-	4	(0.85)
	<b>Total</b>	<b>63</b>	<b>(13.32)</b>	<b>16</b>	<b>(3.38)</b>	<b>79</b>	<b>(16.70)</b>
2014	1 <sup>st</sup> time	72	(15.22)	20	(4.23)	92	(19.45)
	Repetition	16	(3.38)	5	(1.06)	21	(4.44)
	<b>Total</b>	<b>88</b>	<b>(18.60)</b>	<b>25</b>	<b>(5.29)</b>	<b>113</b>	<b>(23.89)</b>
2015	1 <sup>st</sup> time	75	(15.86)	26	(5.50)	101	(21.35)
	Repetition	14	(2.96)	2	(0.42)	16	(3.38)
	<b>Total</b>	<b>89</b>	<b>(18.82)</b>	<b>28</b>	<b>(5.92)</b>	<b>117</b>	<b>(24.74)</b>
2016	1 <sup>st</sup> time	59	(12.47)	23	(4.86)	82	(17.34)
	Repetition	14	(2.96)	3	(0.63)	17	(3.59)
	<b>Total</b>	<b>73</b>	<b>(15.43)</b>	<b>26</b>	<b>(5.50)</b>	<b>99</b>	<b>(20.93)</b>
<b>General total</b>		<b>368</b>	<b>(77.80)</b>	<b>105</b>	<b>(22.20)</b>	<b>473</b>	<b>(100)</b>

Source: HEMOVIDA database of the Regional Blood Center of Santa Maria/RS.  $p < 0.05$  significant.

Finishing the presentation of the data, Table 4 shows the distribution of the candidates for blood donation in relation to skin color. In this, it is identified that the majority of the adolescents were of the Caucasian skin color: 72.5% (n=341).

**Table 4** - Distribution of the candidates for donation regarding skin color. Santa Maria, RS, 2017.

Year	Skin color					Total
	Caucasian	B. Caucasian*	Black	Indigenous	Mixed race	
2012	56 (86.1)	4 (6.2)	-	1 (1.5)	4 (6.2)	65
2013	51 (64.5)	21 (26.6)	3 (3.8)	-	4 (5.1)	79
2014	76 (67.8)	24 (21.4)	1 (1)	-	11 (9.8)	112
2015	75 (64)	25 (21.4)	8 (6.9)	-	9 (7.7)	117
2016	83 (85.6)	3 (3.1)	3 (3.1)	-	8 (8.2)	97
<b>Total</b>	<b>341 (72.5)</b>	<b>77 (16.4)</b>	<b>15 (3.2)</b>	<b>1 (0.2)</b>	<b>36 (7.7)</b>	<b>470</b>

\* Brazilian Caucasian

Source: HEMOVIDA database of the Regional Blood Center of Santa Maria/RS.



## Discussion

The information collected from the HEMOVIDA database represents the results of a regional blood donation center, which during the period under investigation showed a tendency for a slight increase in donations among adolescents between 16 and 17 years old, female, Caucasian, fit to donate, and who donated for the first time voluntarily or spontaneously. A study carried out in Tubarão, in the state of Santa Catarina, Brazil, found that of the total donations, 0.29% in 2011 and 0.49% in 2013 corresponded to adolescents aged 16 to 18 years old.<sup>8</sup>

As for the consent of parents or legal guardians, it is emphasized that the authorization must comply with all the requirements and responsibilities foreseen to other donors, that is, undergo clinical screening, perform and receive the results of the laboratory analysis. However, the results of laboratory screening tests can only be given to the adolescent donor.<sup>9</sup> The need for formal consent from parents or guardians for the donation may constitute a factor that restricts the number of adolescent candidates for donation.

Most of the adolescents whose data comprised this study were considered fit to donate blood. It should be noted that the unfitness can be defined as temporary, when the candidate is prevented from donating blood for a certain period or definitive, for those who can never donate blood.<sup>2</sup> As for the factors that led to unfitness, 77.7% (n=80) of the causes were not described in the system, being classified as “other causes”, 14.6% (n=15) was due to anemia, 3.9% (n=4) dropouts, 2.9% (n=3) due to hypotension and 0.9% (n=1) due to inadequate venous access. Detailed information, which discriminates the reasons for unfitness among the “other causes” may signal the need to improve in the system the data registration process, representing the reality of the service so that one can invest in reducing the number of unfit adolescents.<sup>10-11</sup>

The fact that adolescents have the initiative to donate blood and are considered fit, can motivate them to continue with this act, regardless of whether they do it by the altruistic or social spirit or to help others. In addition, it can favor the uptake of other adolescents and consequently, increase the amount of blood and blood products in donation centers.<sup>10</sup> Identifying any impediment in the screening process making it impossible to become a donor has been pointed out as a factor that favors negative behavior for non-donation, discourages the attitude and makes the person multiply this opinion in his/her coexistence group.<sup>12</sup>

On the other hand, among the reasons for disability, in addition to diseases that prevent donation, the results of lifestyle and habits that may be related to factors such as vulnerability to sexual behavior risks, alcohol consumption, inadequate dietary pattern that can lead to anemia, pregnancy, drug use and lack of information about the blood donation process.<sup>11-13</sup> In this context, carrying out educational activities, especially in schools, with the aim of instigating adolescents through the provision of effective information about healthy habits and the blood donation process can contribute to develop awareness about these aspects, favoring the increase of candidates for donation and, consequently, the reduction of unfitness in clinical screening. Initiatives of this nature raise awareness to make donation a habitual conscious and responsible behavior among adolescents which, in addition to being one of the objectives of health policies, is a social commitment.<sup>11</sup>

Female adolescents represented the majority of candidates for blood donation. This result is in line with an investigation conducted in 2011 in a public blood center in Fortaleza, in the state of Ceará, with candidates aged 16 and 17 which identified that 63.4% of the donors were female.<sup>13</sup> A similar finding is also pointed out in a study carried out in Stockholm/Sweden, in which 60% were female candidates.<sup>14</sup> The higher frequency of female donors may be related to the fact that women are more sensitive to the humanitarian issue of blood donation and are more likely to seek the service due to some advertising or lecture.<sup>15</sup> In comparison with the

results of the national distribution of blood donors, from 2012 to 2015, male candidates had higher percentages; however, it is noteworthy that adolescents between 16 and 17 years old were not considered in this investigation.<sup>2-3</sup>

With regard to the type of donor, this study points out that first-time donors are predominant, which shows the interest of adolescents in seeking hemotherapy services for donation. Although the literature does not sufficiently explore the reasons why adolescents decide to seek blood collection services for the first time, it is considered that these do not differ from those listed by the adult population and that they refer to blood needs by hospitalized family members, influence of donor friends and the marketing of campaigns in favor of donation.<sup>12,15</sup>

As the candidates who voluntarily donated predominated, it can be inferred that some of these may have been accessed in activities to raise awareness of blood donors. Among these activities, we highlight the campaigns carried out by the health institutions and the government, broadcast mainly on television, to encourage the population to donate blood.<sup>16-17</sup>

The marketing strategies developed in campaigns and educational actions aim to inform, raise awareness and encourage the population and adolescents to donate blood for the first time, as well as to become loyal/regular donors. In this regard, the World Health Organization emphasizes the importance of repeat donors, in which blood collection has a low rate of rejection due to positive serology and risky behavior, therefore being the most necessary and recommended, considering the safer and more sustainable blood supply in hemotherapy services.

In a positive way, the campaigns are viewed favorably for trying to attract the population, managing to give visibility to the problem and disseminate information through the media.<sup>19</sup> However, the campaigns have limitations regarding their effectiveness resulting from the weakness in adequately clarifying the requirements to be a donor and in treating fears related to

blood donation. Therefore, it is necessary to seek new ways of approaching the population, promoting a culture conducive to donation. For this purpose, it is important to include discussions related to this topic in the education of children in schools, since this setting influences the acquisition of values and encourages the exercise of citizenship, transforming individuals not only into donors, but also into multipliers of this perspective.<sup>17</sup>

Regarding the skin color self-reported by adolescent candidates for donation, individuals of Caucasian and Brazilian Caucasian color prevailed. In this sense, the Brazilian Caucasian skin color includes browns and individuals of mixed origin. Brazil is an abundantly mixed country, which explains the presence and prevalence of variant hemoglobins, which may be related to the skin color of blood donors.<sup>18-20</sup> Among the variants, Hemoglobin S (HbS) is one of the most frequent hereditary hematological changes and is closely related to African immigration, with a higher prevalence in its descendants. Homozygosity for HbS (hb SS) results in sickle cell anemia that prevents blood donation. Heterozygosis (hb AS) is characterized by the sickle cell trait that ranges from 2 to 6% in Brazil and its carriers do not show symptoms due to the obstruction of small blood vessels under physiological conditions.<sup>21</sup> Hemoglobin S screening is mandatory in the screening of blood donors and the red blood cell concentrate from a donor with the sickle cell trait cannot be transfused in patients with hemoglobinopathies, severe acidosis, hypothermia, newborns and also in intrauterine transfusions and surgical procedures with extracorporeal circulation.<sup>20-21</sup>

Considering the distribution of the total number of adolescents who sought the Blood Center to donate blood in the period analyzed, it is noted that there was a slight increase in the number of candidates for donation each year; however, having receded in the last year. The increase may be related to the content of the campaigns carried out, emphasizing the possibility of donation by individuals in this age group. However, it is evident that actions aimed at attracting blood donors need to be carried out constantly.<sup>22</sup>

## Conclusion

The results identified the main sociodemographic and clinical characteristics of adolescents aged 16 and 17 who were candidates for blood donation, between 2012 and 2016, available in the database of a Regional Blood Center in Rio Grande do Sul. It was found that these individuals represented 0.85% of the total candidates. Among the adolescents who sought the service, there was a predominance of females, with Caucasian skin color, considered fit for donation and who made the donation for the first time, voluntarily or spontaneously.

It should be noted that the possibility of blood donation by adolescents aged 16 and 17 needs to be widely and repeatedly disseminated, based on actions that not only alert to the importance of donating blood, but that are educational in relation to the aspects that involve donation, possible reasons for unfitness and clarify specific doubts of this population.

For the donation to become a frequent behavior among adolescents, it is necessary to raise awareness about the donation and about loyalty. In this sense, campaigns in partnership with schools for dissemination among students and parents (since they need to consent to the donation and can be potential candidates), with support from the primary health care network and the blood centers can collaborate to increase the number of donors, contributing to the maintenance of the stocks of blood components. Another possibility to provide a culture of blood donation as an act of citizenship and solidarity, refers to including this theme in the curriculum context of basic education, which can be addressed in the study of the circulatory system.

The results of this study add to the nursing knowledge by exploring a still incipient theme. They can also contribute to the practice in the area of hemotherapeutic nursing, considering that nurses play an important role both in the development of actions to disseminate, strengthen and encourage blood donation, as well as in donor loyalty. In this sense,

knowing the characteristics of adolescent donors can support the development of care protocols, as well as the selection of educational and marketing strategies aimed at this specific population.

As limitations of this investigation, the context of the investigation stands out, which refers to the data made available by a regional public blood processing service and to the design adopted in the study. It is suggested that further investigations, especially on a population basis and with expansion of the variables of interest, be carried out in order to expand the knowledge of the reality in other blood centers and at the national level regarding blood donation by adolescents. Finally, studies that seek to know about the motivations that lead adolescents to apply as donors and to remain (or not) are necessary for us to understand how to interact with this group and thus develop appropriate marketing strategies and campaigns.

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