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# Blood donation prevalence and associated factors in Pelotas, Southern Brazil

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## ABSTRACT

**OBJECTIVE:** To estimate the prevalence of blood donation and factors associated.

**METHODS:** A cross-sectional study was carried out with a representative sample of 2,986 individuals, aged 20 or more, in the municipality of Pelotas, Southern Brazil, in 2007. Three outcomes were considered: ever donating blood, donation during in the previous year and frequent donation pattern (at least two donations in the previous year). Each outcome was analyzed according to demographic, socioeconomic and health factors, exposure to blood donation publicity campaigns and whether the donor had a relative or friend who donated blood. The crude and multivariable analyses were performed using Poisson's regression, adjusted for sample design effect.

**RESULTS:** Blood donation prevalence – ever, in the previous year and a frequent donation pattern – were 32%, 7.7% and 3.6%, respectively. Blood donation was more prevalent among males and increased in accordance with the economic level and health self-perception. The prevalence of ever donating blood was higher in the 50 to 65 years age group; in the previous year, it was higher among younger people (20 to 29 years); frequent donation was more prevalent in the 30 to 49 group. There was no association of the outcomes with skin color, marital status, religion, having a relative or friend who donates or knowing about publicity campaigns.

**CONCLUSIONS:** Blood donation was more prevalent in men and in those who have better self-perception of health and a higher economic level. Campaigns encouraging blood donation should diversify the donor profile for reaching those groups of people who are less inclined to donate blood.

**DESCRIPTORS:** Blood Donors. Prevalence. Socioeconomic Factors. Cross-Sectional Studies

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## INTRODUCTION

Donating blood is an act that can save the lives of thousands of people worldwide. In England, in 2004 one million of lives were saved or improved by a blood transfusion. In the United States, also in 2004, four and a half million of deaths were avoided due to this act.<sup>a</sup>

In Brazil, there are no available data about how many people die or suffer some other type of damage due to the lack of blood or blood products. Estimates from the Ministry of Health indicate that 1.8% of the Brazilian population voluntarily donates blood every year.<sup>b</sup> However, the World Health Organization (WHO) advocates that 3% to 5% of the population should donate blood every year, which would be the ideal rate for maintaining a country's stocks of blood and blood products at acceptable levels.<sup>b</sup>

Turning people into loyal blood donors – a term referring to at least two donations per year, according to the National Health Surveillance Agency (Anvisa)<sup>c</sup>, – is an extremely relevant issue, since increasing indices would raise the absolute number of donations coming from donors who are known to be both healthy and suitable.

In 2005, a wide national study<sup>d</sup> about the profile of Brazilian blood donors was carried out including just blood donation centers.

The objective of this study was to estimate the prevalence of having ever donated blood, blood donation in the previous year and loyal blood donation and the factors associated.

## METHODS

A cross-sectional population-based study was conducted in the city of Pelotas, Southern Brazil, between October 2007 and January 2008. The study was part of a larger project that evaluated the health and behavioral exposure of the adult population of the town.<sup>e</sup>

Sampling was done in multiple stages. Of the 404 residential census tracts in Pelotas, 126 were randomly selected, with a probability that was proportional to the size of the tract and ordered according to the income of the head of the family, in accordance with data from the

2002 census of the Brazilian Institute of Geography and Statistics (IBGE).<sup>f</sup> As the IBGE establishes an average of 2.1 adults (20 years old or more) per household, 1,428 households were previously selected, which when divided by the 126 tracts, resulted in about 12 households per tract.

To calculate the size of the sample, a blood donation prevalence rate over the previous year of 5%<sup>3</sup> was estimated, with a 1 percentage point margin of error, resulting in a sample of at least 2,504 adults, aged 20 or more. Despite individuals over 18 being capable of donating blood according to the Ministry of Health, a lower limit of 20 was used because this is the start of the adulthood, according to the WHO. To study associated factors, the highest value encountered relative to the variable marital status was 2,823 people. The number of individuals included in the study, however, exceeded the number calculated for the sample, in order to meet the demand of other studies that formed part of the research consortium. For all associations a level of significance of 95% was considered, a design effect of 1.25 and increase of 10% for possible losses and 15% for controlling potential confounders.<sup>7</sup> Individuals who were incapable of replying to the questionnaire because of mental problems were excluded, as were those in institutions (rest homes for elderly and prisons) at the time of data collection.

Data were obtained by means of a standard and previously tested questionnaire, comprising several questions on health. Three outcomes were considered: having ever donated blood, donation in the previous year and a loyal donation pattern. Individuals over 65 (N= 358) were excluded from the analyses of the outcomes loyal blood donation pattern and donation in the previous year, in line with guidance from the Ministry of Health which establishes the age group for blood donation as being between 18 and 65. The outcome was obtained by means of the self-reporting of the respondents about having ever donated blood and in the year prior to the interview. Information about loyal donation was obtained from the response to the question about how many times the individual had donated blood in the previous year; it was defined as being at least two donations in the year prior to the interview. In 10% of the randomly selected sample a

<sup>a</sup> World Health Organization. World Blood Donor Day 2005 Report: "celebrating your gift of blood"; 2006. Available from: [http://www.who.int/worldblooddonorday/resources/WBDD\\_Report\\_2005.pdf](http://www.who.int/worldblooddonorday/resources/WBDD_Report_2005.pdf)

<sup>b</sup> Ministério da Saúde. Saúde incentiva doações de sangue. [cited 2007 Sep 15] Available from: [http://portal.saude.gov.br/portal/saude/visualizar\\_texto.cfm?idtxt=25472](http://portal.saude.gov.br/portal/saude/visualizar_texto.cfm?idtxt=25472)

<sup>c</sup> Agência Nacional de Vigilância Sanitária. Campanha Nacional de Doação de Sangue, 2005. Saúde incentiva doações de sangue. [cited 2007 Sep 17] Available from: <http://www.anvisa.gov.br/cidadao/sangue/index.htm>

<sup>d</sup> Agência Nacional de Vigilância Sanitária. Pesquisa revela perfil de doadores e não-doadores de sangue, 2006 [cited 2007 Sep 16]. Available from: [http://www.anvisa.gov.br/DIVULGA/NOTICIAS/2006/110106\\_1.htm](http://www.anvisa.gov.br/DIVULGA/NOTICIAS/2006/110106_1.htm)

<sup>e</sup> Projeto Saúde e Comportamento da população adulta da cidade de Pelotas, RS, Brasil; 2007-8, financiado pela Coordenação de Aperfeiçoamento do Pessoal de Nível Superior.

<sup>f</sup> Instituto Brasileiro de Geografia e Estatística. Censo Demográfico 2000. Rio de Janeiro: IBGE; 2000.

summarized questionnaire was used for quality control of the interviews. There was a low percentage of losses or refusals (6.1%).

The following were considered as independent variables: gender; marital status; age; skin color (observed by the interviewer); schooling (number of years of formal education completed); economic level, according to the classification of the Brazilian Association of Research Companies (ABEP, 2007);<sup>a</sup> having a religion or not; having a relative or friend who had donated blood; having seen or heard about blood donation campaigns and self-perception of health.

The Epi Info version 6.04d program was used for double entry of the questionnaires. Data analysis was carried out using Stata, version 9.0 statistical package. Poisson regression technique was used for gross and multivariate analyses, with control for the sample design effect.<sup>7</sup>

For the multivariate analysis, a conceptual hierarchical model was designed, in which the demographic variables were located on the first level, the social-economic variables on the second level and the other variables at the third level. The statistical significance of each variable in the model was evaluated, using the Wald test for heterogeneity or for trend (when appropriate). Initially, each block of variables of a particular level was included in the analysis, with all those variables with a value of  $p \leq 0.20$  being maintained. The variables at an hierarchically superior level in the model or at the same level were considered as potential confounders.<sup>13</sup> The level of statistical significance considered was 5% for two-tailed tests.

The study was approved by the Research Ethics Committee of the *Faculdade de Medicina* of the *Universidade Federal de Pelotas*. The participants signed the informed consent form.

## RESULTS

Of the 3,180 individuals eligible for the study, 2,986 (6.1% losses and refusals) were interviewed. Excluding those who did not fulfill the inclusion criteria the final sample consisted of 2,956 individuals, of whom three had no information about blood donation. The sample design effect for the variable donation in the previous year was 1.15 (intraclasse correlation coefficient of 0.005), and the kappa coefficient was 87%.

The average age of the interviewees was 45 (standard deviation,  $SD=17$ ). Of the individuals studied 56% were female and approximately 80% were white. With

regard to marital status, 63.2% of those interviewed said they were married or had a partner or were in a stable relationship. The average number of years of schooling was 8.7 ( $SD=4.3$ ). As for socioeconomic level, around 45% belonged to economic class C. Approximately 80% of the interviewees reported having some kind of religion. More than 70% knew someone close to them who had already donated blood and almost 25% of the individuals considered their state of health to be excellent or very good. As for blood donation campaigns, 80% of the participants said they had seen or heard about many campaigns.

The prevalence of having ever donated blood was 32% (95% CI: 30.3;33.7) (Table 1). After adjusting for confounders, it was observed that donation was 2.3 times higher in men. There was an increasing tendency to donate blood according to age (greater for the 50 to 65 age group), schooling (nine or more years of education) and economic level (1.4 times greater for economic classes A and B together and 1.3 times greater for class C). Better self-perception of health also tended to increase blood donation. The other variables proved not to have any association with having ever donated blood (Table 1).

The prevalence of blood donation over the 12 months that preceded the interview was 7.7% (95% CI: 6.8; 8.7) (Table 2). It was observed that blood donation was 2.5 times greater among men and almost twice as high among young adult men (20 to 49), but with a decreasing tendency according to the increase of age. Skin color and marital status were not associated with blood donation, either in the gross analysis or in the adjusted analysis (Table 2).

As for schooling, in the gross analysis, blood donation tended to increase with the higher number of years of study. However, this significance did not remain in the adjusted analysis. There was a positive association between economic level and donation in the previous year, with the prevalence of blood donation in the previous year almost twice as high in economic classes A and B as in classes D and E.

Of the third level variables, only self-perception of health had a positive association with blood donation: individuals who perceived themselves as having excellent or very good state of health donated 2.3 times more than those who had a regular or poor perception of their health.

The prevalence of loyal donors was 3.6% (95% CI: 2.9; 4.3) (Table 3). Loyal donation was 3.7 times higher among men and 2.0 times higher among middle-aged adult men (30 to 49). Skin color, marital status and socioeconomic variables (schooling and economic

<sup>a</sup> Associação Brasileira de Empresas de Pesquisa. Critério Padrão de Classificação Econômica Brasil/2008. [cited 2007 Sep 17] Available from: [http://www.abep.org/codigosguias/Criterio\\_Brasil\\_2008.pdf](http://www.abep.org/codigosguias/Criterio_Brasil_2008.pdf)

**Table 1.** Prevalence, gross and adjusted prevalence ratios and factors associated with having ever donated blood. Municipality of Pelotas, Southern Brazil, 2007.

Variable	n	Donation prevalence (%)	Gross analysis		Adjusted analysis	
			PR (95% CI)	p	PR (95% CI)	p
Sex				<0.001 <sup>a</sup>		<0.001 <sup>a</sup>
Male	1137	47.8	2.39 (2.14;2.68)		2.38 (2.12;2.67)	
Female	1448	20.0	1		1	
Skin color				0.377 <sup>a</sup>		0.596 <sup>a</sup>
White	1896	32.3	1.11 (0.93;1.32)		1.09 (0.92;1.29)	
Mixed	137	33.7	1.16 (0.92;1.46)		1.08 (0.87;1.34)	
Black	348	29.2	1		1	
Marital status				<0.001 <sup>a</sup>		0.179 <sup>a</sup>
No partner	1149	25.7	1		1	
Has partner	1805	36.0	1.40 (1.23;1.59)		1.09 (0.96;1.23)	
Age (years)				0.002 <sup>b</sup>		0.001 <sup>b</sup>
20-29	711	22.1	0.88 (0.71;1.08)		0.83 (0.68;1.01)	
30-49	1143	36.1	1.43 (1.18;1.74)		1.33 (1.11;1.61)	
50-65	744	38.3	1.52 (1.26;1.83)		1.45 (1.21;1.73)	
66 or more	358	25.2	1		1	
Schooling (years)				0.003 <sup>a</sup>		0.050 <sup>b</sup>
0-4	527	26.6	1		1	
5-8	933	34.6	1.30 (1.12;1.51)		1.25 (1.08;1.44)	
≥ 9	1495	32.3	1.22 (1.06;1.40)		1.21 (1.05;1.40)	
Economic level <sup>c</sup>				<0.001 <sup>b</sup>		0.002 <sup>b</sup>
A/B	1093	36.7	1.56 (1.30;1.86)		1.37 (1.16;1.62)	
C	1362	31.2	1.32 (1.10;1.58)		1.26 (1.07;1.49)	
D/E	471	23.6	1		1	
Religion				0.515 <sup>a</sup>		0.775 <sup>a</sup>
No	642	33.0	1		1	
Yes	2312	31.7	0.96 (0.85;1.09)		0.98 (0.87;1.11)	
Donor relative				0.529 <sup>a</sup>		0.723 <sup>a</sup>
No	880	32.5	1		1	
Yes	1996	31.3	0.96 (0.86;1.08)		0.98 (0.88;1.09)	
Self-perception of health <sup>d</sup>				0.002 <sup>b</sup>		0.026 <sup>b</sup>
Excellent/very good	730	35.0	1.26 (1.08;1.46)		1.18 (1.02;1.37)	
Good	1327	33.2	1.19 (1.04;1.37)		1.11 (0.97;1.27)	
Fair/poor	897	27.8	1		1	
Donation campaigns				0.549 <sup>a</sup>		0.723 <sup>a</sup>
Never seen/heard	117	27.6	1		1	
Seen/heard a few	553	32.8	1.19 (0.87;1.62)		1.09 (0.83;1.43)	
Seen/heard a lot	2284	32.0	1.16 (0.87;1.56)		1.03 (0.80;1.34)	
Total	2953	32.0	-	-	-	-

<sup>a</sup> Heterogeneity test (Wald)<sup>b</sup> Trend test<sup>c</sup> Adjusted for sex, age and marital status<sup>d</sup> Adjusted for sex, age, marital status and economic level

<sup>a</sup> Agência Nacional de Vigilância Sanitária. Pesquisa revela perfil de doadores e não-doadores de sangue, 2006 [cited 2007 Sep 16]. Available from: [http://www.anvisa.gov.br/divulga/noticias/2006/110106\\_1.htm](http://www.anvisa.gov.br/divulga/noticias/2006/110106_1.htm)

**Table 2.** Prevalence, gross and adjusted prevalence ratios and factors associated with blood donation in the previous year. Municipality of Pelotas, Southern Brazil, 2007.

Variable	n	Donation prevalence (%)	Gross analysis		Adjusted analysis	
			PR (95% CI)	p	PR (95% CI)	p
Sex				<0.001 <sup>a</sup>		<0.001 <sup>a</sup>
Male	1137	11.8	2.60 (1.97;3.44)		2.53 (1.93;3.33)	
Female	1448	4.5	1		1	
Skin color				0.686 <sup>a</sup>		0.574 <sup>a</sup>
White	1896	7.9	1.19 (0.75;1.91)		1.17 (0.73;1.87)	
Mixed	137	6.8	1.02 (0.49;2.10)		0.89 (0.44;1.82)	
Black	348	6.7	1		1	
Marital status				0.228 <sup>a</sup>		0.190 <sup>a</sup>
No partner	1149	6.9	1		1	
Has partner	1805	8.2	1.18 (0.90;1.56)		1.20 (0.91;1.58)	
Age (years)				0.001 <sup>b</sup>		<0.001 <sup>b</sup>
20-29	711	9.3	2.16 (1.40;3.33)		2.20 (1.42;3.42)	
30-49	1143	8.9	2.07 (1.47;2.93)		2.02 (1.43;2.87)	
50-65	744	4.3	1		1	
Schooling (years)				0.014 <sup>b</sup>		0.229 <sup>b</sup>
0-4	527	5.2	1		1	
5-8	933	7.4	1.40 (0.89;2.22)		1.18 (0.73;1.89)	
≥ 9	1495	8.6	1.64 (1.10;2.46)		1.31 (0.83;2.05)	
Economic level <sup>c</sup>				0.049 <sup>b</sup>		0.030 <sup>b</sup>
A/B	1093	8.4	1.82 (1.07;3.08)		1.83 (1.11;3.02)	
C	1362	8.0	1.74 (1.04;2.92)		1.68 (1.01;2.79)	
D/E	471	4.6	1		1	
Religion				0.661 <sup>a</sup>		0.664 <sup>a</sup>
No	642	8.1	1		1	
Yes	2312	7.6	0.93 (0.67;1.29)		1.07 (0.78;1.48)	
Donor relative				0.174 <sup>a</sup>		0.237 <sup>a</sup>
No	880	6.6	1		1	
Yes	1996	8.1	1.23 (0.91;1.67)		1.20 (0.89;1.63)	
Self-perception of health <sup>d</sup>				<0.001 <sup>b</sup>		<0.001 <sup>b</sup>
Excellent/very good	730	12.7	3.11 (2.10;4.62)		2.37 (1.55;3.62)	
Good	1327	6.9	1.70 (1.12;2.58)		1.35 (0.88;2.10)	
Fair/poor	897	4.1	1		1	
Donation campaigns				0.391 <sup>a</sup>		0.266 <sup>b</sup>
Never seen/heard	117	5.8	1		1	
Seen/heard a few	553	9.1	1.57 (0.60;4.12)		1.12 (0.47;2.64)	
Seen/heard a lot	2284	7.4	1.28 (0.51;3.22)		0.93 (0.41;2.10)	
Total	2598	7.7	-	-	-	-

<sup>a</sup> Heterogeneity test (Wald)<sup>b</sup> Trend test<sup>c</sup> Adjusted for sex, age and marital status<sup>d</sup> Adjusted for sex, age, marital status and economic level

level) proved not to be significantly associated with loyal donation. The association of self-perception of health was similar to that found for blood donation in

the previous year and having ever donated blood, and also with a linear trend relative to the reference category (self-perception of health as fair or poor). Knowledge

**Table 3.** Prevalence, gross and adjusted prevalence ratios and factors associated with loyal blood donation. Municipality of Pelotas, Southern Brazil, 2007.

Variable	n	Loyal donation prevalence (%)	Gross analysis		Adjusted analysis	
			PR (95% CI)	p	PR (95% CI)	p
Sex				<0.001 <sup>a</sup>		<0.001 <sup>a</sup>
Male	1137	6.1	3.68 (2.42;5.60)		3.65 (2.40;5.53)	
Female	1448	1.6	1		1	
Skin color				0.898 <sup>a</sup>		0.851 <sup>a</sup>
White	1896	3.7	1.15 (0.61;2.17)		1.12 (0.59;2.10)	
Mixed	137	3.4	1.06 (0.36;3.13)		0.89 (0.31;2.55)	
Black	348	3.2	1		1	
Marital status				0.133 <sup>a</sup>		0.337 <sup>a</sup>
No partner	1149	2.8	1		1	
Has partner	1805	4.0	1.43 (0.90;2.27)		1.25 (0.79;1.99)	
Age (years)				0.007 <sup>a</sup>		0.008 <sup>a</sup>
20-29	711	3.2	1.50 (0.81;2.80)		1.42 (0.76;2.66)	
30-49	1143	4.7	2.20 (1.32;3.67)		2.12 (1.27;3.53)	
50-65	744	2.2	1		1	
Schooling (years)				0.233 <sup>a</sup>		0.425 <sup>b</sup>
0-4	527	2.1	1		1	
5-8	933	3.8	1.81 (0.88;3.73)		1.57 (0.73;3.37)	
≥ 9	1495	3.9	1.84 (0.89;3.80)		1.55 (0.66;3.63)	
Economic level <sup>c</sup>				0.281 <sup>a</sup>		0.104 <sup>b</sup>
A/B	1093	4.1	2.00 (0.85;4.67)		1.98 (0.86;4.56)	
C	1362	3.6	1.74 (0.78;3.88)		1.70 (0.76;3.79)	
D/E	471	2.1	1		1	
Religion <sup>d</sup>				0.250 <sup>a</sup>		0.075 <sup>a</sup>
No	642	2.8	1		1	
Yes	2312	3.8	1.35 (0.81;2.56)		1.56 (0.95;2.56)	
Donor relative <sup>d</sup>				0.118 <sup>a</sup>		0.121 <sup>a</sup>
No	880	2.7	1		1	
Yes	1996	3.9	1.45 (0.91;2.31)		1.46 (0.90;2.36)	
Self-perception of health <sup>d</sup>				0.001 <sup>b</sup>		0.030 <sup>b</sup>
Excellent/very good	730	5.0	2.89 (1.55;5.40)		2.10 (1.07;4.11)	
Good	1327	3.8	2.17 (1.18;4.00)		1.63 (0.88;3.00)	
Fair/poor	897	1.7	1		1	
Donation campaigns				0.530 <sup>a</sup>		0.093 <sup>b</sup>
Never seen/heard	117	4.4	1		1	
Seen/heard a few	553	4.5	1.03 (0.31;3.38)		0.85 (0.28;2.58)	
Seen/heard a lot	2284	3.4	0.77 (0.25;2.35)		0.60 (0.22;1.65)	
Total	2598	3.6	-	-	-	-

<sup>a</sup> Heterogeneity test (Wald)<sup>b</sup> Trend test<sup>c</sup> Adjusted for sex, age and marital status<sup>d</sup> Adjusted for sex, age, marital status and economic level

of blood donation campaigns, religion and knowledge of someone close who had already donated blood were not associated with loyal donation (Table 3).

## DISCUSSION

A limitation in this study, frequently observed in cross-sectional studies, refers to recall bias. However, as the associated factors gave similar results for having ever donated blood and in the year prior to the interview, we consider that recall bias may not have affected the results.

Another factor to be considered is the exclusion of the interviews of people aged 18 and 19. Although those aged 18 and over are able to donate blood, the study Profile of the Brazilian Blood Donor<sup>a</sup> did not show higher prevalence of outcomes related to blood donation in this age group. Although this is a limitation of the study, such bias probably did not occur.

The prevalence of having ever donated blood was 32%, which is similar to the prevalence of 38% observed in the city of Yazd, Iran, among randomly selected adults aged between 20 and 60.<sup>6</sup> Zaller et al,<sup>14</sup> in a study with a sample of 1,280 individuals in Urumqi, China, found that 27.6% had already donated blood. The prevalence reported in other studies were smaller.<sup>1,4,5,11</sup> The prevalences of blood donation in the previous year of 7.7% is relatively high if we consider that a smaller prevalence was found for Brazil as a whole and in comparison with studies in the United States, which found a prevalence between 4% and 6%.<sup>3</sup>

In international literature, the prevalence of blood donation in the previous year showed more variation, ranging from 4% to 11%.<sup>3,4</sup> These variations might be explained by the cultural and socioeconomic differences between countries.

As for loyal blood donation, the only cross-sectional study that analyzed this aspect, despite using a different methodology from this study, was carried out with students from the University of Maastricht, Netherlands, and found a 7% loyal donor rate, which was higher than in our study (3.6%).<sup>8</sup>

Regarding the factors associated, blood donation was higher among male donors in the three evaluations, thus corroborating the literature,<sup>3,10,12</sup> as well as the positive association with higher economic and educational levels.<sup>2,3,14</sup> Such variables were probably not associated with loyal donation due to their low prevalence, which may have compromised the strength of the analyses. However, the size of the effect encountered was greater than that observed for having ever donated and blood donation in the previous year.

The association with age proved to be very different in the three types of outcome considered. The oldest age group (50-65) had the greatest prevalence of having ever donated blood. On the other hand, the prevalence in the previous year was higher in the youngest group, reducing with age. The intermediary age group (30-49) was the one that was most associated with loyal donation. In the study Profile of the Brazilian Blood Donor, conducted in blood banks throughout the country, having ever donated blood was more prevalent in the youngest age group.<sup>a</sup> Also in the study by Godwin et al,<sup>4</sup> it was greater for the 50-70 age group. In other two studies which analyzed the association with age, having ever donated blood was more frequent among people in the intermediary age group (26 to 55).<sup>10</sup>

The associations with age found in our study were expected given that people in the oldest age group had had more opportunities for donating blood in their lifetime. Loyal donation was prevalent in the intermediary age group. Younger individuals have perhaps not acquired an awareness of and/or sufficient maturity for recognizing the importance of regular donations, although they are healthier and probably better informed. This behavior may be changing, once higher frequency of donation in the previous year was observed.

As expected, self-perception of health as being excellent/very good proved to be strongly associated with blood donation because people who perceive they are healthy feel more suitable for donating blood and are also less excluded in the triage, when the candidate is questioned about his health characteristics. This was also observed by Godin et al.<sup>4</sup> This association remained after adjustment for the socioeconomic level, which could be a possible confounder (people from a higher socioeconomic level would have better self-perception of their health and donate more blood).

With regard to blood donation campaigns, in our study, more than two thirds of the interviewees reported having seen or heard about many blood donation campaigns. Nevertheless, this fact did not seem to have a positive influence on blood donation, suggesting the need for improving blood donation campaigns so that they really motivate people to become donors. The fact that a great number of people reported having seen or heard about many campaigns on the topic may be due to the fact that the interviews were conducted in November when there is more publicity about blood donation in the media, because 25<sup>th</sup> November is National Blood Donor Day.

The objectives of the Ministry of Health's National Blood Donor Program in 2003<sup>a</sup> were to reach a prevalence of 2% of blood donation in the population per year, increasing the percentage of female donors to

<sup>a</sup> Ministério da Saúde. Saúde incentiva doações de sangue. [cited 2007 Sep 15] Available from: [http://portal.saude.gov.br/portal/saude/visualizar\\_texto.cfm?idtx=25472](http://portal.saude.gov.br/portal/saude/visualizar_texto.cfm?idtx=25472)

30% and also raising the number of donations from young people (18 to 29 age group). This study found a donation prevalence of 7.7% in the previous year, 33% of the donors were women and 33% of the donors were also in the 20 to 29 age group. Therefore, in Pelotas, the objectives of the program were achieved. However, the demand for blood and blood components is still greater than donations. The fact that Pelotas is a reference for many smaller towns in the region for treatments, such as in the area of cancerology, may explain the bigger demand, despite its adequate donation prevalence, according to WHO criteria. Perhaps for centers like this it is necessary to reassess the real need for donors in the population in order to maintain adequate stocks of blood and derivatives, which would provide data for improving the quality and effectiveness of the campaigns.

This study, based on a consultation of Brazilian scientific literature, is the first population-based investigation

on the topic in Brazil and can serve as the basis for future comparisons in order to evaluate the impact of the measures for increasing the number of donors, particularly loyal donors whose characteristics and blood types are known.

In conclusion, the study identified the groups of people more inclined to donate blood voluntarily and also those who are the least susceptible to this type of behavior. Many people do not give blood for fear of becoming anemic and because they do not know the interval of time between donations and the maximum number of donations allowed. This indicates a substantial need for clarification and specific incentives for making people loyal donors.<sup>9</sup> As blood donation is an attitude that demands taking individual initiative, population-based studies should investigate the reasons that lead people to donate blood and those that prevent people from having this initiative.

## REFERENCES

1. Androulaki Z, Merkouris A, Tsouras C, Androulakis M. Knowledge and attitude towards voluntary blood donation among a sample of students in TEI of Crete, Greece. *Nurs Web J*. 2005(23):1-9.
2. Bettinghaus EP, Milkovich MB. Donors and nondonors: communication and information. *Transfusion*. 1975;15(2):165-9.
3. Gillespie TW, Hillyer C. Blood donors and factors impacting the blood donation decision. *Transfus Med Rev*. 2002;16(2):115-30. DOI:10.1053/tmrv.2002.31461
4. Godin G, Sheeran P, Conner M, Germain M, Blondeau D, Gagné C, et al. Factors explaining the intention to give blood among the general population. *Vox Sang*. 2005;89(3):140-9. DOI:10.1111/j.1423-0410.2005.00674.x
5. Hosain GM, Anisuzzaman M, Begum A. Knowledge and attitude towards voluntary blood donation among Dhaka University students in Bangladesh. *East Afr Med J*. 1997;74(9):549-53.
6. Javadzadeh Shahshahani H, Yavari MT, Attar M, Ahmadiyeh MH. Knowledge, attitude and practice study about blood donation in the urban population of Yazd, Iran, 2004. *Transfus Med*. 2006;16(6):403-9. DOI:10.1111/j.1365-3148.2006.00699.x
7. Kirkwood B. *Essential Medical Statistics*. 2.ed. Blackwell Science Publication; 2003.
8. Lemmens KP, Abraham C, Hoekstra T, Ruiter RA, De Kort WL, Brug J, et al. Why don't young people volunteer to give blood? An investigation of the correlates of donation intentions among young nondonors. *Transfusion*. 2005;45(6):945-55. DOI:10.1111/j.1537-2995.2005.04379.x
9. Mathew SM, King MR, Glynn SA, Dietz SK, Caswell SL, Schreiber GB. Opinions about donating blood among those who never gave and those who stopped: a focus group assessment. *Transfusion*. 2007;47(4):729-35. DOI:10.1111/j.1537-2995.2007.01177.x
10. Misje AH, Bosnes V, Gåsdal O, Heier HE. Motivation, recruitment and retention of voluntary non-remunerated blood donors: a survey-based questionnaire study. *Vox Sang*. 2005;89(4):236-44. DOI:10.1111/j.1423-0410.2005.00706.x
11. Sampath S, Ramsaran V, Parasram S, Mohammed S, Latchman S, Khunja R, et al. Attitudes towards blood donation in Trinidad and Tobago. *Transfus Med*. 2007;17(2):83-7. DOI:10.1111/j.1365-3148.2007.00731.x
12. Silva H, Nunes C, Nachtigal G, Passos S, Primo L, Brum M, et al. Perfil dos doadores de sangue do Hemocentro Regional de Pelotas (RS). *Rev Bras Hematol Hemoter*. 2005;27(Supl 2):271.
13. Victora CG, Huttly SR, Fuchs SC, Olinto MT. The role of conceptual frameworks in epidemiological analysis: a hierarchical approach. *Int J Epidemiol*. 1997;26(1):224-7. DOI:10.1093/ije/26.1.224
14. Zaller N, Nelson KE, Ness P, Wen G, Bai X, Shan H. Knowledge, attitude and practice survey regarding blood donation in a Northwestern Chinese city. *Transfus Med*. 2005;15(4):277-86. DOI:10.1111/j.0958-7578.2005.00589.x

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