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Does religiosity predict blood donation in Brazil?

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Abstract

Background: To investigate the association of religiosity with blood donation in a representative/stratified sample of primary healthcare users of Ribeirão Preto, São Paulo, Brazil.

Methods: A cross-sectional study was conducted using the Duke University Religious Index - DUREL (dimensions: organizational, non-organizational, and intrinsic religiosity). Odds ratios adjusted by sex and age were used as measures of association.

Results: 1,055 individuals participated (79.7% females; mean age=40.6 years); 23.3% had previously donated blood. Most reported having a religion and grew up in a religious environment. High frequencies of religiosity were observed. Similar DUREL scores were observed among participants who donated blood and those who did not. Family members and close friends had significant influence on participants' blood donation practices.

Conclusion: Religiosity was not directly associated with blood donation despite the high prevalence and scores of religiosity. However, possible associations between religion and blood donation should consider mediating variables in future studies.

Keywords

Introduction

Establishing and maintaining sufficient numbers of voluntary, repeat blood donors is a global challenge especially in low and middle-income countries, which motivates ongoing

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search for more efficient recruitment strategies. In Brazil, less than 2% of the population donates blood regularly and despite the efforts to enhance this prevalence, the rates have remained unchanged insufficient over the last years (WHO, 2013).

Evidence has shown that the voluntary blood donation is a multifactorial process that encompass a set of variables modulated by both individual and social characteristics (Gonçalez et al., 2012). Altruism, sense of solidarity, social pressure, and family/friends influences have been described as the main motivating factors to donate blood (Barboza, 2012; Gonçalez et al., 2012; Gonçalez et al., 2008; Jouybari et al., 2016; Ludwig & Rodrigues, 2005).

However, few studies have examined the relationship between religion and blood donation (Beyerlein, 2016).

The hypothesis that religiosity may potentially influence the decision to donate blood was tested by Gillum & Masters (2010). In a large, representative sample of young adults in United States, they did not find a direct association between religiosity and blood donation. However, this and other studies focused solely on religious affiliation (Koenig & Büssing, 2010) and did not explore other dimensions of religiosity. Subjective elements of religion that go beyond the specific religious group to which an individual belongs, can promote giving and volunteerism.

In this sense, a study conducted by Martinez, Almeida, Braz, and Carvalho (2014) among 226 Brazilian post-graduate students measured three dimensions of religiosity using the Duke University Religious Index (DUREL)(Koenig & Büssing, 2010) and showed a significant association between mean scores of organizational religiosity and attitudes related to blood donation. Higher intrinsic religiosity levels have been detected among regular donors when compared to those students who donated blood once but have not returned for further donations (Martinez, Almeida, et al., 2014). In the same line of research, Charseatd (2016) founded a positive influence of religious beliefs on the attitude toward blood donation and a considerable influence of religion in prosocial activities among the youngsters in Iran. Another study conducted by Beyerlein (2016) that assessed the association between religiosity and blood donation in a large sample in the United States showed positive mediation effects of organizational and subjective dimensions of religiosity in blood donation practice. According to these authors, the factors that promote the donation act vary entirely some religious ties, which can influence several channels of donation, as well as solicitation to donate, and messages about helping others as an indirect effect through moral norms and willingness, and involvement with religious group through exposure to thoughts of the importance of helping others.

Religiosity is a multidimensional and dynamic construct that incorporates cognitions and behaviors in personal, social, and organizational contexts (Taylor, 2013). Many measures of religiousness have been developed, usually including multiple dimensions (Hall, Meador, & Koenig, 2008). The DUREL scale, introduced by Koenig & Büssing (2010) includes three dimensions: organizational, non-organizational, and intrinsic religiosity. Organizational religiosity involves behaviors that occur in the context of an institution (such

as attendance at formal religious activities). Non-organizational religiosity encompasses private or informal religious behavior occurring outside the context of institutions, with no fixed place and time, and without following pre-established liturgical forms. These may manifest individually or in small family or informal groups for activities such as prayer, scripture study, watching religious TV, or listening to religious radio. Intrinsic religiosity is a subjective dimension that assesses how the individual perceives the importance of religion in their life, that is, motivating or influencing their behaviors and decisions (Koenig & Büssing, 2010).

Religiosity is an outstanding characteristic of the Brazilian population, in which 95 % of Brazilians report having a religion, 83 % consider religion beliefs very important, and 37 % attend religious services at least once a week(Censo demográfico 2010. Características gerais da população, religião e pessoas com deficiência, 2012; Moreira- Almeida, Pinsky, Zaleski, & Laranjeira, 2010).

Given the lack of knowledge about religiosity in the blood donation context in general Brazilian population and in view of the frequent need to evaluate the psychosocial factors that may interfere in the decision to donate blood, the aim of this study was to investigate the association of religiosity and blood donation under three theoretical dimensions of the DUREL index and blood donation in a large and representative sample of primary healthcare users in a Brazilian municipality.

Material and Methods

Settings, study design and sampling

A cross-sectional study using stratified random sampling was conducted from August 2015 to May 2016 at 12 primary health care facilities. The target study population was adult residents of Ribeirão Preto city who accessed primary health care services.

Ribeirão Preto city is encompassed by five health districts; North, West, Central, South and East. At the time of data collection, there were 41 primary health care facilities. These units were classified into six distinct groups of social vulnerability according to the district in which they are located and the São Paulo Social Vulnerability Index (IPVS)(Ferreira, Dini, & Ferreira, 2006) prevalent in their area. IPVS was developed by SEADE (State System of Data Analysis) from the Census data, which allows a detailed view of the living conditions in the municipalities of the São Paulo State. The IPVS classify the regions according to social vulnerability in 6 groups (1 – low vulnerability; 6 - high vulnerability) (Ferreira et al., 2006). Thus, healthcare units were grouped into 12 strata according to the district where they are located and the predominant IPVS. Facilities with an IPVS of 1 or 2 were grouped together in the same stratum as were those with IPVS greater or equal than 4. The facilities with IPVS equal to 3 were grouped in a single independent stratum.

The sample size was estimated assuming a stratified sampling design (Scheaffer, Mendenhall, & Ott, 1986), with a confidence coefficient of 95% and an absolute precision of 3% to the estimative proportion of blood donors. The estimated total sample size required 1,054 was apportioned across each stratum proportional to their estimated population

size and number of consultations per month in each primary healthcare facility. The data collection locations (12 healthcare facilities, one of each stratum) were selected randomly within each stratum (a total of twelve healthcare facilities), using a generation of random numbers in R software (https://cran.r-project.org/).

Study Questionnaire

The questionnaire included four major domains: religiosity, sociodemographic, general health, and blood donation history.

Religiosity was measured using the Portuguese version of the Duke University Religious Index (DUREL) (Koenig & Büssing, 2010). The Portuguese version was proposed by Moreira-Almeida et al.(2008) and was validated to Brazilian public health services users by Martinez et al.(2014). This instrument consists of 5 items distributed in three factors. The first factor is called "organizational religiosity" (ORA: attend religious institutions and meetings) and the item correspondent is "How often do you attend church or other religious meetings?"; the second factor is called "non-organizational religiosity" (NORA: attend private religious activities) composed by the item "How often do you spend time in private religious activities, such as prayer, meditation or Bible study?"; the third factor is called "intrinsic religiosity" (IR: internalization and religious experience) and is composed by three items, such as "In my life, I experience the presence of the Divine", "My religious beliefs are what really lie behind my whole approach to life", and "I try hard to carry my religion over into all other dealings in life". The response categories for all items are arranged in a 6-point Likert scale. The dimensions ORA and NORA are composed by one item each (maximum score = 5); the dimension IR is composed by three items (maximum score = 15). In addition, two questions about having a religion and growing up in a religious environment were included (1. Do you have a religion?; 2. Did you grow up in a religious environment?). As a complement, the participants who reported having a religion were also asked about religious affiliation, religious practice and a self-perception of the level of religiosity (very religious, moderately religious, or a little or not religious).

The sociodemographic domain collected gender, age, educational level, socioeconomic status, and marital status. The participants were classified by socioeconomic levels A, B, C and D/E according to the Brazilian Economic Classification Criterion (ABEP, 2015).

For general health, a question about self-perception of health (good, regular, poor) was included.

Blood donation practice was assessed using questions related to previous donations in lifetime and being a non-donor or unable to donate. It is worth emphasizing that the inability to donate blood was self-referred by the participants. The participants were divided into three groups according to the blood donation practice (never donated, unable to donate, previously donated) or according to frequency of donations in lifetime considering the relevance of this division in previous statistical analysis. In addition, seven questions (response categories yes or no) were included to assess blood donation practice by peer groups (family and close friends) and social norms such as, perceived obligation or pressure

to donate blood, freedom to practice beliefs and convictions, and friends disapproval related to blood donation refusal.

Compliance with Ethical Standards

This study was approved by the Ethics Committee on Human Research of Hospital das Clínicas in Ribeirão Preto (CAAE: 38148814.2.0000.5440), and the data collection in primary health care facilities approved by the Ribeirão Preto Municipal Secretariat of Health. Only adult individuals (18 years) who agreed and signed the informed consent participated on the study.

Data collection

Data collection was from August 2015 to May 2016. Trained research assistants approached all potential participants in primary health care facility waiting rooms. As inclusion criteria were considered the primary healthcare users aged 18 years or over, who live in Ribeirão Preto, that were able and had availability to respond to the instrument to the end. During the approach, potential participants were informed of the objectives of the study, expected duration of the interview, and that if they were called for the medical consultation the study interview would be interrupted and finished after the medical consultation (according to the participant's availability). Data were collected in a face-to-face interview on paper forms. Data were later entered in an online form (Google Docs) by one trained research staff. The database was checked routinely through random selection of questionnaires to assess quality and to detect possible data entry errors. Only a few questionnaires were entered per day to avoid fatigue. For further quality control, after the questionnaires were electronically entered, a different research staff verified the database to ensure accuracy and to detect any missing information.

Statistical analysis

Mean scores of DUREL participants' responses compared according to blood donation practice (never donated, unable to donate, and previously donated). Means for the ORA, NORA and IR subscales of the DUREL were compared between these groups using regression models based on the beta-binomial distribution(Martinez, Achcar, & Aragon, 2015). A multinomial logistic regression model (Hosmer, Lemeshow Jr, & Sturdivant, 2013) was fit to describe the associations between blood donation practice (considering the groups "unable to donate blood versus never donated" and "already donated blood versus never donated") and sociodemographic variables, individual religiosity, blood donation practice by peer groups and social standards. Odds ratios (OR) adjusted by sex and age were obtained from these models and used as a measure of association between variables and the blood donation practice. Inferences for the ORs were based on 95% confidence intervals (95% CI). Intervals that did not include the value 1 were interpreted as evidence for a signification association between variables at the 0.05 significance level (similar to $p<0.05$). In the face of Jehovah's well-known witness behavior toward blood donation, participants who reported this religious affiliation were excluded from the analysis (n=11).

Results

A total of 1,307 primary health care users were approached in 12 primary health care facilities, of whom 1,136 (84.7%) agreed to participated. Of the 1,136 participants who started the interview, 81 (7.1%) were called to medical consultation and were not available to continue. Thus, a total of 1,055 participants answered all questions (80.7% of the total invited). Only participants who answered all questions were included in the present analysis. Of these, 11 (1.04%) reported being Jehovah's Witnesses and were not included in the analysis, being the final sample of 1,044 participants.

Table 1 shows sample characteristics and beliefs by prior blood donation. The sample was composed of 831 (79.6%) females with mean age of 39.6 years (standard deviation [SD]=14.9) and 213 (20.4%) males with mean age of 45.2 years (SD=15.3). Of 1,044 study participants, 659 (63.1%) had never donated blood, 245 (23.5%) previously donated in their lifetime, and 140 (13.3%) declared themselves unable to donate blood. A higher percentage of reported blood donation was observed among men, older age groups, and higher socioeconomic and educational levels. The proportion of participants who reported a poor/regular self-perception of health was high in the group of participants who never donated blood (Table 1).

Of participants, 905 (86.7%) reported having a religion and 769 (73.6%) grew up in a religious environment. The most cited religions were Catholic and Evangelical, 495 (54.6%) and 332 (36.7%), respectively.

Overall, more than 3.0% of the total sample reported felt obligated, pressured and/or forced to donate blood by someone, while 4.5% reported felt obliged to donate when heard about someone in need of blood donation. In addition, the proportion of household members and close friends who were not blood donors was higher among participants who never donated. Furthermore, the proportion of participants who had never donated blood was higher among those who reported not having friends who talk about the importance of blood donation.

According to the participant's responses to DUREL, nearly one-third (31.2%) of women and one-fourth (23.6%) of men reported attending church or other religious meetings at least once a week (ORA). A majority (60.1% of females and 57.8% of males) reported spending time on daily private religious activities (NORA). The highest scores of the Likert scale was observed for the 3 questions related to IR: "In my life, I experience the presence of the Divine (i.e., God); My religious beliefs are what really lie behind my whole approach to life; I try hard to carry my religion over into all other dealings in life", for men and women.

Table 2 shows the means of the NORA, ORA, and IR dimensions according to blood donation practice. The mean scores in Table 2 are similar and regression models based on the beta-binomial distribution did not detect significant differences, with one exception. The mean IR was highest among persons unable to donate. Notably, mean scores of the NORA, ORA, and IR dimensions did not differ by frequency of donation ("only once", "2 to 5 times", "6 to 10 times" and "more than 10 times") nor when merged into "ever" vs. "never" categories. Further, stratified analyses by sex and age groups did not detect significant differences between donors and non-donors on any of the three dimensions of religiosity.

In multivariable analysis, the association of blood donation practice, sociodemographic variables, individual religiosity, and social standards, were adjusted by sex and age (Table 3). Older age, poor self-perception of health, having a religion, growing up in a religious environment, and Spiritist religious affiliation were associated with those who were unable to donate versus those who never donated blood. Male sex, older age, the highest socioeconomic status, higher educational levels, and little or no self-perception of religiosity were associated with those who had ever donated versus those who had never donated blood. The proportion of those who had previously donated blood was higher among participants who reported having members of their household or close friends who were blood donors.

Discussion

In the present study, there were no associations between religiosity and voluntary blood donation. Nearly 87% of participants reported having a religion, and high scores on religiosity dimensions were detected by the DUREL responses. Nevertheless, similar religiosity scores were found among those who "never donated", were "unable to donate", and "already donated" blood, suggesting that religiosity by itself was not a blood donation motivator in our sample.

According to Gillum and Masters (2010) the lack of association of religiosity and blood donation practice can be justified based on the concept that pro social tendencies modulated by religiosity may be limited in benefit to close individuals. In addition, they suggest that blood donation may be associated with a construct called universalism (i.e., the benefit to all people and nature), a component of spirituality. Spirituality is a different domain of religiosity and refers to a more personal, private domain of beliefs and values (Almeida, Martinez, Mazzo, Trevizan, & Mendes, 2013). However, an association of spirituality and blood donation was already assessed in a sample of post-graduate Brazilian students and any association was detected (Almeida et al., 2013).

Nevertheless, the results of the present study do not definitively exclude a possible effect of religiosity on blood donation, since the mechanisms of association can be very complex and important mediating variables may have been overlooked. The need for reassessment of the psychosocial factors that motivate individuals for voluntary blood donation is necessary considering the constant social, philosophical and cultural changes that directly interfere with the attitudes and behaviors in different communities. Brazil is a highly religious country where, according to the National Demographic Census, 92% of the population are affiliated with a church or religion and only 0.32% consider themselves atheists. In Brazil, 64.6% are Catholics, 22.2% are Evangelicals and 2% are Spiritists (Coutinho & Golgher, 2014). All these religions motivate behaviors in relation to health, illness and death and, despite the high degree of religiosity in the Brazilian population (Censo demográfico 2010. Características gerais da população, religião e pessoas com deficiência, 2012; Moreira-Almeida et al., 2010), few prior studies have examined how religiosity affects blood donation attitudes and practice.

As hypothesized by Beyerlein (2016), the organizational and subjective dimensions of religion can motivate established predictors of giving blood, such as opportunities,

solicitations, and moral norms, but studies that evaluate only direct effects of religiosity on blood donation may underestimate the true impact. Religious service attendance can have a positive effect on volunteering, and can promote occasions for encourage blood donation. As a recent example in Ribeirão Preto, The Universal Church of the Kingdom of God, a Brazilian Pentecostal church, organized in 2017 a blood donation campaign among its own followers and allowed one of its temples to be temporally used as an external blood collection unit. Furthermore, still considering the organizational dimension of religiosity, Beyerlein (2016) argues that religious groups bring people together for a common purpose, providing conductive contexts to developing religious ties that would increase solicitations to donate blood. Among the subjective dimensions of the religiosity, Beyerlein (2016) hypothesizes that religious salience promotes the importance of faith feelings and moral norms, which consequently influence blood donation. This author cites Harris (1999) to arguing that the faith "could potentially empower individuals with a sense of competence and resilience, inspiring them to believe in their own ability", and this consequently can encourage blood donation by increasing self-efficacy.

Apart from religiosity, it is noteworthy that peer groups may influence the blood donation decision (Gonçalez et al., 2012; Jouybari et al., 2016; Quéniart, 2013). Never donating was higher among those who reported not having friends who donate blood and or among those whose friends did not talk about the importance of blood donation. In addition, the percentage of participants who had donated was higher among those with household members and close friends were blood donors. These results are in line with those of other recent studies (Gonçalez et al., 2012; Jouybari et al., 2016; Pule, Rachaba, DamasMagafu, & Habte, 2014; Quéniart, 2013) showing that individuals are more likely to make decisions when influenced by the behaviors of people close to them. Being encouraged by a friend or household member may be a particularly important factor in blood donation among men and first-time donors (Glynn et al., 2002). Donor recruitment strategies should focus on these associations between household members and close friends to develop the most effective approaches to mobilize voluntary blood donation.

Regarding sociodemographic factors, our findings were similar to other studies conducted in Brazilian population, in which blood donation is more frequent among males, older age groups and, higher socioeconomic and educational levels (Moreno et al., 2016; Silva, Kupek, & Peres, 2013; Zago, Silveira, & Dumith, 2010).

We recognize limitations of our data. This study to assessed dimensions of religiosity and blood donation in the context of primary healthcare users, which may affect generalizability and comparability to other studies. Also, the inability to donate blood was self-reported. As it was not possible to clarify whether those individuals were really unable or there was a lack of knowledge or misunderstanding about the eligibility criteria for the donation, they may have classified themselves as such. Another limitation is the cross-sectional study design, which does not allow us to assess for a cause-and-effect relationship between variables. Information about previous religious experiences and the length of time in which the subjects followed their current religion were not measured. The study assessed only the direct effects of religiosity on giving blood, ignoring the role of mediating variables. Lastly, we recognize the possible presence of a socially desirable reporting biases, since the study

relied on self-reported information. Despite these limitations, the study contributes to our knowledge as the first to assess the relationship between religiosity and blood donation using a multi-dimensional, validated measure of religious involvement.

Acknowledgements

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Table 1.

Study participant demographic and behavioral characteristics by blood donation history; clients of primary care services, Ribeirão Preto, Brazil, 2016. (N=1,044).

	Never donated (n = 659)	Unable to donate (n = 140)	People who have donated blood			
			Only once (n = 63)	2 to 5 times (n = 97)	6 to 10 times (n = 26)	More than 10 times (n = 59)
Sex						
Females	565 (68.0)	117 (14.1)	43 (5.2)	62 (7.5)	13 (1.6)	31 (3.7)
Males	94 (44.1)	23 (10.8)	20 (9.4)	35 (16.4)	13 (6.1)	28 (13.2)
Age group (years)						
Until 25	159 (86.4)	4 (2.2)	11 (6.0)	9 (4.9)	0	1 (0.5)
26 – 30	100 (76.3)	5 (3.8)	12 (9.2)	9 (6.9)	3 (2.3)	2 (1.5)
31 – 40	168 (68.0)	18 (7.3)	13 (5.3)	24 (9.7)	9 (3.6)	15 (6.1)
41 – 50	99 (57.6)	27 (15.7)	10 (5.8)	22 (12.8)	3 (1.7)	11 (6.4)
51 – 60	84 (51.5)	40 (24.5)	4 (2.5)	15 (9.2)	7 (4.3)	13 (8.0)
> 60	49 (33.3)	46 (31.3)	13 (8.8)	18 (12.2)	4 (2.7)	17 (11.6)
Socioeconomic class (average monthly household income)						
A (R$ 20,888) or B1 (R$ 9,254)	33 (50.8)	10 (15.4)	5 (7.7)	7 (10.8)	3 (4.6)	7 (10.8)
B2 (R$ 4,852)	173 (59.9)	45 (15.6)	14 (4.8)	37 (12.8)	3 (1.0)	17 (5.9)
C1 (R$ 2,705)	219 (60.3)	43 (11.9)	28 (7.7)	32 (8.8)	15 (4.1)	26 (7.2)
C2 (R$1,625)	160 (69.6)	30 (13.0)	14 (6.0)	15 (6.5)	3 (1.3)	8 (3.5)
D or E (R$ 728)	74 (76.3)	12 (12.4)	2 (2.1)	6 (6.2)	2 (2.1)	1 (1.0)
Educational level						
Illiterate	70 (54.7)	33 (25.8)	4 (3.1)	11 (8.6)	2 (1.6)	8 (6.2)
Elementary school (Preschool - 4th grade)	22 (41.7)	17 (28.3)	8 (13.3)	7 (11.7)	-	3 (5.0)
Middle school (5th grade - 8th grade)	146 (66.1)	25 (11.3)	8 (3.6)	22 (10.0)	8 (3.6)	12 (5.4)
High school (Secondary education-3 years)	355 (69.8)	48 (9.4)	38 (7.5)	36 (7.1)	10 (2.0)	23 (4.5)
Higher education	63 (50.4)	17 (13.6)	5 (4.0)	21 (16.8)	6 (4.8)	13 (10.4)
Marital status						
Married	403 (62.8)	87 (13.6)	39 (6.1)	56 (8.7)	19 (3.0)	38 (5.9)
Divorced	54 (50.5)	19 (17.8)	8 (7.5)	15 (14.0)	3 (2.8)	8 (7.5)
Single	176 (72.4)	20 (8.2)	13 (5.3)	21 (8.6)	3 (1.2)	10 (4.1)

	Never donated (n = 659)	Unable to donate (n = 140)	People who have donated blood			
			Only once (n = 63)	2 to 5 times (n = 97)	6 to 10 times (n = 26)	More than 10 times (n = 59)
Widowed	26 (50.0)	14 (26.9)	3 (5.8)	5 (9.6)	1 (1.9)	3 (5.8)
Self-perception of health						
Good	478 (65.8)	77 (10.6)	44 (6.1)	68 (9.4)	18 (2.5)	41 (5.6)
Regular	165 (59.4)	52 (18.7)	18 (6.5)	25 (9.0)	6 (2.2)	12 (4.3)
Poor	16 (40.0)	11 (27.5)	1 (2.5)	4 (10.0)	2 (5.0)	6 (15.0)
Have a religion						
Yes	547 (60.4)	136 (15.0)	58 (6.4)	85 (9.4)	25 (2.8)	54 (6.0)
No	112 (80.6)	4 (2.9)	5 (3.6)	12 (8.6)	1 (0.7)	5 (3.6)
Grew up in a religious environment						
No	198 (72.0)	20 (7.3)	14 (5.1)	23 (8.4)	7 (2.6)	13 (4.7)
Yes	461 (60.0)	120 (15.6)	49 (6.4)	74 (9.6)	19 (2.5)	46 (6.0)
Religious affiliation [a]						
Evangelic	221 (66.6)	43 (13.0)	19 (5.7)	25 (7.5)	11 (3.3)	13 (3.9)
Catholic	286 (57.8)	76 (15.3)	39 (7.9)	51 (10.3)	10 (2.0)	33 (6.7)
Spiritist	28 (45.2)	16 (25.8)	-	6 (9.7)	4 (6.4)	8 (12.9)
Others	12 (75.0)	1 (6.2)	-	3 (18.8)	-	-
Practice their religion [a]						
No	143 (57.4)	30 (12.1)	17 (6.8)	33 (13.2)	4 (1.6)	22 (8.8)
Yes	404 (61.6)	106 (16.2)	41 (6.3)	52 (7.9)	21 (3.2)	32 (4.9)
Are you a religious person? [a]						
Very religious	113 (54.3)	50 (24.0)	16 (7.7)	10 (4.8)	4 (1.9)	15 (7.2)
Moderately religious	346 (62.3)	76 (13.7)	31 (5.6)	56 (10.1)	19 (3.4)	27 (4.9)
A little or nothing	88 (62.0)	10 (7.0)	11 (7.7)	19 (13.4)	2 (1.4)	12 (8.4)
Are there blood donors in your home?						
No	501 (65.5)	98 (12.8)	40 (5.2)	68 (8.9)	20 (2.6)	38 (5.0)
Yes	158 (56.6)	42 (15.1)	23 (8.2)	29 (10.4)	6 (2.1)	21 (7.5)
Do you have friends who talk to you about the importance of blood donation?						
No	384 (67.2)	61 (10.7)	35 (6.1)	46 (8.1)	16 (2.8)	29 (5.1)
Yes	275 (58.1)	79 (16.7)	28 (5.9)	51 (10.8)	10 (2.1)	30 (6.3)

| | Never donated (n = 659) | Unable to donate (n = 140) | Only once (n = 63) | People who have donated blood | | |
				2 to 5 times (n = 97)	6 to 10 times (n = 26)	More than 10 times (n = 59)
Have you ever felt forced or pressured by people to donate blood?						
No	645 (63.7)	135 (13.3)	62 (6.1)	91 (9.0)	25 (2.5)	54 (5.3)
Yes	14 (43.8)	5 (15.6)	1 (3.1)	6 (18.8)	1 (3.1)	5 (15.6)
Do you feel completely free to practice your beliefs and convictions?						
No	13 (76.5)	3 (17.6)	-	1 (5.9)	-	-
Yes	646 (62.9)	137 (13.3)	63 (6.1)	96 (9.4)	26 (2.5)	59 (5.7)
Do you have close friends who disapprove of people refusing to donate blood?						
No	559 (63.7)	120 (13.7)	52 (5.9)	79 (9.0)	24 (2.7)	44 (5.0)
Yes	100 (60.2)	20 (12.1)	11 (6.6)	18 (10.8)	2 (1.2)	15 (9.0)
Are most of your close friends blood donors?						
No	492 (67.2)	79 (10.8)	42 (5.7)	65 (8.9)	20 (2.7)	34 (4.6)
Yes	167 (53.5)	61 (19.6)	21 (6.7)	32 (10.3)	6 (1.9)	25 (8.0)
Have you ever felt obliged to donate blood when you heard about someone who needed a donation?						
No	634 (63.6)	132 (13.2)	61 (6.1)	91 (9.1)	24 (2.4)	55 (5.5)
Yes	25 (53.2)	8 (17.0)	2 (4.3)	6 (12.8)	2 (4.3)	4 (8.5)

(a) Considering the n = 916 respondents who reported having a religion.

Table 2.

Blood donation history according religiosity dimensions as measured by the Duke University Religious Index (DUREL); clients of primary care services, Ribeirão Preto, Brazil, 2016 (N=1,044).

			People who have donated blood			
DUREL[*] dimensions	Never donated (n = 659) mean (SD)	Unable to donate (n = 140) mean (SD)	Only once (n = 63) mean (SD)	2 to 5 times (n = 97) mean (SD)	6 to 10 times (n = 26) mean (SD)	More than 10 times (n = 59) mean (SD)
Non-organizational religious activity (NORA),	4.6 (1.3)	4.7 (1.1)	4.6 (1.2)	4.7 (1.3)	5.0 (1.0)	4.6 (1.4)
Organizational religious activity (ORA),	4.2 (1.6)	4.5 (1.5)	4.1 (1.5)	4.0 (1.5)	4.5 (1.4)	3.7 (1.9)
Intrinsic religiosity (IR)	13.6 (2.0)	14.3 (1.3)	13.9 (1.5)	13.5 (2.4)	14.2 (1.8)	13.4 (2.5)

[*]
The DURELL scale is composed of five items, distributed for 3 dimensions, scored as a 5-point Likert scale: Organizational religious activity (1 item; maximum score = 5); Non-organizational religious activity (1 item; maximum score = 5); Intrinsic religiosity (3 items; maximum score = 15).

Table 3.

Predictors of blood donation adjusted by sex and age among study groups; clients of primary care services, Ribeirão Preto, Brazil, 2016 (N=1,044).

	Unable to donate *versus* never donated	Previously donated blood *versus* never donated
	OR1 (95% CI)[a]	OR2 (95% CI)[a]
Sex		
Women	Reference	Reference
Men	0.8 (0.5 – 1.5)	3.3 (2.3 – 4.7)*
Age group (years)		
18 – 25	Reference	Reference
26 – 30	2.0 (0.5 – 7.6)	2.0 (1.0 – 3.7)*
31 – 40	4.3 (1.4 – 12.9)*	2.6 (1.5 – 4.5)*
41 – 50	10.9 (3.7 – 32.2)*	3.1 (1.7 – 5.7)*
51 – 60	19.1 (6.5 – 55.1)*	3.2 (1.7 – 5.9)*
> 60	38.1 (13.0 – 111)*	6.3 (3.4 – 11.7)*
Socioeconomic status		
A or B1	Reference	Reference
B2	0.86 (0.37 – 1.99)	0.67 (0.35 – 1.29)
C1	0.65 (0.28 – 1.50)	0.74 (0.39 – 1.41)
C2	0.68 (0.28 – 1.62)	0.44 (0.22 – 0.88)*
D or E	0.79 (0.29 – 2.18)	0.25 (0.10 – 0.59)*
Educational level		
Illiterate	Reference	Reference
Elementary school	1.1 (0.5 – 2.5)	1.3 (0.6 – 3.0)
Middle school	0.5 (0.3 – 1.1)	1.2 (0.6 – 2.2)
High school	0.8 (0.4 – 1.5)	1.8 (1.0 – 3.1)
Higher education	1.4 (0.6 – 2.9)	3.8 (1.9 – 7.2)*
Marital status		
Married	Reference	Reference
Widowed	0.9 (0.5 – 1.8)	1.6 (0.9 – 2.7)
Single	0.9 (0.5 – 1.7)	1.2 (0.8 – 1.9)
Divorced	0.7 (0.3 – 1.5)	0.8 (0.3 – 1.8)
Self-perception of health		
Good	Reference	Reference
Regular	1.3 (0.8 – 2.0)	0.9 (0.6 – 1.3)
Poor	2.7 (1.1 – 6.3)*	1.8 (0.8 – 4.0)
Have a religion		
No	Reference	Reference
Yes	4.1 (1.4 – 11.7)*	1.6 (0.9 – 2.6)
Growing up in a religious environment		
No	Reference	Reference

	Unable to donate *versus* never donated	Previously donated blood *versus* never donated
	OR1 (95% CI)[a]	OR2 (95% CI)[a]
Yes	2.2 (1.3 – 3.8)*	1.3 (0.8 – 1.8)
Religious affiliation [b]		
Evangelic	Reference	Reference
Catholic	1.1 (0.7 – 1.8)	1.2 (0.8 – 1.8)
Spiritist	2.3 (1.1 – 4.9)*	2.0 (1.0 – 4.0)
Others	0.6 (0.1 – 4.8)	1.2 (0.3 – 4.4)
Practice their religion [b]		
No	Reference	Reference
Yes	1.2 (0.7 – 2.0)	0.7 (0.5 – 1.1)
Are you a religious person? [b]		
Very religious	Reference	Reference
Moderately religious	0.7 (0.4 – 1.1)	1.2 (0.7 – 1.8)
A little or nothing	0.4 (0.2 – 1.0)	1.9 (1.1 – 3.3)*
Are there blood donors at your home?		
No	Reference	Reference
Yes	1.2 (0.8 – 2.0)	2.1 (1.4 – 3.0)*
Do you have friends who talk to you about the importance of blood donation?		
No	Reference	Reference
Yes	1.9 (1.2 – 2.8)*	1.4 (0.9 – 1.9)
Have you ever felt obliged or pressured by people to donate blood?		
No	Reference	Reference
Yes	2.0 (0.6 – 6.3)	2.1 (0.9 – 5.0)
Do you feel completely free to practice your beliefs and convictions?		
No	Reference	Reference
Yes	0.6 (0.1 – 2.8)	3.3 (0.4 – 26.4)
Do you have close friends who disapprove about people's refusal to donate blood?		
No	Reference	Reference
Yes	1.0 (0.6 –1.8)	1.1 (0.7 – 1.8)
Are most of your close friends' blood donors?		
No	Reference	Reference
Yes	2.8 (1.8 – 4.3)*	1.8 (1.2 – 2.6)*
Have you ever felt obliged to donate blood when you found out about a person who needed a donation?		
No	Reference	Reference
Yes	1.7 (0.7 – 4.1)	1.4 (0.6 – 3.0)

[a] OR= Odds Ratio with 95% Confidence Interval

[b] Considering n=905 - participant's who reported having a religion