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Original Article

Religiosity and patterns of alcohol consumption among users of primary healthcare facilities in Brazil

Religiosidade e padrões de consumo de álcool entre usuários de unidades de atenção primária à saúde no Brasil

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Abstract

Background: A number of studies have been reported on the role of religiosity in health beliefs and behaviors. **Objective:** The objective of this cross-sectional study is to examine the association between religious involvement and patterns of alcohol consumption in a large representative sample of users of primary healthcare facilities in Ribeirão Preto, Southeast Brazil. **Method:** Data were collected through personal interviews. Religiosity was measured using the Duke University Religion Index (DUREL) and the alcohol consumption was measured using the Alcohol Use Disorders Identification Test (AUDIT) questionnaire. Multinomial logistic regression models were used to evaluate the associations between the participant characteristics, the AUDIT risk levels, and the drinking groups. **Results:** The sample was composed of 841 women with a mean age of 39.5 years old and 214 men with a mean age of 45.1 years old. A significant relationship between patterns of alcohol consumption and the multiple dimensions of religiosity was detected, such as religious affiliation, religious practices, self-perception of the level of religiosity and the ORA, NORA and IR components of DUREL. Lower levels of drinking risk were detected among religious individuals and among those who practice their religions compared to individuals who have no religion and/or non-practicing individuals, respectively. **Conclusion:** A lifestyle motivated by religious concerns is associated with alcohol use habits among the Brazilian users of the public healthcare facilities.

Keywords: alcohol abuse; religion; epidemiology; primary health care.

Resumo

Introdução: Vários estudos têm mostrado o papel da religiosidade nas crenças e comportamentos em saúde. **Objetivo:** O objetivo deste estudo transversal é examinar a associação entre envolvimento religioso e padrões de consumo de álcool em uma amostra representativa de usuários de unidades de atenção primária à saúde de Ribeirão Preto, Brasil. **Método:** Os dados foram obtidos por entrevistas pessoais. A religiosidade foi mensurada usando o Duke University Religion Index (DUREL) e o consumo de álcool foi mensurado pelo Alcohol Use Disorders Identification Test (AUDIT). Modelos de regressão logística multinomiais foram usados para avaliar as associações entre as características dos participantes, os níveis do AUDIT e os grupos de consumo de álcool. **Resultados:** A amostra foi composta por 841 mulheres com idade média de 39,5 anos e 214 homens com média de idade de 45,1 anos. Foram evidenciadas associações significativas entre padrões de consumo de álcool e as múltiplas dimensões da religiosidade, como afiliação religiosa, práticas religiosas, autopercepção do nível de religiosidade e os componentes do DUREL. Baixos níveis de ingestão de álcool foram detectados entre indivíduos religiosos e entre aqueles que praticam sua religião,

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comparados com aqueles que não possuem uma religião e/ou não praticam uma religião, respectivamente. **Conclusão:** Um estilo de vida motivado por interesses religiosos é associado com os hábitos de uso de álcool entre os usuários de unidades de atenção primária à saúde.
Palavras-chave: alcoolismo; religião; epidemiologia; atenção primária à saúde.

INTRODUCTION

Alcohol consumption is associated with an increased risk of many health problems, including depression, certain types of cancer, epilepsy, cardiovascular disease, and tuberculosis[1]. Alcohol abuse or dependence is also an important risk factor for mortality and morbidity related to both intentional and unintentional injuries[2]. In Brazil, the 2013 National Health Survey (PNS 2013) estimated that current drinking prevalence was 26%, with an average age of initiation of 18.7 years[3]. This survey also showed that binge drinking is reported by 51% of drinkers, 43% of whom reported binge drinking 4 or more times. In addition, alcohol consumption was responsible for 4.8% of all new cases of cancer recorded in 2012 in Brazil[4].

Primary prevention of alcohol disorders includes strategies of early detection of individuals with hazardous alcohol intake in the population[5]. A sectional multi-center study estimated an alcohol dependence prevalence of 8.7% among patients attended in primary care settings of six European countries, but the treatment utilization rate was only 22.3%[6]. In this study, the alcohol dependence was associated with a number of socio-economic disadvantages and higher physical and mental comorbidities. In another study including patients attending primary healthcare facilities in several countries (Australia, Bulgaria, Kenya, Mexico, Norway and the USA), it was estimated that 18% of subjects had a hazardous level of alcohol intake and 23% had experienced at least one alcohol-related problem in the previous year[7]. In another large study about alcohol use disorders in European primary health care settings, prevalence estimates ranged from 7.5% to 15.1% of patients[8]. This study showed higher prevalence and treatment rates of alcohol use disorders in primary health care compared to general population surveys. In a Brazilian study including a sample of users of primary healthcare facilities, 29.1% of the participants were low risk alcohol users, 12.7% at-risk drinkers, 1.1% harmful drinkers and 4.3% were likely dependent[9]. A possible explanation for the high prevalence of heavy use of alcohol among users of primary healthcare facilities might be that alcohol disorders are associated with many disease and injury categories attended in these services[10]. Accordingly, authors have recommended treatment initiation for alcohol use disorders at the primary healthcare level[6]. These treatments include individual and group interventions provided by different health professionals, since is recognized that early interventions are able to decrease alcohol consumption in primary healthcare populations[11]. Among a number of other variables, religion has been viewed as having an important association with alcohol behaviors[12-16]. In fact, a number of authors[9,16-20] have reported that participation in religious groups reduces the incidence of alcohol consumption among users of primary health care facilities.

The present study was undertaken to examine the association between religious involvement and patterns of alcohol consumption in a large sample of users of primary healthcare facilities in Ribeirão Preto, Southeast Brazil. The objectives of this study were (1) to describe the prevalence of alcohol consumption and identify the social and demographic factors associated with alcohol consumption among the users of primary healthcare facilities; and (2) to explore associations between religiosity and patterns of alcohol consumption.

METHOD

Study design and setting

This was a cross-sectional study. Ribeirão Preto is a municipality with approximately 600,000 inhabitants located in the Northeast of São Paulo state. Its per capita income is one of the highest in the country, and its economy is based on agribusiness, focusing mainly the sugarcane production, as well as food and beverage industries and health and educational services.

Sampling

At the time of data collection, the primary healthcare system in Ribeirão Preto was composed of 41 healthcare facilities divided into five health districts denominated as North, Central, South, East and West. In the stratified sampling scheme used in this study, the healthcare facilities were also classified using the São Paulo Social Vulnerability Index (IPVS), based on the values that are considered to be most frequent in each area of coverage. IPVS is calculated by the Brazilian State Data Analysis System Foundation and it intends to classify each census tract according to a degree of social vulnerability[21]. IPVS data are available from the site http://www.seade.gov.br/. Therefore, the facilities were grouped by health district and IPVS classification to form 12 strata, and one unit from each stratum was randomly selected for the interviews. The sample size determination was based on the estimates of the mean number of monthly health visits in each unit[22]. It was considered a 95% confidence level to estimate the prevalence of alcohol use in this population. This prevalence was considered to be 50% in each stratum to maximize the variance[22], and it was thus estimated that a minimum sample size of 1,055 individuals is required to achieve an absolute precision of 3%. 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.

Procedures

Data were collected through personal interviews conducted by three trained interviewers from August 2015 to May 2016. A pilot study with 30 primary healthcare users was performed before the beginning of official data collection aiming the standardization of the approach to the participants, familiarization with the instrument, resolution of doubts about the issues and orientations to the participants regarding the objective of the research and the ethical aspects involved. Participants were invited to participate in the study while waiting for medical care in the waiting room of healthcare facilities selected and were informed of the objectives of the study, and expected duration of the interview. In addition, all participants were informed 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).

Variables and instruments

The socioeconomic status was defined by the classification proposed by the Brazilian Association of Market Research Institutions, based on the accumulation of material goods and the schooling of the head of the family[23]. This classification allows the grouping of subjects into ordinal classes labeled as A, B, C1, C2, D and E, where A denotes the more privileged socioeconomic class and D and E denotes the less privileged classes. The educational level was classified into eight groups: insufficient (including illiterates, people who have never attended school and people who did not complete the fundamental I level), complete fundamental I, incomplete and complete fundamental II, incomplete and complete medium school, and incomplete and complete higher education. In the Brazilian educational system, "fundamental I" corresponds to years 1 to 5 of the elementary education while "fundamental II" corresponds to years 6 to 9, "medium school" is equivalent to the high school and "higher education" corresponds to the college, undergraduate schools or university level courses. Self-perception of health may be viewed as an indicator of quality of life and subjective well-being[24], and in the present study it was measured using a single item that asked "How do you perceive your health?". Possible responses to this question were: good, regular and poor. Self-reported diabetes and hypertension were ascertained by the answer to the question "Has a doctor or medical personnel ever told you that you have diabetes (or hypertension)?". Participants also were asked if they have private insurance (yes or no), and about their marital status (single, married, widowed or divorced) and smoking status (never smoked, ex-smoker or current smoker).

The Alcohol Use Disorders Identification Test (AUDIT) was used to measure the pattern of alcohol consumption[5]. AUDIT is a 10-item questionnaire that addresses frequency of alcohol consumption, alcohol dependence symptoms, and alcohol-related problems. This instrument allows to classify the individuals into four risk levels, according to the score obtained: level I (up to 7 points, low-risk use or abstinence), level II (from 8 to 15 points, moderate risk of harm), level III (from 16 to 19 points, harmful and hazardous use); and level IV (above 20 points, indicates a possible dependence). The total score range is 0-40 points. AUDIT is a useful instrument for detecting hazardous alcohol consumption among users of primary healthcare facilities[5,25], with satisfactory validity properties. Answers to the third question of the AUDIT can also be used to detect binge drinking ("How often in the last year have you had 6 or more drinks on one occasion?", where a response other than "never" is considered a positive screen). Although binge drinking is commonly defined as the consumption of at least five drinks per occasion for men and four for women, the AUDIT defines binge drinking as the consumption of six or more drinks in one occasion for both men and women[26].

Religiosity was measured using the Duke University Religion Index (DUREL)[27]. It is a 5-item scale measuring three major dimensions of religiousness: organizational religious activity (ORA), non-organization religious activity (NORA) and intrinsic religiosity (IR). ORA is related to a social component and considers attendance at religious meetings, such as cults, ceremonies, and prayer groups. NORA includes religious habits and behaviors that may occur outside the context of a religious institution or organization, without the form of liturgies established by them. Unlike the ORA, NORA does not necessarily depend on interaction with other people, and may manifest itself individually or in small family and informal groups. NORA include prayers, reading the Bible or other religious texts and the audience to religious television or radio programs. When based on IR, religion assumes a meaning in which all aspects of life are understood as a function of it. It refers to the "search for internalization and full experience of religion as the main goal of the individual"[28].

The questionnaire asks participants to classify their religiousness and religious attendance using a six-point rating scale for ORA and NORA and a five-point rating scale for the IR items. Higher values indicate higher religiosity. DUREL was translated to the Portuguese language by Moreira-Almeida et al.[27] and its psychometric properties in a sample of Brazilian users of primary healthcare facilities were studied by Martinez et al.[29]. Participants who reported having a religion were also asked about religious affiliation, religious practices and a self-perception of the level of religiosity.

Statistical analysis

Multinomial logistic regression models[30] were used to evaluate the associations between participant characteristics, AUDIT risk levels (I, II and III/IV) and drinking groups (abstemious, no-binge and binge drinkers). In this analysis, the AUDIT risk levels III and IV were merged due to the low frequency of respondents in the risk level IV. These models provided odds ratios (OR) for each covariate after controlling for the effects of sex, age groups and socioeconomic status. The adjusted OR were estimated with their respective 95% confidence intervals (95% CI). Ninety-five percent CI that do not include 1 within their ranges indicate significant associations (at the 5% level of significance, similar to $p<0.05$). Means for ORA, NORA and IR subscales of the DUREL where compared between the AUDIT risk levels and the drinking groups using regression models based on the beta-binomial distribution[31]. SAS 9.4 software was used for all statistical analyses.

Ethics approval

The study was approved by the Research Ethics Committee of the Hospital das Clínicas of Ribeirão Preto Medical School (protocol 931.952). Privacy and confidentiality were guaranteed for all participants. Each participant was informed about the objectives and procedures of this research and signed an informed consent form.

RESULTS

A total of 1,307 primary health care users were approached, 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. The sample was composed of 841 (80%) women with mean age of 39.5 years (standard deviation [SD] 14.9) and 214 (20%) men with mean age of 45.1 years (SD 15.3).

According to AUDIT scores, 88.8% of females were classified as abstemious or low-risk users (level I), 9.3% as moderate risk of harm (level II), 1.4% as harmful or hazardous alcohol users (level III), and 0.5% as suggestive of possible alcohol dependence. Among males, 66.4%, 27.1%, 3.7% and 2.8% were classified in the risk levels I, II, III and IV, respectively.

Table 1 shows the frequencies of participant responses for each item of the AUDIT, reported as column percentages.

Table 1. Alcohol use disorders identification test (AUDIT) item response distributions, Ribeirão Preto, Southeast Brazil.

Item	Women		Men	
	n	%	*n*	%
1. Drinks containing alcohol				
Never	522	62.1	84	39.2
Monthly or less	119	14.1	24	11.2
2 to 4 times a month	136	16.2	49	22.9
2 to 3 times a week	50	5.9	35	16.4
4 or more times a week	14	1.7	22	10.3
2. Number of drinks on a typical day[a]				
1 or 2	120	37.6	37	28.5
3 or 4	92	28.8	35	26.9
5 or 6	60	18.8	26	20.0
7 to 9	19	6.0	10	7.7
10 or more	28	8.8	22	16.9
3. Frequency of six or more drinks[a]				
Never	156	48.9	39	30.0
Less than monthly	58	18.2	16	12.3
Monthly	41	12.9	31	23.9
Weekly	61	19.1	36	27.7
Daily or almost daily	3	0.9	8	6.1
4. Frequency of impaired control over drinking[a]				
Never	282	88.4	104	80.0
Less than monthly	22	6.9	16	12.3
Monthly	10	3.1	5	3.9
Weekly	5	1.6	3	2.3
Daily or almost daily	0	0	2	1.5

[a] $n = 449$ respondents

Table 1. Continued...

Item	Women		Men	
	n	%	*n*	%
5. Failure to do what expected because of drinking[a]				
Never	307	96.2	122	93.8
Less than monthly	7	2.2	5	3.8
Monthly	3	0.9	1	0.8
Weekly	2	0.6	1	0.8
Daily or almost daily	0	0	1	0.8
6. Need of a first drink in the morning[a]				
Never	315	98.8	124	95.4
Less than monthly	2	0.6	2	1.5
Monthly	1	0.3	1	0.8
Daily or almost daily	1	0.3	3	2.3
7. Feeling guilty after drinking[a]				
Never	268	84.0	109	83.9
Less than monthly	29	9.1	11	8.5
Monthly	16	5.0	6	4.6
Weekly	6	1.9	1	0.7
Daily or almost daily	0	0	3	2.3
8. Unable to remember what happened night before[a]				
Never	290	90.9	107	82.3
Less than monthly	16	5.0	17	13.0
Monthly	11	3.5	4	3.1
Weekly	2	0.6	1	0.8
Daily or almost daily	0	0	1	0.8
9. Injured because of drinking				
No	788	93.8	189	88.3
Yes, but not in the last year	36	4.3	21	9.8
Yes, during the last year	16	1.9	4	1.9
10. Others' concern about drinking				
No	733	87.1	131	61.2
Yes, but not in the last year	40	4.8	37	17.3
Yes, during the last year	68	8.1	46	21.5

[a]*n* = 449 respondents

Questions 2 to 8 were answered only by those participants who did not respond "never" for question 1. According to the first question of the instrument, 62.1% of females and 39.2% of males reported alcohol abstinence. Among all respondents, 19.3% of females and 42.5% of males reported binge drinking (third question of the AUDIT). Few participants reported needing to consume alcohol in the morning (question 6).

Table 2 shows the associations between some participant characteristics, including variables related to religion and religiosity, and the AUDIT risk levels. In this analysis, the risk levels III and IV were merged in a single category due to small frequency observed for the level IV ($n = 10$ participants). Frequencies of persons at a risk level II or higher are expressively higher between males. Odds ratios adjusted by sex, age and socioeconomic status in logistic regression analysis suggested that the AUDIT risk levels were associated with the variables sex, age groups, educational level, socio-economic status, health insurance and smoking status. However, there were not found significant associations between AUDIT risk levels and self-perception of health or self-reported hypertension and diabetes. Respondents classified at risk level IV were more frequent in lower socioeconomic status and lower educational level. Table 2 also shows evidences of association between the AUDIT risk levels and the variables related to religion. Those who have a religion presented a lower risk level than people who have no religion, as well as religious respondents who practice their religions presented a lower risk level than people who not practice their religions. Frequencies of risk levels III and IV were

Table 2. Association between the AUDIT risk levels and the demographics, clinical and religious characteristics of users of primary healthcare facilities, Ribeirão Preto, Southeast Brazil

	n	AUDIT risk level			III or IV *versus* I	II *versus* I
		I	II	III or IV	OR1 (95% CI)[a]	OR2 (95% CI)[a]
Sex						
Women	841	88.8	9.3	1.9	Reference	Reference
Men	214	66.4	27.1	6.5	5.2 (2.4-11.2)*	4.3 (2.9-6.5)*
Age group (years)						
Until 25	188	86.7	11.2	2.1	Reference	Reference
26-30	132	79.6	16.7	3.8	1.6 (0.4-6.3)	1.5 (0.8-2.7)
31-40	250	80.4	16.0	3.6	3.2 (0.9-11.8)	2.3 (1.3-4.3)*
41-50	173	83.2	12.7	4.1	2.8 (0.9-8.8)	2.1 (1.2-3.6)*
51-60	164	83.5	13.4	3.5	2.9 (0.9-9.5)	1.5 (0.8-2.7)
> 60	148	93.9	6.1	0	-	-
Educational level						
Higher education	126	86.5	12.7	0.8	Reference	Reference
Medium school	517	86.1	11.6	2.3	2.8 (0.3-22)	0.9 (0.5-1.7)
Fundamental II	221	79.2	18.5	2.3	2.8 (0.3-26)	1.4 (0.7-2.8)
Fundamental I	61	85.2	11.5	3.3	4.3 (0.3-58)	0.8 (0.2-2.3)
Insufficient	130	83.1	9.2	7.7	11.7 (1.2-109)*	0.8 (0.3-1.9)
Marital status						
Single	247	84.6	13.4	2.0	Reference	Reference
Married	648	84.4	12.8	2.8	1.2 (0.3-3.4)	0.8 (0.4-1.3)
Widowed	53	90.5	5.7	3.8	4.5 (0.7-30.2)	0.6 (0.1-2.4)
Divorced	107	79.4	15.9	4.7	3.0 (0.7-12.3)	1.5 (0.7-3.1)
Socioeconomic status						
A or B	355	85.9	12.1	1.2	Reference	Reference
C1	368	86.1	11.7	2.2	1.1 (0.3-3.0)	0.9 (0.5-1.5)
C2	235	82.6	14.0	3.4	1.9 (0.6-5.4)	1.3 (0.7-2.1)
D or E	97	75.3	17.5	7.2	3.9 (1.3-11.9)*	1.5 (0.8-2.9)
Self-perception of health						
Good	735	84.4	13.2	2.4	Reference	Reference
Regular	280	85.0	11.8	3.2	1.4 (0.6-3.5)	1.0 (0.6-1.6)
Poor	40	77.5	15.0	7.5	3.2 (0.8-12.3)	1.3 (0.4-3.3)
Have health insurance						
Yes	154	79.9	18.8	1.3	Reference	Reference
No	901	85.0	11.9	3.1	1.9 (0.4-8.6)	0.6 (0.3-0.9)*
Self-reported hypertension						
No	823	84.1	12.9	3.0	Reference	Reference
Yes	232	84.9	12.9	2.2	0.7 (0.2-2.2)	1.1 (0.6-1.8)
Self-reported diabetes						
No	971	83.9	13.3	2.8	Reference	Reference
Yes	84	88.1	8.3	3.6	1.3 (0.3-5.0)	0.6 (0.2-1.4)

OR = odds ratio; CI = confidence interval.

*Confidence intervals that do not include 1 are marked with an asterisk (similar to $p<0.05$); [a]Odds ratios adjusted by sex, age and socioeconomic status

Table 2. Continued...

	n	AUDIT risk level			III or IV *versus* I	II *versus* I
		I	II	III or IV	OR1 (95% CI)[a]	OR2 (95% CI)[a]
Smoking status						
Never smoked	697	89.1	9.3	1.6	Reference	Reference
Ex-smokers	216	83.8	13.9	2.3	1.6 (0.5-4.8)	1.7 (1.0-2.8)
Current smokers	142	61.3	28.8	9.9	10.2 (4.3-24)*	5.1 (3.1-8.3)*
Have a religion						
Yes	916	85.8	11.7	2.5	Reference	Reference
No	139	74.1	20.9	5.0	2.3 (0.9-5.9)	2.2 (1.3-3.5)*
Religious affiliation (b)						
Evangelic	332	91.9	6.6	1.5	Reference	Reference
Catholic	495	81.6	15.2	3.2	2.3 (0.8-6.8)	2.5 (1.5-4.3)*
Spiritist	62	87.1	12.9	0	-	-
Others	27	85.2	7.4	7.4	9.0 (1.4-57)*	1.6 (0.3-7.5)
Practice their religion (b)						
Yes	665	88.9	9.3	1.8	Reference	Reference
No	251	77.7	17.9	4.3	2.4 (1.1-5.9)*	2.0 (1.3-3.3)*
Are you a religious person? (b)						
Very religious	215	91.6	7.4	0.9	Reference	Reference
Moderately religious	559	84.4	12.5	3.0	3.8 (0.8-17)	1.9 (1.1-3.5)*
A little or nothing	142	82.4	14.8	2.8	3.3 (0.5-19)	2.2 (1.1-4.7)*
Growing up in a religious home						
No	280	83.9	13.6	2.5	Reference	Reference
Yes	775	84.4	12.6	3.0	1.8 (0.5-5.5)	1.0 (0.6-1.7)

OR = odds ratio; CI = confidence interval.

*Confidence intervals that do not include 1 are marked with an asterisk (similar to $p<0.05$); [a]Odds ratios adjusted by sex, age and socioeconomic status

lower among Evangelical respondents, while between Spiritists these risk levels were not observed.

Table 3 describes the associations between some participant characteristics and drinking groups (abstemious, no-binge and binge drinkers). All ORs showed in this table were adjusted by sex, age and socioeconomic status using multinomial logistic regression models. Results in Table 3 shows that binge drinking was more frequent among males than females, and this behavior was lower among elderly (60 years age or more) and married respondents. Binge drinking behavior was reported by 42.5% of males and 19.4% of females. The prevalence of binge drinking was significantly higher among current smokers than among those who never smoked. In addition, this behavior was more common among those who do not have a religion, those who do not practice their religion, and those who do not consider themselves as a religious person. Catholics and Spiritists were more likely to present binge drinking patterns than Evangelicals.

Table 4 shows the comparisons of the mean scores and standard deviations of ORA, NORA and IR subscales of the DUREL for the four risk levels of AUDIT. According to the results of the regression analysis based on a beta-binomial distribution, there was evidence that females who are at risk level III have lower mean values of ORA and NORA than low-risk users or abstemious (risk level I). However, there was no evidence that the mean values of IR are different among the risk levels of AUDIT among females. Males who were classified at risk level II had lower mean values of ORA, NORA and IR than users classified as low-risk or abstemious. Low values of ORA were observed among males who were classified at risk level IV of AUDIT.

Table 5 shows the means scores and standard deviations of ORA, NORA and IR subscales of the DUREL, according to drinking pattern groups (abstemious, no-binge and binge drinkers). The statistical analysis (beta-binomial model) showed a significant relationship between all subscales of the DUREL and the drinking groups among females. Those females who reported binge drinking were more likely to present lower scores for the DUREL compared with females who do not consume

Table 3. Association between the drinking groups and the demographics, clinical and religious characteristics of users of primary healthcare facilities, Ribeirão Preto, Southeast Brazil

	n	Drinking group			No binge versus abstemious OR1 (95% CI)[a]	Binge versus abstemious OR2 (95% CI)[a]
		Abstemious	No-binge	Binge		
Sex						
Women	841	62.1	18.6	19.4	Reference	Reference
Men	214	39.2	18.2	42.5	1.5 (0.9-2.3)	4.0 (2.7-5.7)*
Age group (years)						
Until 25	188	58.0	16.0	26.1	Reference	Reference
26-30	132	55.3	13.6	31.1	0.8 (0.4-1.7)	1.2 (0.7-2.0)
31-40	250	54.4	17.6	28.0	1.2 (0.6-2.0)	1.0 (0.6-1.6)
41-50	173	58.4	17.3	24.3	1.0 (0.5-1.9)	0.7 (0.4-1.3)
51-60	164	61.6	14.6	23.8	0.8 (0.4-1.5)	0.7 (0.4-1.5)
> 60	148	58.1	33.1	8.8	1.9 (1.1-3.3)*	0.2 (0.1-0.4)*
Educational level						
Higher education	126	48.4	23.8	27.8	Reference	Reference
Medium school	517	59.8	17.4	22.8	0.7 (0.3-1.4)	0.8 (0.4-1.7)
Fundamental II	221	52.9	19.0	28.1	0.5 (0.1-1.1)	0.6 (0.2-1.5)
Fundamental I	61	65.6	14.8	19.7	0.8 (0.4-1.4)	1.0 (0.5-1.8)
Insufficient	130	60.8	18.4	20.8	0.7 (0.4-1.2)	0.7 (0.4-1.2)
Marital status						
Single	247	51.8	18.6	29.6	Reference	Reference
Married	648	59.7	17.6	22.7	0.7 (0.4-1.1)	0.5 (0.3-0.8)*
Widowed	53	62.3	20.7	17.0	0.8 (0.3-1.8)	0.8 (0.3-2.1)
Divorced	107	54.2	22.4	23.4	0.9 (0.5-1.8)	0.9 (0.5-1.8)
Socioeconomic status						
A or B	355	52.1	22.5	25.4	Reference	Reference
C1	368	59.5	16.6	23.9	0.6 (0.4-0.9)*	0.8 (0.5-1.2)
C2	235	61.3	17.9	20.8	0.7 (0.4-1.1)	0.6 (0.4-1.1)
D or E	97	59.8	12.4	27.8	0.4 (0.2-0.9)*	0.8 (0.4-1.4)
Self-perception of health						
Good	735	57.6	17.4	25.0	Reference	Reference
Regular	280	56.8	20.7	22.5	1.2 (0.8-1.8)	1.2 (0.8-1.7)
Poor	40	60.0	22.5	17.5	1.2 (0.5-2.8)	0.7 (0.3-1.9)
Have health insurance						
Yes	154	52.6	21.4	26.0	Reference	Reference
No	901	58.3	18.0	23.8	0.8 (0.5-1.3)	0.9 (0.6-1.4)
Self-reported hypertension						
No	823	57.0	17.7	25.3	Reference	Reference
Yes	232	59.1	21.1	19.8	1.0 (0.6-1.5)	0.8 (0.5-1.3)
Self-reported diabetes						
No	971	57.1	18.1	24.8	Reference	Reference
Yes	84	61.9	22.6	15.5	0.9 (0.5-1.7)	0.6 (0.3-1.2)

OR = odds ratio; CI = confidence interval.

*Confidence intervals that do not include 1 are marked with an asterisk (similar to $p<0.05$); [a]Odds ratios adjusted by sex, age and socioeconomic status

Table 3. Continued...

	n	Drinking group			No binge versus abstemious OR1 (95% CI)[a]	Binge versus abstemious OR2 (95% CI)[a]
		Abstemious	No-binge	Binge		
Smoking status						
Never smoked	697	63.0	18.1	18.9	Reference	Reference
Ex-smokers	216	55.5	20.4	24.1	1.2 (0.8-1.9)	1.7 (1.1-2.5)*
Current smokers	142	33.1	17.6	49.3	1.9 (1.1-3.2)*	5.9 (3.7-9.3)*
Have a religion						
Yes	916	59.8	17.7	22.5	Reference	Reference
No	139	41.7	23.8	34.5	2.3 (1.4-3.7)*	2.2 (1.3-3.4)*
Religious affiliation (b)						
Evangelic	332	78.9	30.7	11.1	Reference	Reference
Catholic	495	48.9	21.8	29.3	3.3 (2.1-5.2)*	4.2 (2.7-6.5)*
Spiritist	62	37.1	30.6	32.3	6.4 (3.1-13.3)*	7.7 (3.7-15.9)*
Others	27	77.8	7.4	14.8	0.8 (0.1-3.9)	1.6 (0.4-5.0)
Practice their religion (b)						
Yes	665	66.0	15.5	18.5	Reference	Reference
No	251	43.4	23.5	33.1	2.5 (1.6-3.7)*	2.7 (1.8-3.9)*
Are you a religious person? (b)						
Very religious	215	76.3	12.6	11.1	Reference	Reference
Moderately religious	559	57.9	18.1	24.0	1.9 (1.2-3.2)*	2.8 (1.6-4.7)*
A little or nothing	142	42.3	23.9	33.8	4.3 (2.3-8.2)*	5.3 (2.8-10.0)*
Growing up in a religious home						
No	280	62.2	13.2	24.6	Reference	Reference
Yes	775	55.7	20.4	23.9	2.0 (1.2-3.3)*	1.4 (0.9-2.1)

OR = odds ratio; CI = confidence interval.
*Confidence intervals that do not include 1 are marked with an asterisk (similar to $p<0.05$); [a]Odds ratios adjusted by sex, age and socioeconomic status

Table 4. Means and standard deviations for ORA, NORA and IR subscales of the DUREL, according to sex and risk levels of AUDIT, Ribeirão Preto, Southeast Brazil.

AUDIT risk level	Women		Men	
	n	Mean (SD)	*n*	Mean (SD)
ORA				
I	747	4.39 (1.53)	142	4.13 (1.67)
II	78	3.90 (1.62)	58	3.10 (1.57)*
III	12	3.42 (1.44)*	8	3.63 (0.74)
IV	4	3.75 (1.26)	6	2.67 (1.86)*
NORA				
I	747	4.75 (1.18)	142	4.54 (1.41)
II	78	4.38 (1.36)*	58	4.07 (1.52)*
III	12	3.75 (1.60)*	8	4.88 (0.35)
IV	4	5.00 (0.82)	6	4.33 (1.21)
IR				
I	747	13.88 (1.82)	142	13.89 (1.83)
II	78	13.23 (2.26)	58	12.62 (2.99)*
III	12	12.08 (2.15)	8	13.75 (1.58)
IV	4	14.00 (0.82)	6	13.67 (1.51)

ORA = organizational religious activity; NORA = non-organizational religious activity; IR = intrinsic religiosity; SD = standard deviation
*Statistically significant differences from the reference group (AUDIT level I) are marked with an asterisk

Table 5. Means and standard deviations for ORA, NORA and IR subscales of the DUREL, according to drinking groups, Ribeirão Preto, Southeast Brazil.

Drinking group	Women		Men	
	n	Mean (SD)	*n*	Mean (SD)
ORA				
Abstemious	522	4.59 (1.54)	84	4.33 (1.78)
No-binge drinking	156	3.87 (1.49)*	39	3.90 (1.52)
Binge drinking	163	3.79 (1.52)*	91	3.25 (1.52)*
NORA				
Abstemious	522	4.81 (1.15)	84	4.60 (1.43)
No-binge drinking	156	4.63 (1.28)*	39	4.67 (1.15)
Binge drinking	163	4.43 (1.31)*	91	4.15 (1.49)*
IR				
Abstemious	522	14.05 (1.64)	84	13.87 (1.83)
No-binge drinking	156	13.46 (2.12)*	39	13.77 (1.87)
Binge drinking	163	13.31 (2.23)*	91	13.12 (2.67)

ORA = organizational religious activity; NORA = non-organizational religious activity; IR = intrinsic religiosity; SD = standard deviation; *Statistically significant differences from the reference group (abstemious respondents) are marked with an asterisk

alcohol. Mean values of ORA and NORA were significantly lower among males who reported binge drinking than among males who do not consume alcohol.

DISCUSSION

Brazil is a highly religious country where, according to the Brazilian Demographic Census, 92% of its population are affiliated with a religion and only 0.32% claim to be atheists. In Brazil, 64.6% are Catholics, 22.2% are Evangelicals and 2% are Spiritists[32]. Spiritism is a common religion in Brazil, and its practitioners believe in afterlife and reincarnation. In the present study, 86.8% of the respondents declared to have a religion. The high religious involvement of the Brazilian population encourages new studies to investigate how religious beliefs can influence health behaviors and health outcomes[33] and, in this sense, the results found in this article have evidenced that religiosity is probably an important protective factor against the alcohol consumption in Brazilian users of public healthcare facilities. A significant relationship between patterns of alcohol consumption and multiple dimensions of religiosity was detected, such as religious affiliation, religious practices, self-perception of the level of religiosity and the ORA, NORA and IR components of DUREL. As evidenced in other previous Brazilian studies[9,19,20,34-36], individuals affiliated to Evangelical religious groups are less susceptible to hazardous consumption of alcohol when compared with individuals from other religious groups. In fact, people from Evangelical backgrounds tend to have a proper lifestyle and they are more disposed to assume restrictive moral attitudes, including disapproval of smoking and drinking[37].

In the present study, 11.2% of females and 33.6% of males were classified in the risk level II (moderate risk of harm) or greater according to the AUDIT scores. A large population based survey conducted in Ribeirão Preto ten years before the present study, showed a prevalence of hazardous alcohol use/dependence of 10.2% among females and 43.5% among males[38], being this prevalence slightly higher among males compared to our results. However, similar prevalence for both genders were detected comparing our results with another Brazilian study including a sample of users of primary healthcare facilities living in Juiz de Fora, southeast Brazil, that found a prevalence of hazardous use of alcohol/dependency of 9.1% among females and 30.9% among males[9].

In addition, comparing our results with other previous population-based studies carried out in other Brazilian municipalities, which used the AUDIT instrument, our study showed a higher prevalence of alcohol consumption. In a study conducted by Mendoza-Sassi and Béria[35] that interviewed individuals aged 15 and over in Rio Grande, southern Brazil, the prevalence of alcohol consumption (AUDIT risk level II or greater) was 14.5% among males and 2.4% among females. In addition, this study also showed that alcohol consumption prevalence was higher among males, younger people and people from less privileged social classes. Another study, a household survey carried out in the urban area of Campinas, southeastern Brazil, found a prevalence of hazardous use of alcohol/dependence of 13.1% among males and 4.1% among females[34].

The high prevalence of alcohol consumption founded in this study and the well-known association between alcohol and chronic diseases reinforce the need for health interventions[39]. Surveys involving the population who use the public healthcare

facilities are essentials for a better understanding of their habits and attitudes toward substance use and other risk behaviors. Moreover, knowledge by professionals about the role of religious beliefs and institutions in the health promotion of populations can improve these interventions. Almost all religions motivate behaviors in relation to health, illness and death, and the beneficial resources that individuals can access through their religiosity include social and emotional supports, resilience, optimism and purpose[40]. Adequate training in spiritual care can provide to health professionals a better understanding of how to help people to use these resources to promoting their health. In addition, the integration between health professionals and religious organizations can results in effective educational environments and community-based strategies for tobacco cessation and alcohol control.

The strengths of the article include the use of a large sample and an instrument including more than one domain of religiosity. Many articles define "religiosity" only under the aspect of religious affiliation, but without using validated instruments such as DUREL. However, the present study has limitations that should be discussed. First, the study relied on self-reported information, which may be subject to under-reporting or socially desirable reporting biases. The second point is the cross-sectional nature of data, which does not allow establishing a true causal relationship. This approach does not include important information such as previous religious affiliations and how long the respondents have been professing their current religion. Thus, longitudinal research is necessary to provide further evidence of associations found in this study. Third, we did not study other possible confounders that may have influenced the results of this study, such as depressive symptoms, social support, daily stress behavior and perceived self-efficacy. As a last limitation, we can note that the AUDIT does not differentiate between the amount consumed by men and women on a binge, despite although some authors draw attention to the different body constitution and alcohol metabolism of women[41]. Despite these problems, the present study provides new insights about the role of religiosity in determining the patterns of alcohol consumption of an important section of the population.

Overall, the results provide additional evidence that religiosity is closely related to the pattern of alcohol consumption of Brazilian users of primary healthcare facilities. Effectiveness in implementing alcohol prevention strategies depends on the knowledge about behaviors, beliefs, values, social norms and attitudes of the population who receive the assistance of the healthcare service. In addition, the present study can contribute to the development and implementation of these strategies, so that resources can be target to individuals most likely to have harmful alcohol consumption.

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