# Relationship of alcohol consumption and mental disorders common with the quality of life of patients in primary health care

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**Abstract** *The objective was to measure the Quality of Life (QoL) of the patients treated in Primary Health Care in the city of Rio de Janeiro and its own association with CMD, alcohol consumption and socio-demographic aspects. This is a cross-sectional study involving 624 patients in 2012/2013, using: General Health Questionnaire, Hospital Anxiety and Depression Scale, Screening for Somatoform Symptoms, Alcohol Use Disorder Identification Test e World Health Organization Quality of Life Instrument (bref version). There were conducted a bivariate analysis and a multiple linear regressions for each domain of QOL. The QoL score for the domains, physical, psychological, social relationships and environment were: 61,2; 62,6; 66 and 50,9. In multivariate analysis, the QOL was negatively associated to the CMD, especially in the psychological domain (β = -15,75; p-value = 0,00), and the dependence on physical (β = -5,38; p-value = 0,05). There was a positive and significant association of the QoL with the risk consumption (β = 5,77) and the harmful consumption (β = 6,15) in the environment domain, and with the first in the psychological domain (β = 7,08). CMD and alcohol dependence are associated with the loss of QOL, but other patterns of consumption, even being harmful are associated with higher QOL.*

**Key words** *Quality of life, Alcohol-related disorders, Primary healthcare*

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## Introduction

Alcohol abuse is a major public health problem and is associated with increased rates of mortality and morbidity due to its potential to cause disease and relationship with loss of quality of life (QoL)[1]. In 2008, alcohol abuse/dependence was the second, third, and sixth leading cause of Disability Adjusted Life Years or DALYs - years of life lost due to premature mortality and due to disability – among Brazilian men aged between 15-29, 30-44, and 45-59 years, respectively[2]. The second National Alcohol and Drugs Survey conducted in 2012 showed that the prevalence of the harmful use of alcohol and alcohol dependence was 16% and 6.8%, respectively[3], while a multicentric study conducted in the same year reported that alcohol abuse (9.8%) and alcohol dependence (3.3%) were the second and third most prevalent lifetime disorders, respectively[4].

Mental disorders (MDs) also account for a significant portion of the burden of morbidity and mortality among the Brazilian and global population, especially in recent decades. National burden of disease studies undertaken in Brazil in 1998[5] and 2008[6] and the Global Burden of Disease Study 2010[7] reported that non-communicable diseases accounted for the largest fraction of DALYs (around 75%), with neuropsychiatric disorders accounting for 34%. MDs generate large social and economic costs, demanding various care actions[8,9]. A multicentric study conducted in 2012 reported that major depression (16.8%) and anxiety disorders (28.1%) were the most frequent lifetime disorders and group of disorders among participants[4].

Common mental disorders (CMDs) are a subgroup of MDs normally treated by primary health care services encompassing both emotional suffering and depressive-anxiety disorders and somatization. The literature shows that CMDs are prevalent conditions among primary healthcare service users[10-12].

A study published in 2011 reported that prevalence of CMDs among patients receiving treatment in Family Health Program health centers in Petropolis, Rio de Janeiro[13] was 56%, while a multicentric epidemiological study conducted in four state capitals in 2014 showed that prevalence was over 50% in each of the cities[12].

The prevalence of the harmful use of alcohol among both primary healthcare patients and the general population is cause for concern among health professionals[14-16]. A household survey that assessed users of the Family Health Strategy (ESF, acronym in Portuguese) in Rio de Janeiro showed that the prevalence of the harmful use of alcohol and probable alcohol dependence was 29.6% and 5.7%, respectively[14], while a study in the same city with members of the general population observed a high prevalence harmful use of alcohol (31%)[16].

Primary healthcare services are regarded as the main point of entry to Brazil's Unified Health System (SUS). One of the underlying principles of primary healthcare is the promotion of bonding and accountability between health teams and service users[17]. To promote bonding it is necessary to take effective steps to bring health professionals and users closer together, especially through effective listening, through which it is possible to share and detect health conditions that are often overlooked due to stigma and prejudice. It is therefore essential to provide this level of care to patients with CMDs and problematic alcohol use.

To establish a bond it is essential to value users' experiences and values and their perceptions of their history, life, and health. As such, a strong bond and awareness of 'problem issues' from the user's perspective can help health professionals to plan more effective interventions[18].

Measuring quality of life (QoL), defined by the World Health Organization as "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns", can help to systematize users' perceptions of their health[19].

CMDs and alcohol consumption reduce QoL and are prevalent conditions in primary healthcare patients. The aim of this study was therefore to measure the QoL of primary health care patients in Rio de Janeiro and determine the association between QoL and CMDs (depression, anxiety, and acute somatization), alcohol consumption, and sociodemographic characteristics.

## Material and Methods

### Study design and sample

A cross-sectional study was undertaken using data from the longitudinal survey "*Avaliação do cuidado da depressão a partir da Atenção Primária na rede SUS da área programática (AP) 2.2 do município do Rio de Janeiro*" (An evaluation

of the treatment of depression in the primary healthcare services of the SUS network in the programmatic area (PA) 2.2 of the municipality of Rio de Janeiro"), conducted in 2012 and 2013[20]. This study was funded by the National Council for Scientific and Technological Development (CNPq, acronym in Portuguese) and approved by the research ethics committees of the Pedro Ernesto University Hospital and State University of Rio de Janeiro and by the Municipal Department of Health and Civil Defense (application number 78A/2011), in accordance with the provisions Resolution Nº 196/96[21] (revoked by Resolution 466/2012)[22] of the National Health Council dealing with research involving human beings.

The source survey screened primary healthcare patients for anxiety and depressive disorders and use of alcohol in two different health facilities: a traditional primary healthcare center (UBS, acronym in Portuguese) and an ESF care center, both located in the same geographic region of the municipality of Rio de Janeiro. Suspected cases were communicated to the health teams for follow-up. The participants were reassessed after 12 months using the same instruments and based on the analysis of their health records.

This article presents the findings of the first assessment of the participants (first cycle). Data was collected from patients in the waiting room while they were waiting to be seen by a health professional by a previously trained professional. All participants signed an informed consent form. Convenience sampling was used given that the aim of the study was to compare the treatment provided to patients with MDs in each service. The final sample was made up of 624 service users aged between 18 and 65 years, 309 of which from the UBS and 315 from the ESF center.

**Instruments**

*a) Socioeconomic and demographic questionnaire*

This instrument contained objective questions to obtain information about the participants' social, economic, and demographic background. The questionnaire was used by two previous studies[10,23].

Since the sample was homogenous, the socioeconomic and demographic characteristics were treated as dichotomous variables, making it possible to develop indicators capable of highlighting significant social differences. The following variables and respective categories were used: sex (male/female), age group (up to 39 years/over 39 years), marital status (without a partner/with a partner), race/color (nonwhite/white), schooling (completed primary education/primary education incomplete), frequency of religious activities (less than twice a month/more than twice a month), monthly per capita family income (over R$272.50/less than or equal to R$272.50, which is equivalent to half of the minimum salary in 2011).

*b) Assessment of CMDs (anxiety, depression, and acute somatization)*

- *General Health Questionnaire (GHQ-12)*

The GHQ-12 is a screening device used for identifying CMDs and has been successfully validated for use in primary healthcare settings in Brazil[24]. For the purposes of this study, individuals who scored between three and four were suspected to have CMDs, while those who obtained a score of five or over were considered to be probable cases of severe CMDs.

- *Hospital Anxiety and Depression Scale - HAD*

Translated and validated for use in Brazil, the HAD is a 14-item scale with two subscales: depression and anxiety. The total score for each subscale ranges between 0 and 21, with a score of over eight indicating depression or anxiety[25].

- *Screening for Somatoform Symptoms – SOMS-2*

The SOMS-2 is a screening device used to detect medically unexplained symptoms (MUSs). It comprises a list of 53 somatoform symptoms from the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) and International Classification of Diseases (CID-10)[26]. For the purposes of this study, patients who mentioned four or more symptoms without a medical diagnosis and showed some degree of disability due to the symptoms were considered to cases of acute somatization[26].

*c) Alcohol Use Disorder Identification Test - AUDIT*

The AUDIT is a 10-item screening tool developed by the WHO to assess alcohol consumption in the last 12 months. The tool is indicated for use in primary healthcare settings to diagnose patterns of alcohol consumption[27]. The cut-off score for problematic alcohol use is eight[28]. Individuals are classified into four "risk zones":

Zone 1 – probable low-risk drinking or abstinence. Score between 0 and 7.

Zone 2– probable at risk drinking. Score between 8 and 15.

Zone 3– probable harmful drinking. Score between 16 and 19.

Zone 4 – probable alcohol dependence. Score between 20 and 40.

For the purpose of analysis, these zones were classified as dummy variables, creating the variables 'at-risk alcohol use', 'harmful drinking', and 'alcohol dependence', where YES corresponds to the pattern of consumption of interest and NO to the other patterns. For example, for the variable 'at-risk alcohol use', the group YES refers to the individuals in Zone 2 of the AUDIT (at-risk drinking), while the group NO refers to the other zones (1, 3 and 4).

*d) World Health Organization Quality of Life Instrument (WHOQOL-BREF)*

QoL was assessed using the WHOQOL-BREF developed by the WHO[21]. The instrument contains 26 questions, consisting of two general questions and 24 questions grouped into four domains (physical, psychological, social relationships, and environmental). Each item is scored on a 5-point Likert scale and transformed to a 0-100 lineal scale, with higher scores denoting better quality of life. The final domain scores were calculated using the SPSS syntax file as recommended by the WHO[29].

### Statistical analysis

The data was analyzed using the Statistical Package for the Social Sciences version 17 (SPSS 17). A descriptive analysis of the outcome QoL was conducted calculating averages, standard deviation, and minimum and maximum values for each WHOQOL-BREF domain. Bivariate analysis was then performed using the t-test to determine the association between the socioeconomic and clinical exposure variables and the different domains of the outcome QoL (p-value < 0.05), except for the variable 'alcohol consumption', where ANOVA was conducted using the Bonferroni post-hoc test, also adopting a significance level of 0.05.

Finally, backward stepwise multiple linear regression was performed where the outcomes were the four WHOQOL-BREF domains, thus resulting in four multiple linear regression models. Explanatory variables that obtained a level of significance of less than 10% in the bivariate analysis were included in the final models.

The coefficients of determination ($R^2$), coefficients of the model ($\beta$), and their respective p-values for each explanatory variable were calculated and presented for each model. Finally, the residuals of each model were analyzed.

### Results

The findings show that the majority of participants were female (72.6%), over 39 years age (64.5%), lived without a partner (57.6%), non-white (76%), and had not completed primary education (55%). The majority of interviewees frequented religious activities more than twice a month (64.6%). A little over half of the participants were patients at the UBS (51.1%), with the rest frequenting the ESF center. Almost a quarter of participants (23.7%) had a per capita family income of less than half a minimum salary (R$272.50) (Table 1). The sample was made up predominantly of low-income individuals, with 57.2% of participants having a per capita family of up to one minimum salary and 28.7% between one and two minimum salaries (data not shown).

The lowest average QoL score was obtained in the environmental domain (50.96), while the highest score was in the social relationships domain (66) (Table 1). The results show that being a woman decreased the QoL score by around eight points in all domains (p < 0.05), while being over 39 years reduced the score by 3.5 points in the physical (p = 0.027) and social relationships domains (p = 0.012). In the psychological and environmental domains, QoL was lower among patients with a partner and those with a per capita income of less than or equal to half a minimum salary (p < 0.05), respectively.

The most prevalent disorder was anxiety (42.3%). The prevalence of depression was 29.5%, while only 4% of the participants were shown to have acute somatization. It is interesting to note that the QoL score was lower (p < 0.05) in all domains among all individuals with these disorders (Table 2). Although acute somatization is the least prevalent outcome, the results show a reduction in the QoL score of almost 20 points in the physical domain in the presence of this disorder.

With respect to alcohol consumption, the results show that 4.2% of participants were in Zone 3 (harmful drinking) and 4.8% in Zone 4 (alcohol dependence). QoL scores were lower in all domains among individuals shown to be alcohol dependent by the AUDIT. The Bonferroni post-hoc test was performed after running ANOVA for the variable alcohol consumption (data not shown), followed by a two-by-two comparison with the categories of the AUDIT performed to identify the zones that show statistically significant differences in QoL.

The results show that average QoL scores in the physical domain obtained by individuals in

**Table 1.** Frequency distribution of a sample of patients treated in programmatic area 2.2, averages, and standard deviation of the scores in the quality of life domains of the WHOQOL-BREF, by socioeconomic characteristics. Rio de Janeiro, 2012.

| Characteristic | Frequency | | Physical Domain | | | Psychological Domain | | | Social Relationships Domain | | | Environmental Domain | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | Average | SD | P-value | Average | SD | P-value | Average | SD | P-value | Average | SD | P-value |
| Sex | | | | | | | | | | | | | | |
| Female | 453 | 72.6 | 58.5 | 18.7 | 0.000 | 60.3 | 17.2 | 0.000 | 64.1 | 20.3 | 0.000 | 49.02 | 13.4 | 0.000 |
| Male | 171 | 27.4 | 68.3 | 15.9 | | 68.6 | 14.2 | | 71.0 | 19.7 | | 56.11 | 14.0 | |
| Age Group | | | | | | | | | | | | | | |
| Up to 39 years | 221 | 35.5 | 63.3 | 17.0 | 0.027 | 63.6 | 15.0 | 0.236 | 68.8 | 19.3 | 0.012 | 50.53 | 13.5 | 0.562 |
| Over 39 years | 402 | 64.5 | 60.0 | 19.3 | | 62.0 | 17.8 | | 64.5 | 20.8 | | 51.21 | 14.2 | |
| Marital Status | | | | | | | | | | | | | | |
| Without partner | 359 | 57.6 | 61.3 | 18.8 | 0.823 | 63.8 | 16.5 | 0.031 | 66.7 | 20.3 | 0.326 | 50.88 | 14.2 | 0.870 |
| With partner | 264 | 42.4 | 60.9 | 18.2 | | 60.9 | 17.2 | | 65.1 | 20.4 | | 51.06 | 13.6 | |
| Race | | | | | | | | | | | | | | |
| Nonwhite | 474 | 76.0 | 61.1 | 18.7 | 0.874 | 63.1 | 16.6 | 0.127 | 66.3 | 19.9 | 0.468 | 51.0 | 13.8 | 0.845 |
| White | 150 | 24.0 | 61.4 | 18.2 | | 60.7 | 17.3 | | 64.9 | 21.9 | | 50.8 | 14.4 | |
| Schooling | | | | | | | | | | | | | | |
| Primary school completed | 281 | 45.0 | 62.0 | 18.3 | 0.322 | 63.0 | 16.8 | 0.560 | 67.7 | 18.7 | 0.057 | 51.3 | 13.7 | 0.552 |
| Primary school incomplete | 343 | 55.0 | 60.5 | 18.7 | | 62.2 | 16.9 | | 64.6 | 21.6 | | 50.7 | 14.2 | |
| Frequency of religious activity +2 X month | | | | | | | | | | | | | | |
| Yes | 403 | 64.6 | 60.4 | 18.7 | 0.158 | 62.8 | 16.6 | 0.655 | 66.4 | 19.3 | 0.527 | 50.4 | 13.9 | 0.204 |
| No | 221 | 35.4 | 62.6 | 18.1 | | 62.2 | 17.3 | | 65.3 | 22.2 | | 51.9 | 14.0 | |
| Income per capita < or = 0.5 Minimum Salary* | | | | | | | | | | | | | | |
| No | 476 | 76.3 | 61.5 | 18.5 | 0.458 | 62.5 | 16.9 | 0.915 | 66.4 | 20.1 | 0.433 | 51.7 | 14.0 | 0.012 |
| Yes | 148 | 23.7 | 60.2 | 18.7 | | 62.7 | 16.6 | | 64.8 | 21.4 | | 48.5 | 13.5 | |
| Type of Service | | | | | | | | | | | | | | |
| UBS | 319 | 51.1 | 60.0 | 19.1 | 0.093 | 62.9 | 17.5 | 0.667 | 65.6 | 21.2 | 0.648 | 50.9 | 14.6 | 0.971 |
| ESF | 305 | 48.9 | 62.4 | 17.8 | | 62.3 | 16.1 | | 66.4 | 19.5 | | 51.0 | 13.2 | |
| Sample total | 624 | 100 | 61.2 | 18.5 | - | 62.6 | 16.8 | - | 66 | 20.4 | - | 50.9 | 13.9 | - |

*Minimum salary R$ 545 in 2011.

**Table 2.** Frequency distribution of mental health (MH) outcomes, averages, and standard deviation of the scores in the quality of life domains of the WHOQOL-BREF by outcome. Rio de Janeiro, 2012.

| MH outcomes | Frequency | | Physical Domain | | | Psychological Domain | | | Social Relationships Domain | | | Environmental Domain | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | Average | SD | P-value | Average | SD | P-value | Average | SD | P-value | Average | SD | P-value |
| **Common Mental Disorders (GHQ)** | | | | | | | | | | | | | | |
| No | 498 | 79.8 | 60.5 | 19.2 | 0.051 | 61.6 | 17.6 | 0.005 | 65.8 | 20.4 | 0.756 | 50.1 | 14.1 | 0.051 |
| Yes | 126 | 20.2 | 63.7 | 15.2 | | 66.3 | 12.7 | | 66.5 | 20.3 | | 53.1 | 13.0 | |
| **Severe Common Mental Disorders** | | | | | | | | | | | | | | |
| No | 375 | 60.1 | 69.5 | 14.4 | 0.000 | 69.9 | 12.4 | 0.000 | 71.4 | 17.8 | 0.000 | 55.0 | 13.0 | 0.000 |
| Yes | 249 | 39.9 | 48.7 | 17.0 | | 51.5 | 16.6 | | 57.8 | 21.4 | | 44.9 | 13.1 | |
| **Anxiety (HAD)** | | | | | | | | | | | | | | |
| No | 360 | 57.7 | 69.4 | 14.4 | 0.000 | 69.6 | 12.6 | 0.000 | 71.1 | 18.1 | 0.000 | 55.0 | 12.6 | 0.000 |
| Yes | 264 | 42.3 | 50.0 | 17.7 | | 52.9 | 17.1 | | 59.0 | 21.3 | | 45.4 | 13.8 | |
| **Depression (HAD)** | | | | | | | | | | | | | | |
| No | 440 | 70.5 | 67.1 | 15.2 | 0.000 | 68.8 | 12.8 | 0.000 | 70.6 | 17.9 | 0.000 | 54.8 | 12.5 | 0.000 |
| Yes | 184 | 29.5 | 46.9 | 18.1 | | 47.6 | 15.8 | | 55.1 | 21.7 | | 41.8 | 12.9 | |
| **Somatization** | | | | | | | | | | | | | | |
| No | 599 | 96.0 | 61.8 | 18.2 | 0.000 | 62.9 | 16.7 | 0.014 | 66.4 | 20.1 | 0.015 | 51.4 | 13.8 | 0.000 |
| Yes | 25 | 4.0 | 45.0 | 18.4 | | 54.5 | 17.5 | | 56.3 | 24.1 | | 41.4 | 14.6 | |
| **Alcohol consumption (AUDIT)** | | | | | | | | | | | | | | |
| Zone 1 | 458 | 73.4 | 60.3 | 18.8 | 0.010[a] | 61.6 | 17.6 | 0.004[a] | 66.0 | 20.6 | 0.010[a] | 49.6 | 13.9 | 0.000[a] |
| Zone 2 | 110 | 17.6 | 64.6 | 16.3 | | 67.8 | 13.8 | | 69.2 | 17.9 | | 56.4 | 13.8 | |
| Zone 3 | 26 | 4.2 | 68.4 | 14.9 | | 60.7 | 13.4 | | 64.1 | 19.8 | | 56.6 | 12.2 | |
| Zone 4 | 30 | 4.8 | 55.7 | 21.6 | | 59.7 | 13.6 | | 55.3 | 22.4 | | 47.1 | 11.1 | |
| **At-risk drinking**[1] | | | | | | | | | | | | | | |
| No | 514 | 82.4 | 60.4 | 18.9 | 0.033 | 61.4 | 17.2 | 0.000 | 65.3 | 20.8 | 0.066 | 49.8 | 13.7 | 0.000 |
| Yes | 110 | 17.6 | 64.6 | 16.3 | | 67.8 | 13.8 | | 69.2 | 17.9 | | 56.4 | 13.8 | |
| **Harmful drinking**[2] | | | | | | | | | | | | | | |
| No | 598 | 95.8 | 60.9 | 18.6 | 0.042 | 62.6 | 17.0 | 0.571 | 66.1 | 20.4 | 0.629 | 50.7 | 14.0 | 0.035 |
| Yes | 26 | 4.2 | 68.4 | 14.9 | | 60.7 | 13.4 | | 64.1 | 19.8 | | 56.6 | 12.2 | |
| **Alcohol dependence**[3] | | | | | | | | | | | | | | |
| No | 594 | 95.2 | 61.4 | 18.3 | 0.098 | 62.7 | 17.0 | 0.345 | 66.5 | 20.2 | 0.003 | 51.2 | 14.0 | 0.118 |
| Yes | 30 | 4.8 | 55.7 | 21.6 | | 59.7 | 13.6 | | 55.3 | 22.4 | | 47.1 | 11.1 | |
| **Sample total** | 624 | 100 | 61.2 | 18.5 | | 62.6 | 16.8 | | 66 | 20.4 | | 50.9 | 13.9 | |

*a) p-value from the ANOVA test; 1) At-risk drinking (suspected case of alcohol use that poses risk, assigned to Zone 2 according to AUDIT score); 2) Harmful drinking (suspected case of harmful alcohol use, assigned to Zone 3 according to AUDIT score); 3) Alcohol dependence (Suspected case of alcohol dependence, assigned to Zone 4 according to AUDIT score).

Zone 4 (alcohol dependence) were lower than those obtained by individuals in Zone 3 (harmful drinking) (p-value = 0.06), while average scores in the psychological domain obtained by patients in Zone 2 (at risk drinking) were higher than those obtained by those in Zone 1 (low-risk drinking/abstinence) (p-value = 0.030). In the social relationships domain, scores obtained by individuals in Zone 4 (alcohol dependence) were lower than those obtained by low-risk drinkers/ abstainers (p-value = 0.029) and at risk drinkers (p-value = 0.005). Finally, in the environmental domain, at risk drinkers obtained higher QoL scores than low-risk drinkers/abstainers (p-value = 0.000).

The results of the analysis of the AUDIT dummy variables showed a negative association between alcohol dependence and QoL in the social relationships domain and a positive association between at-risk drinking and QoL in all domains except social relationships and between harmful drinking and QoL in the physical and environmental domains (p-value < 5%).

The results of the multivariate analysis (Table 3) showed that the set of selected variables explained 37.8%, 40.6%, 14.5%, and 25.6% of the variation ($R^2$) of QoL in the physical, psychological, social relationships, and environmental domains, respectively. The analysis of the residuals of the multivariate models showed good diagnostic quality.

A statistically significant negative association was found between the variables sex, age group, marital status, per capita income, anxiety, depression, acute somatization, and alcohol dependence and QoL in at least one of the QoL domains. Conversely, a positive association was observed between at-risk drinking and harmful drinking and QoL.

At-risk drinking increased the average QoL score in the psychological domain by around five points (p-value = 0.001), while harmful drinking increased the score in the physical domain by seven points (p-value = 0.019). At-risk and harmful drinking increased the average QoL score in the environmental domain by around six points

**Table 3.** Results of backward stepwise multiple linear regression for the quality of life domains of the WHOQOL-BREF. Rio de Janeiro, 2012.

| Backward stepwise multiple linear regression | Physical Domain | | Psychological Domain | | Social Relationships Domain | | Environmental Domain | |
|---|---|---|---|---|---|---|---|---|
| | β | p-value | β | p-value | β | p-value | β | p-value |
| **R²** | | 37.8 | | 40.6 | | 14.5 | | 25.6 |
| **Constant (α)** | 74.23 | 0.000 | 72.46 | 0.000 | 72.19 | 0.000 | 54.47 | 0.000 |
| **Explanatory variables (*)** | | | | | | | | |
| Sex | -3.51 | 0.012 | -2.43 | 0.047 | -3.18 | 0.069 | -2.41 | 0.040 |
| Age group | -2.84 | 0.022 | - | - | - | - | - | - |
| Marital status | - | - | -2.13 | 0.045 | - | - | - | - |
| Per capita income < or =0.5 MS | - | - | - | - | - | - | -2.45 | 0.030 |
| Anxiety | -13.05 | 0.000 | -8.74 | 0.000 | -6.23 | 0.000 | -4.36 | 0.000 |
| Depression | -11.78 | 0.000 | -15.75 | 0.000 | -11.56 | 0.001 | -9.56 | 0.000 |
| Somatization | -8.93 | 0.003 | - | - | - | - | -4.98 | 0.050 |
| At-risk drinking | - | - | 4.65 | 0.001 | - | - | 5.77 | 0.000 |
| Harmful drinking | 7.08 | 0.019 | - | - | - | - | 6.15 | 0.010 |
| Alcohol dependence | -5.38 | 0.053 | - | - | - | - | - | - |

Notes: Cells with a dash ( "-" ) represent the variables not included in the final model. The variables schooling and type of service were excluded from the table because they did not obtain statistical significance in the final model (p < 5%) in any of the domains.

P = P-value of the Beta coefficient (α) in the Wald test. $R^2$ = the coefficient of determination of the dependent variable (QoL). β = the coefficient of each independent variable by regression. α = the constant in each model for each domain. The blank cells ( "-" ) represent the variables not included in the final model. Variables added to the model: Sex (0 = Male/1 = Female), Age group (0 = up to 39 years/ 1 = over 39 years), Marital status (0 = without partner/1 = with partner), Schooling (0 = primary school completed/1 = primary school incomplete) Per capita family income < or = 0.5 MS (0 = greater than 0.5 minimum salary/ 1 = less than or equal to 0.5 minimum salary),Type of service (0 = UBS/1 = ESF), Anxiety (0 = No/1 = Yes), Depression (0 = No/1 = Yes), Somatization (0 = No/1 = Yes), At-risk drinking (0 = No/1 = Yes), Harmful drinking (0 = No/1 = Yes), and Alcohol dependence (0 = No/1 = Yes).

(p-value < 0.05 for both categories). No association was found between the variables schooling and type of service and the QoL domains in the multivariate analysis.

The variables that showed the strongest association with QoL in all domains (after controlling for the other model variables) were anxiety, depression, somatization, and alcohol consumption (at risk drinking, harmful drinking, and alcohol dependence). The factors that most decreased QoL in the physical domain were anxiety ($\beta$ = -13.05), depression ($\beta$ = -11.78), and acute somatization ($\beta$ = -8.93) (p-value < 0.05), while the factors that most decreased QoL in the psychological, social relationships, and environmental domains were anxiety and depression (p-value < 0.05). The factors at risk drinking ($\beta$ = 5.77; p-value = 0.000) and harmful drinking ($\beta$ = 6.15; p-value=0.010) significantly increased QoL in the environmental domain.

## Discussion

A statistically significant association was found between marital status, age group, and having a per capita income of less than half a minimum salary and lower QoL scores in at least one domain. A negative association was found between being female and QoL in all domains. Various studies have reported a negative association between QoL and these characteristics[11,30-34].

Given that the individuals were primary healthcare patients, lower QoL in the physical domain was to be expected. Furthermore, greater occurrence of chronic diseases was expected with older age, as shown by other studies[31,32,34]. Poorer QoL was also expected among individuals with lower monthly salary. However, this was confirmed only in the environmental domain, where this facet of QoL is measured by a specific question, showing a negative association between having an income per capita of less than half a minimum salary and QoL. The environmental domain obtained the lowest score (50.9 points) of the four domains of the WHOQOL-BREF, which is consistent with the findings of various studies conducted in Brazil with populations of lower socioeconomic status[11,30-32].

The results of the present study show that the prevalence of suspected cases of anxiety and depression is high. These findings are in line with studies that confirm that these disorders are frequent among primary healthcare patients[10,12,33]. The presence of anxiety, depression, and acute somatization was associated with lower QoL scores in all domains, which is corroborated by the literature[11,31,33,35].

With respect to CMDs, an association was found between anxiety and depression and QoL in all domains, whereas with acute somatization an association was found between the disorder and QoL in only the physical and environmental domains. Acute somatization is defined by the presence of medically unexplained symptoms for at least two years, by the seriousness of such symptoms, and the disability they cause[26]. Disability caused by these symptoms may be related to a reduction in leisure activities and difficulty in engaging in paid activities, thus reducing individual income and explaining lower scores in the environmental domain.

The prevalence rates of harmful drinking and alcohol dependence observed by the present study are similar to those found by other studies conducted in Brazil with primary healthcare patients, which reported rates of between 3% and 10%[14,15,36].

With respect to the multivariate analysis, different independent variables explain the four QoL domains, which is expected given the WHOQOL-BREF's objective to investigate different aspects of QoL. The association between schooling and type of service and QoL did not remain in the final regression model, probably due to the correlation between these variables and the other variables included in the analysis and the homogenous nature of the study sample. The proportion of explained variation was greatest for the psychological domain ($R^2$ = 40.6%), possibly due to the presence of variables related to mental health and alcohol consumption, which have a stronger association with the facets of QoL assessed under this domain.

It is interesting to note that better QoL scores were obtained in the presence of harmful drinking and at-risk drinking. These findings are relevant to discussions regarding the various ways of understanding alcohol consumption in society. In this respect, although alcohol consumption is linked to cultural and social activities that generate individual pleasure, a significant proportion of research tends to focus on health issues, thus limiting the opportunity to discuss the leisure aspects of alcohol use and the pleasure and positive feelings derived from its consumption[37]. The psychological domain of the WHOQOL-BREF assesses particular facets of QoL, such as positive and negative feelings, self-esteem, body image and appearance, and personal beliefs. Therefore,

individuals who use alcohol in social or recreational activities may have a more positive perception of QoL.

Participation in leisure and recreational activities and financial resources are some of the facets of QoL assessed in the environmental domain, which showed a positive association with at-risk drinking in the present study. Motives for drinking include leisure, recreation, and social interaction, which may be a possible explanation for the association between at risk drinking and QoL in this domain. Furthermore, alcoholic beverages have a financial cost, which is another possible explanation for this association. In other words, this finding may be a reflection of the relationship between higher socioeconomic status and QoL.

As expected, since it is often present when the physical or psychological effects of drug use are identified, alcohol dependence was associated with lower QoL scores in the physical domain. Conversely, an inverse association was found between QoL and harmful drinking.

However, it is important to highlight that the variable harmful drinking was a dummy variable comprising different patterns of alcohol consumption. Therefore the interpretation of this association with QoL in the physical domain should take into account this analysis method. In this respect, it is possible that the observed relationship is not explained exclusively by the presence of harmful drinking.

The findings of the present study in relation to alcohol consumption and QoL are not directly comparable to those of other studies because different methods were used to assess this variable and the outcome. However, our findings corroborate the literature in so much as they indicate that the association between alcohol consumption and QoL varies depending the domain and pattern of consumption.

A cross-sectional study conducted in Brazil with 648 participants using the Medical Outcomes Study 36- Item Short Form- Health Survey (SF-36) observed a statistically significant association between heavy drinking and the QoL dimension functional capacity, but failed to show an association with limitation due to physical aspects, general health status, pain, vitality, social aspects, emotional aspects, and mental health[34]. A case-control study concluded that the QoL scores obtained by drug users (39% of participants used alcohol) were much lower than those obtained by individuals from the control group, except in the environmental domains, where drug users obtained better scores[38]. A population-based study

conducted in the State of Minas Gerais showed that frequent drinkers obtained lower QoL scores in the physical component, but not in the mental component[39].

With respect to positive associations between alcohol consumption and QoL, our findings are in line with those obtained by some international studies. The "National Epidemiologic Survey on Alcohol and Related Conditions" (NESARC) conducted by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) with 43,093 participants concluded that drinking was associated with better QoL in relation to physical and mental health[40], while in another study, participants who reported binge drinking showed a higher percentage of physical QoL than participants who did not (no differences were found for mental QoL)[41]. Finally, a study conducted in Norway with a random population-based sample of 4,000 individuals showed that nondrinkers reported poorer QoL in the physical health domain[42].

One of the limitations of this study is the cross-sectional study design. In this respect, it is assumed that the associations between QoL and sociodemographic factors, alcohol consumption, and CMDs can occur in two directions and cross-sectional studies are limited in their ability to determine the cause-and-effect relationship between variables.

Furthermore, the fact that the study sample was a convenience sample made up of a specific sample of primary healthcare patients led to prevalence bias. This sampling bias meant that individuals with health problems and of lower socioeconomic status were more likely to be included in the sample, resulting in a higher than normal prevalence of CMDs and distorting associations between these variables and QoL.

Finally, diagnostic criteria, such as the DSM-IV or CID-10, were not used for the definition of CMDs and alcohol dependence. False positives may have occurred, given that the instruments used (*GHQ-12, SOMs-2, HAD, AUDIT*) were screening devices. However, this does not diminish the importance of the findings, given that high prevalence rates were detected and that primary care service plays an essential role in treating these disorders.

## Final considerations

This study showed a high prevalence of mental health outcomes and a significant presence of different patterns of alcohol consumption, reit-

erating the importance of enhancing the capacity of health professionals and primary health services to manage these problems. Moreover, the findings show an association between lower QoL scores and certain socioeconomic factors (being female and aged over 39 years and having a partner and a per capita family income of under half a minimum salary) and health conditions (anxiety, depression, and somatization).

Although a number of studies have shown that alcohol consumption has a negative effect on QoL, the results show that harmful drinking and at-risk drinking are associated with a more positive perception of QoL (particularly in the psychological and environmental domains) among participants. The findings show that the association between alcohol consumption and QoL is not uniform, but rather dependent upon the pattern of consumption. Further research is therefore warranted to obtain a more in-depth understanding of the relationship between different patterns of alcohol consumption and QoL.

In light of the findings, with a view to improving the quality of life of patients, it is recommended that, without disregarding the harmful health effects of alcohol consumption, health professionals and services should adopt strategies where the focus is not exclusively abstinence.

Although QoL is a widely studied construct, this study makes an important contribution because it investigates the relationship between different patterns of alcohol consumption and the different QoL domains specifically in primary healthcare patients.

## Collaborations

MVF Santos contributed to data analysis and interpretation, the drafting of this article, and final approval of the version to be published. MR Campos contributed to study conception and design, data analysis and interpretation, the critical review of intellectual content, and final approval of the version to be published. SLCL Fortes contributed to study conception and design, the coordination of field research, fundraising, data analysis and interpretation, critical review of intellectual content, and final approval of the version to be published.

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