

## Alcohol intake and symptoms of depression, anxiety and stress in women\*

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**Objective:** to verify the association between alcohol intake and symptoms of depression, anxiety and stress in women.

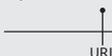
**Methodology:** this is an exploratory, non-probabilistic, snowball cross-sectional study carried out with adult women. The instruments were a structured questionnaire with sociodemographic data, behavioral variables and physical exercise, Alcohol Use Disorders Identification Test (AUDIT) and Depression, Anxiety and Stress Scales (DASS-21). Data collection was carried out online, through an invitation with a link sent by mobile application (WhatsApp), electronic address (e-mail) and social networks (Facebook and Instagram), carried out in the period from December 2020 to January 2021. **Results:** a total of 301 women participated in the study, with a mean age and standard deviation of  $34.14 \pm 10.47$  years. Among the sample, 78.4% had low alcohol intake, 17.9% risk intake and 3.7% probable dependence. The study showed an association between high risk alcohol intake in young adult women with: other sources of income, non-practice of physical exercise, symptoms of anxiety and stress. It was also verified in the sample, risk of probable alcohol use disorder among young adult participants, with other sources of remuneration, symptoms of depression, anxiety and stress. **Conclusions:** high risk intake and possible alcohol use disorder by the women researched was high, highlighting the importance of regional studies, aiming to present the magnitude of this problem.

**Descriptors:** Consumption of Alcoholic Beverages; Alcoholism; Women's Health; Anxiety; Depression; Stress.

\* Paper extracted from master's thesis "Consumo de álcool, binge drinking, sintomas de depressão, ansiedade e estresse em mulheres vilhenenses", presented to Fundação Universidade Federal de Rondônia, Porto Velho, RO, Brazil.

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### How to cite this article

Costa ES, Calheiros PRV, Farias ES. Alcohol intake and symptoms of depression, anxiety and stress in women. SMAD, Rev Eletrônica Saúde Mental Álcool Drog. 2024;20:e-200807 [cited ]. Available from: . <https://doi.org/10.11606/issn.1806-6976.smad.2024.200807>

## Consumo de álcool e sintomas de depressão, ansiedade e estresse em mulheres

**Objetivo:** verificar a relação entre consumo de álcool e sintomas de depressão, ansiedade e estresse em mulheres. **Metodologia:** trata-se de um estudo de delineamento transversal exploratório, não probabilístico, do tipo "bola-de-neve", realizado com mulheres adultas. Os instrumentos foram um questionário estruturado com dados sociodemográficos, variáveis comportamentais e prática de exercício físico, escala *Alcohol Use Disorders Identification Test* (AUDIT) e *Depression, Anxiety and Stress Scales* (DASS-21). A coleta de dados foi feita *online*, por meio de convite com *link* enviados por aplicativo de celular (*WhatsApp*), endereço eletrônico (*e-mail*) e redes sociais (*Facebook* e *Instagram*), realizada no período compreendido entre dezembro de 2020 a janeiro de 2021. **Resultados:** participaram do estudo 301 mulheres, com idade média e desvio padrão de  $34,14 \pm 10,47$  anos. Entre a amostra, 78,4% apresentaram consumo de álcool baixo, 17,9% consumo de risco e 3,7% provável dependência. O estudo mostrou associação entre consumo de álcool de risco em mulheres adultas jovens com: outras formas de remuneração, não prática de exercício físico, sintomas de ansiedade e estresse. Verificou-se ainda na amostra risco de provável transtorno por uso de álcool entre as participantes jovens adultas, com outras formas de remuneração, sintomas de depressão, ansiedade e estresse. **Conclusões:** o consumo de risco e possível transtorno por uso de álcool pelas mulheres pesquisadas se mostrou alto, evidenciando a importância de estudos regionais, objetivando apresentar a magnitude dessa problemática.

**Descritores:** Consumo de Bebidas Alcoólicas; Alcoolismo; Saúde da Mulher; Ansiedade; Depressão; Estresse.

## Consumo de alcohol y síntomas de depresión, ansiedad y estrés en mujeres

**Objetivo:** verificar la relación entre el consumo de alcohol y los síntomas de depresión, ansiedad y estrés en mujeres. **Metodología:** se trata de un estudio transversal exploratorio, no probabilístico, *snowball* o bola de nieve, realizado con mujeres adultas. Los instrumentos fueron un cuestionario estructurado con datos sociodemográficos, variables conductuales y de ejercicio físico, *Alcohol Use Disorders Identification Test* (AUDIT) y *Depression, Anxiety and Stress Scales* (DASS-21). La recolección de datos se realizó en línea, mediante una invitación con enlace enviada por aplicación móvil (*WhatsApp*), dirección electrónica (correo electrónico) y redes sociales (*Facebook* e *Instagram*), realizada en el período de diciembre de 2020 a enero de 2021. **Resultados:** un total de 301 mujeres participaron en el estudio, con una edad media y desviación estándar de  $34,14 \pm 10,47$  años. Entre la muestra, 78,4% tenían bajo consumo de alcohol, 17,9% consumo de riesgo y 3,7% dependencia probable. El estudio mostró asociación entre el consumo de riesgo de alcohol en mujeres adultas jóvenes con otras formas de ingresos, falta de práctica de ejercicio físico, síntomas de ansiedad y estrés. También se verificó en la muestra, riesgo de probable trastorno por consumo de alcohol entre los participantes adultos jóvenes, con otras formas de remuneración, síntomas de depresión, ansiedad y estrés. **Conclusiones:** el consumo de riesgo y posible trastorno por uso de alcohol por parte de las mujeres encuestadas fue alto, destacando la importancia de los estudios regionales, con el objetivo de presentar la magnitud de este problema.

**Descriptorios:** Consumo de Bebidas Alcohólicas; Alcoholismo; La Salud de la Mujer; Ansiedad; Depresión; Estrés.

## Introduction

Alcohol intake brings serious problems to mental health and has been discussed and considered a global challenge. Studies establish an association between alcohol use and anxiety, depression and stress disorders<sup>(1-3)</sup>. Another concern regarding the issue is gender inequality. Women show greater losses when it comes to the negative effects of alcohol<sup>(4-5)</sup>.

The World Health Organization global report<sup>(6)</sup> on alcohol and health indicated that approximately 1.6% of Brazilian women, aged 15 years or older, have some disorder due to alcohol use, with 0.5% indicating possible dependence. A survey conducted by the Brazilian Institute of Geography and Statistics (IBGE)<sup>(7)</sup> points out that alcohol intake has been growing among Brazilians: in 2019, about 17% of adult women reported having drunk alcohol once or more a week, against 12.9% in 2013. Among the male population, intake in 2019 was 37.1% against 36.3% in 2013. The prevalence among men is higher, while the growth among women was greater.

Regarding mental disorders such as anxiety, depression and stress, studies indicate greater vulnerability for women at different stages of life, and when associated with alcohol use, there is an incidence of greater physical, psychological and social damage for them<sup>(2-3,8)</sup>. In a study that sought to understand the meaning of drinking among women, the participants revealed that in the beginning, the use meant socialization and pleasure, while dependence brought prejudice and withdrawal, leading to loneliness due to the low social tolerance of the practice in relation to the female gender<sup>(9)</sup>. Thus, the complexity is observed after intake becomes frequent, leading to an increase in the probability of losses and comorbidities.

In Sweden and Spain, scholars have linked alcohol intake to comorbidities, such as anxiety disorders, with severe symptoms, and treatment outcomes were even worse under conditions of isolation<sup>(10-11)</sup>. American researchers set out to elucidate variables that could mediate the relationship between symptoms of depression and stress, with problems related to excessive alcohol intake. The research had the participation of 393 university students, 60.8% of whom were women. Depression and elevated stress were linked to higher levels of alcohol problems among young adults. It concluded that young adults who drink and suffer from stress or depression are likely to have problems with binge drinking<sup>(12)</sup>. In Belgium, the course of the relationship between affects and desire during alcohol detoxification was investigated, with particular attention given to gender, in relation to known differences in affects. Scholars found that

negative affects were related to the intensity of desire (alcohol), and in women the symptoms persisted until the end of treatment, as well as high levels of depression disorder<sup>(2)</sup>, showing emotional aspects of greater vulnerability for females.

In Brazil, a cross-sectional study<sup>(1)</sup> evaluated the relationship between the use of psychoactive substances, anxiety, depression and stress in 345 workers from a Brazilian public university, located in the state of Rio Grande do Sul, with a mean age of participants of 38.9 years (SD=10.5), 54.2% (n=187) and most were women. Among the sample, 60.3% of men and 49.7% of women consumed heavy alcohol. The use of heavy alcohol was more significant among workers with higher levels of anxiety (p=0.002). Research has shown that heavy and episodic alcohol intake was higher among workers with high levels of anxiety, depression and stress<sup>(1)</sup>. The research had a positive relationship with the variables investigated in this study, greater participation of women and high indicative of intake among them.

Although there are few studies in Brazil involving psychological comorbidities and alcohol use, a quantitative and descriptive study was found, carried out with an exclusively female population, which sought to identify sociodemographic and clinical characteristics of women undergoing outpatient treatment for alcohol abuse. The medical records of women who underwent treatment at the Drug Addiction Unit of the Hospital das Clínicas of the Faculty of Medicine of Ribeirão Preto, at the University of São Paulo, were part of the study. The sample consisted of 27 medical records, the average age of women was 50 years (SD=10), most were married (59.3%), did not work (70.4%) and had psychiatric diagnoses (70.3%); among the diagnoses 57.8% were of depression and 15.9% of anxiety<sup>(3)</sup>. The research showed the peculiarities of female alcoholism, relating them to psychological comorbidities, such as depression and anxiety.

Given this context, it is important to address the relationship between alcohol intake and the symptoms of depression, anxiety and stress in female alcohol users. The question sought to be discussed in this study encompasses the relationship between gender vulnerability, with regard to alcohol use and mental health problems. In the North of the country, particularly in Rondônia, studies of this magnitude are difficult to find. Research that presents regional and gender differences is necessary to understand the behavior and characteristics that involve female drinking and its relationship with psychiatric disorders.

In this regard, the study seeks to verify the association between alcohol intake and symptoms of depression, anxiety and stress in women.

## Methods

This is an exploratory, non-probabilistic cross-sectional study with snowball sampling<sup>(13)</sup>. It was applied in the city of Vilhena, state of Rondônia, located west of the North region of Brazil and part of the Western Amazon, with an estimated population of 102,211 and HDI 0.731<sup>(14)</sup>.

The research population is composed of women, aged between 18 and 65 years. In reference to the 2010 census, the estimated population of women residing in the urban area of Vilhena is 37,796. The sample size was determined, with a 90% confidence interval, and 12% added to compensate losses and refusals, 5% of sampling error, which resulted in a sample of 301 women. Afterwards, it was decided to present the power ( $1 - \beta$ ) 98% ( $\beta = 1.6\%$ ) and 95% confidence level ( $\alpha = 5\%$ ) to detect equal areas under the Receiver Operating Characteristic (ROC) curve or greater than 0.50 as significant as significant, performed in the G\*Power 3.1.9.7 program.

### Data collection instruments

Regarding data collection, a structured questionnaire was developed with sociodemographic data and behavioral variables, with the aim of verifying the possible associations between alcohol intake and symptoms of depression, anxiety and stress. The sociodemographic variables assessed in this study were: age (young adult: 18 to 39 years old; and intermediate adult: 40 to 65 years old)<sup>(15)</sup>; marital status (married, stable union or living together; single, divorced or widowed); form of work (paid; and other forms of work: for own intake, voluntary, household chores and care for people living in the same household or family members living in other households); and physical exercise: Do you practice weekly physical exercise? (Yes and no).

To verify problematic alcohol intake, the instrument chosen in the present study was the AUDIT (Alcohol Use Disorders Identification Test), produced by the World Health Organization<sup>(16)</sup> with validation in Brazil<sup>(17)</sup>, which classifies the pattern of alcohol intake based on the level of risk. The instrument consists of ten questions, with scores ranging from 0 to 4 points for each item. At the end, the points are added up and the scores indicate the individual's alcohol intake pattern, classifying it in one of four possible alcohol intake risk zones, namely: Risk Zone I - individuals who had a pattern of low-risk intake of alcohol or were teetotalers. Score between 0 and 7; Risk Zone II - individuals who had a pattern of risky alcohol intake. Score between 8 and 15; Risk Zone III - individuals who had a pattern of harmful alcohol intake. Score between 16

and 19; and Risk Zone IV - individuals who had an intake pattern of probable alcohol dependence. Score between 20 and 40.

It is noteworthy that the word dependency is used in the study to follow the AUDIT guidelines. However, "probable dependence" refers to the "Alcohol Use Disorder" described in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), classified among Substance-Related Disorders and Addictive Disorders<sup>(18)</sup>.

Regarding the verification of psychological symptoms, the instrument selected for research was the Depression, Anxiety and Stress Scales (DASS-21) developed by Lovibond & Lovibond in 1993, which originally had 42 items, validated in Brazil<sup>(19)</sup>. In the validated version, the scale now has 21 items, divided into three subscales. Each subscale is composed of seven items, namely: 3, 5, 10, 13, 16, 17, 21 (depression); 2, 4, 7, 9, 15, 19 and 20 (anxiety); and 1, 6, 8, 11, 12, 14 and 18 (stress), which assess depressive symptoms (anhedonia, dysphoria, lack of interest, inertia, devaluation, lack of motivation), anxiety (related to changes in the nervous system, anxiety resulting from numerous situations) and stress (experience of impatience, irritability and high excitability).

Scores range from a minimum value of zero to a maximum value of three. The DASS-21 questionnaire is answered using a Likert scale: zero for "did not apply to me"; one for "applied to me a little, or some of the time"; two for "applied to me a lot, or a good deal of the time"; and three, "applied to me a lot, or most of the time". The classification consists of the sum of the items belonging to the subscales<sup>(19)</sup>.

The Brazilian validation indicates good internal consistency of the scale,  $\alpha = 0.92$  (depression),  $\alpha = 0.90$  (stress) and  $\alpha = 0.86$  (anxiety). The cutoff point of the scale is applied after multiplying each factor by 2. The classification corresponds to: depression (0-9) normal, (10-13) mild, (14-20) moderate, (21-27) severe and (>28) extremely severe; anxiety (0-7) normal, (8-9) mild, (10-14) moderate, (15-19) severe, and (>20) extremely severe; and stress (0-14) normal, (15-18) mild, (19-25) moderate, (25-33) severe, and (>34) extremely severe. The scale's internal consistency index for this sample was  $\alpha = 0.93$ <sup>(19)</sup>.

### Data collection and analysis procedures

The snowball sampling was selected mainly due to the general conditions of realization, where the research was built and carried out in a pandemic period of COVID-19<sup>(20)</sup>. Invitations were sent to social networks of known people, enabling them to send the invitation to other women, with the aim of reaching the calculated sample.

The invitations included adult women residing in the city of Vilhena, in the state of Rondônia, who had access to the internet. Those who did not know how to read and/or write or did not have the knowledge to access the internet were excluded.

Thus, data collection was carried out online, through an invitation with an electronic link included. The participants signed the Informed Consent Form (ICF), and after acceptance, the questionnaires were made available, which could be filled out using a cell phone or computer with internet access. The invitations were sent by mobile application (WhatsApp), electronic address (email) and made available on social networks (Facebook and Instagram). The authors contacted approximately 400 women, from December 2020 to January 2021.

The research was approved by the Research Ethics Committee of the Federal University of Rondônia Foundation, #4,445,053, following the guidelines of the National Health Council, based on resolution nº 466/12 and nº 510/16 regarding research. involving humans.

### Statistical treatment

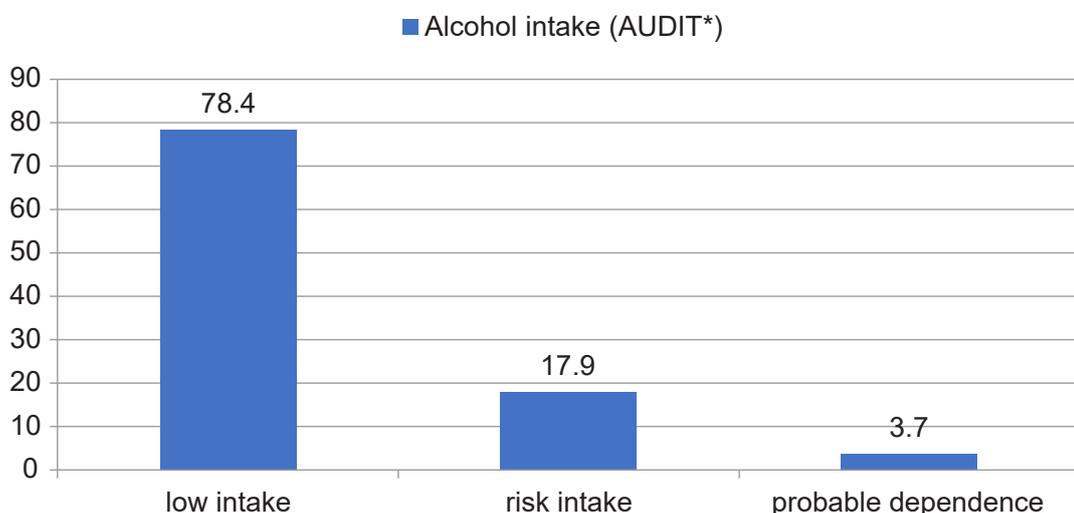
Data were analyzed using the Statistical Package for the Social Sciences (SPSS), version 20.0. For the first analysis, the Cronbach's alpha coefficient test was applied to assess the reliability of the AUDIT instrument (alcohol intake) and DASS-21 (levels of symptoms of depression, anxiety and stress) through descriptive measures of mean and standard deviation, and for reliability analysis the total item correlation and Cronbach's alpha, if the item is excluded. Afterwards, the chi-square test (Fisher's

exact test) was used to assess the prevalence (%) and associations between low alcohol intake, risk and probable dependence with sociodemographic variables and symptoms of depression, anxiety and stress. Finally, multinomial logistic regression analysis was performed to examine the association of the variable alcohol intake (reference low alcohol intake 0= low risk) between sociodemographic variables and symptoms of depression, anxiety and stress. Multinomial logistic regression was used to verify the association with alcohol intake. After adjusting the odds ratio (OR) and 95% confidence intervals (95%CI), different levels of alcohol intake were calculated. The potential confounding variable in the multiple logistic regression analysis was age. P values lower than 0.05 were considered statistically significant.

### Results

The study included 301 women from Vilhena, with a mean age of  $34.14 \pm 10.47$  (18 – 65) years. Among the sample, 78.4% had low alcohol intake, 17.9% risk intake and 3.7% probable dependence (Figure 1).

For the use of the AUDIT and DASS-21 instruments, a reliability analysis was carried out by measuring internal consistency through Cronbach's alpha coefficient, indicated by the original reading of the instrument. Estimates were obtained for descriptive measures (mean and standard deviation), item-total correlation and Cronbach's alpha coefficient if the item was excluded. For the DASS 21 scale in relation to symptoms, the alpha value was for depression, 0.923, anxiety, 0.900 and stress, 0.916 (Table 1). According to the evaluation, in the AUDIT, the alpha value was 0.83 (Table 2).



\*AUDIT = Alcohol Use Disorders Identification Test

Figure 1 – Alcohol intake (AUDIT) in women. Vilhena, RO, Brazil, 2020-2021

Table 1 - Mean, standard deviation, reliability coefficients and total item correlation for DASS\* factor scores. Vilhena, RO, Brazil, 2020-2021

DASS* Factors and items	Descriptive measures			Reliability Analysis	
	Mean	Standard deviation	Correlation total item	Cronbach alpha if item deleted	Cronbach's alpha
Depression					0.923
P3	0.61	0.83	0.635	0.924	
P5	0.82	0.91	0.711	0.915	
P10	0.59	0.88	0.766	0.907	
P13	0.90	0.95	0.835	0.905	
P16	0.66	0.89	0.763	0.905	
P17	0.73	0.99	0.759	0.907	
P21	0.68	0.97	0.720	0.911	
Anxiety					0.900
P2	0.49	0.75	0.524	0.903	
P4	0.54	0.80	0.675	0.886	
P7	0.41	0.75	0.651	0.888	
P9	0.63	0.89	0.798	0.878	
P15	0.55	0.84	0.768	0.880	
P19	0.73	0.93	0.760	0.879	
P20	0.68	0.90	0.774	0.881	
Stress					0.916
P1	0.85	0.88	0.675	0.911	
P6	0.88	0.89	0.692	0.908	
P8	0.85	0.95	0.796	0.898	
P11	1.07	0.93	0.690	0.904	
P12	0.95	0.94	0.786	0.899	
P14	0.79	0.89	0.768	0.903	
P18	1.19	1.03	0.779	0.903	

\*DASS = Depression, Anxiety and Stress Scales

Table 2 - Mean, standard deviation, reliability coefficients and total item correlation for the AUDIT\*, in women. Vilhena, RO, Brazil, 2020-2021

AUDIT*	Descriptive measures			Reliability Analysis	
	Mean	Standard deviation	Correlation total item	Cronbach's alpha if item deleted	Cronbach's alpha
P1	1.81	0.85	0.526	0.810	0.83
P2	1.08	1.22	0.639	0.797	
P3	1.22	1.16	0.622	0.799	
P4	0.34	0.90	0.561	0.806	
P5	0.14	0.62	0.268	0.830	
P6	0.13	0.55	0.475	0.818	
P7	0.40	0.86	0.572	0.806	
P8	0.30	0.73	0.585	0.807	
P9	0.38	1.06	0.411	0.823	
P10	0.45	1.18	0.548	0.809	

\*AUDIT = Alcohol Use Disorders Identification Test

Table 3 presents the prevalence (%) of alcohol intake (AUDIT), and one can point out the probable evidence of alcohol intake in younger women (18 to 39 years old). for risk intake, 19.9% and probable dependence 4.3%; marital status. being single or divorced/widowed. 20.5% and 6.8%, respectively; other forms of remuneration, 25.0% and 7.4%; not practicing physical exercise showed evidence of a intake risk of 22.8%; the prevalence of depression symptoms showed evidence of 11.3% with probable alcohol dependence; anxiety, with risky intake 18.6%, stress, with risky intake of 22.2% and probable dependence, 11.1%.

Using multinomial logistic regression, the variables associated with the risk of alcohol intake were: young adult (OR=1.66; 95%CI:1.18-3.34), other forms of remuneration (OR=1.90; 95%CI:1.02-3.67), no physical exercise (OR=2.18; 95%CI:1.15-4.13), anxiety (OR=1.14;95%CI:1.05 -2.41) and stress (OR=1.51;95%CI:1.07-4.01); the risk of probable dependence: being a young adult (OR=2.14; 95%CI:1.45-10.13), other forms of remuneration (OR=4.74; 95%CI 1.22-18.33), other forms of remuneration (OR=3.44; 95%CI:1.01-11.77), depression (OR=6.06; 95%CI:1.76-20.85), anxiety (OR=3.74; 95%CI:1.10-12.82) and stress (OR=4.54; 95%CI:1.11-18.62) (Table 4).

Table 3 - Prevalence (%) of demographic variables and symptomatology of depression, anxiety and stress in women. Vilhena, RO, Brazil, 2020-2021

Variables	Alcohol intake (AUDIT*)				p-value
	n (%)	Low intake	Risk intake	Probable dependency	
<b>Sociodemographic</b>					
Age					0.046 <sup>†</sup>
Young adult (18 to 39 years old)	211 (70.1)	160 (75.8)	42 (19.9)	9 (4.3)	
Intermediate adult (40 to 65)	90 (29.9)	76 (84.4)	12 (13.3)	2 (2.2)	
Marital status					0.016 <sup>†</sup>
Married, stable union or living together	184 (61.1)	151 (82.1)	30 (16.3)	3 (1.6)	
Single, divorced or widowed	117 (38.9)	85 (72.6)	24 (20.5)	8 (6.8)	
Form of work					0.013 <sup>†</sup>
Paid	233 (77.4)	190 (81.5)	37 (15.9)	6 (2.6)	
Other forms of remuneration	68 (22.6)	46 (67.6)	17 (25.0)	5 (7.4)	
Physical exercise					0.025 <sup>†</sup>
Yes	134 (44.5)	113 (84.3)	16 (11.9)	5 (3.7)	
No	167 (55.5)	123 (73.7)	38 (22.8)	6 (3.6)	
<b>Symptomatology</b>					
Depression					0.039 <sup>†</sup>
No	248 (82.4)	197 (79.4)	46 (18.5)	5 (2.0)	
Yes	53 (17.6)	39 (73.6)	8 (15.1)	6 (11.3)	
Anxiety					0.067 <sup>†</sup>
No	242 (80.4)	193 (79.8)	43 (17.8)	6 (2.5)	
Yes	59 (19.6)	43 (72.9)	11 (18.6)	5 (8.5)	
Stress					0.042 <sup>†</sup>
No	274 (91.0)	218 (79.6)	48 (17.5)	8 (2.9)	
Yes	27 (9.0)	18 (66.7)	6 (22.2)	3 (11.1)	

\*AUDIT = Alcohol Use Disorders Identification Test; Prevalence: <sup>†</sup>Fisher's Exact

Table 4 - Association between alcohol intake risk factors (AUDIT) with sociodemographic variables and symptoms of depression, anxiety and stress in women. Vilhena, RO, Brazil, 2020-2021

Variables	Alcohol intake /AUDIT*			
		Low intake	Risk intake	Probable dependency
Young adult	OR <sup>†</sup>	Ref. <sup>‡</sup>	1.66	2.14
	IC95% <sup>§</sup>	1	1.18 – 3.34	1.45 – 10.13
Single, divorced or widowed	OR <sup>†</sup>	Ref. <sup>‡</sup>	1.42	4.74
	IC95% <sup>§</sup>	1	0.78 – 2.58	1.22 – 18.33
Other forms of remuneration	OR <sup>†</sup>	Ref. <sup>‡</sup>	1.90	3.44
	IC95% <sup>§</sup>	1	1.02 – 3.67	1.01 – 11.77
No physical exercise	OR <sup>†</sup>	Ref. <sup>‡</sup>	2.18	1.10
	IC95% <sup>§</sup>	1	1.15 – 4.13	0.33 – 3.71
Depression (yes)	OR <sup>†</sup>	Ref. <sup>‡</sup>	1.14	6.06
	IC95% <sup>§</sup>	1	0.50 – 2.59	1.76 – 20.85
Anxiety (yes)	OR <sup>†</sup>	Ref. <sup>‡</sup>	1.14	3.74
	IC95% <sup>§</sup>	1	1.05 – 2.41	1.10 – 12.82
Stress (yes)	OR <sup>†</sup>	Ref. <sup>‡</sup>	1.51	4.54
	IC95% <sup>§</sup>	1	1.07 – 4.01	1.11 – 18.62

\*AUDIT = Alcohol Use Disorders Identification Test; <sup>†</sup>OR = Odds ratio; <sup>‡</sup>Ref. = Reference to low risk intake; <sup>§</sup>95%CI = 95% Confidence Interval

## Discussion

In this study among the women who participated in the sample, there was a high prevalence of alcohol intake considered to be at risk and of probable dependence. Thus, for 21.6% of them there is an indication of some form of intervention regarding intake, and for 3.7% it would be treatment for alcohol use disorder.

Often, the perception of alcohol dependence by women is marked by their own gender bias, the behavior is predicted for the male population and not for females<sup>(9)</sup>. This makes them delay in seeking treatment, and there are indications that women

look for emotional support in the intake of alcoholic beverages for their anguish and concerns, often suffer social stigmas and hide intake for fear of being judged. Difficulties in affective relationships, such as betrayal, domestic violence, influence of friendships, working conditions, low cost and easy access to alcoholic beverages, in addition to changes in social roles such as death of family members, death of the husband, pregnancy, birth of children, children leaving home and illness of family members, have been pointed out as triggers for abusive intake<sup>(3,21-22)</sup>.

According to preliminary data from the Ministry of Health (*Vigitel*, carried out only in Brazilian capitals

in 2020 and in the Federal District), in the capital of Rondônia, 12.4% of women consumed alcohol excessively<sup>(23)</sup>. The same survey, carried out in 2019, indicated that intake among Rondonians was 9.3%<sup>(24)</sup>. In addition to the rates presenting a significant discrepancy with the result of this study, the need for regional surveys is pointed out, and the data presented by the agency suggest a gradual increase among women from Rondônia.

Among the Vilhena sample, the indicative of a probable alcohol use disorder, one of the most serious problems associated with alcohol intake, rises significantly when the variables of prevalence of depression symptoms are included, 11.3%. The same phenomenon can also be observed with symptoms of anxiety and stress, the first increasing both risk intake, to 18.6%, and probable dependence, 8.5%, the second raising risk intake to 22.2 % and probable dependence for 11.1% of women.

Corroborating the idea, a study carried out with women in outpatient treatment for alcohol abuse, 76% of them had psychiatric comorbidity<sup>(3)</sup>. In the same direction, researchers suggest that many women use alcohol as a medication against suffering, in an attempt to minimize the symptoms, while they end up exacerbating these problems through the use of the substance<sup>(25)</sup>.

Multinomial logistic regression indicated risk of alcohol intake, being a young adult, with other forms of remuneration, not practicing physical exercise and anxiety. The risk of probable predictors for alcohol use disorder indicated being a young adult, single, having other forms of remuneration, depression and anxiety.

Studies are consistent with the results presented, indicating a positive association between alcohol use and psychiatric symptoms. The relationship between the problematic use of alcohol and other drugs, stress, anxiety and depression was evaluated in nursing students at a public university in Minas Gerais; the sample consisted predominantly of women, with 87.1% of the participants<sup>(26)</sup>. Among college students, there was a positive correlation between alcohol use and symptoms of stress and depression ( $p=0.001$ ). In another survey<sup>(25)</sup>, which aimed to investigate symptoms of depression, anxiety and stress and drug use, with 81.1% of the participants being women, there was a positive relationship between alcohol and symptoms of anxiety ( $p<0.05$ ) and stress ( $p<0.01$ ).

In the same way as the present research, preliminary data recently presented by the Ministry of Health<sup>(23)</sup>, of the age group that consumes heavy alcohol, higher percentages are observed for young

adult women (65.1%). As a warning, globally, people in this age group are more affected by alcohol compared to older people, and 13.5% of deaths among this population were attributed to alcohol intake<sup>(6)</sup>.

The positive relationship between risky intake and possible alcohol use disorder with single marital status was also presented in the study that evaluated the prevalence and levels of alcohol intake in university students in the north of Portugal<sup>(27)</sup>. This study also showed that "other forms of remuneration" (informal work) had a positive association with risky intake and possible dependence. It is more common that these activities have little monitoring by immediate supervisors, allowing the use of alcohol with more freedom. The non-practice of physical exercise associated with the risky intake of alcoholic beverages comes from the probability that women who adopt physical activities have a healthier lifestyle with less intake of alcoholic beverages. Thus, one can infer willingness to harmful alcohol intake with single marital status, having other forms of remuneration and not practicing physical exercise.

In view of the findings, clinical interventions can receive contributions as a possibility of intervention in constructed beliefs that induce the intake style of heavy episodic drinking: support for clinical, psychological, social and economic complications associated with female intake of alcoholic beverages; coping with the risk of different forms of abuse and violence against women; and also subsidize prevention programs in primary care, brief interventions and treatment, specifically aimed at women.

Of the instruments used in this research, the DASS-21 proved to be adequate to assess the symptoms of anxiety, depression and stress in the sample of women studied, indicating good reliability. The scale has already been used in other studies<sup>(1,25-26,28)</sup>. The AUDIT was also evaluated, showing good reliability to assess the problematic use of alcohol in women, being widely used<sup>(27,29)</sup>.

Given the above, it is possible to perceive the relevance of using the aforementioned instruments to assess the relationship between alcohol intake and the symptoms of depression, anxiety and stress. The studied sample found an association between alcohol intake and the highlighted disorders. The association between symptoms of depression, anxiety and stress points to complementary paths, one of which is the possibility of substance use as a form of relief<sup>(3)</sup>. In another, as a result of this intake, and the last one a mix of the two possibilities in the form of a positive feedback<sup>(9)</sup>. For any possibility, there is strong evidence

that associates the intake of alcoholic beverages with symptoms of possible psychological comorbidities.

Another important aspect to highlight is that the data were collected during the COVID-19 pandemic, and during this period there was an increase in the manifestations of symptoms related to mental health and alcohol intake. A study conducted by the Pan American Health Organization (PAHO)<sup>(30)</sup> in 33 countries showed that 42% of respondents (men and women) in Brazil reported high intake of alcoholic beverages during the pandemic. The survey pointed out that there was a higher prevalence among young people, heavy episodic drinking and severe anxiety. This may be a factor that has an impact on intake in the general population, and possibly on the particularities of alcohol intake among women (social isolation, anxiety symptoms, among others).

Studies on alcohol intake and the female population are difficult to find, and the complexity increases when psychiatric variables such as anxiety, depression and stress are added. When comparing abusive or dependent intake by gender, they present a lower percentage, but there is an indication of rapid growth, in addition to evidence of numerous negative repercussions for health.

## Conclusion

Risk intake and possible disorder due to alcohol use by the women was high, highlighting the importance of regional studies, aiming to present the magnitude of this problem, as well as to demystify social stigmas in relation to alcoholic women, so that they can seek treatment when they need it.

In the Vilhena sample, probable alcohol use disorder was associated with young adult women, single or divorced/widows, other forms of remuneration, and symptoms of depression and anxiety. Risk intake was associated with young adults, other forms of remuneration, no physical exercise and anxiety symptoms. Alcohol use disorder is considered one of the main public health problems worldwide and in Brazil the situation is no different. The use of this substance can favor the emergence of psychiatric disorders and aggravate existing conditions, especially in populations indicated as being more vulnerable, such as women.

Regarding the limitations of the study, we highlight the "snowball" sampling, selected for the ease of data collection in a pandemic period, which can be a starting point for research and intervention networks. Research in this dimension is necessary to understand the phenomenon of alcohol intake and its implications for women and may contribute with relevant information for regional and national public health policies and further in-depth investigations on the subject.

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**Study concept and design:** Eldessandra Santos da Costa, Paulo Renato Vitória Calheiros, Edson dos Santos Farias. **Obtaining data:** Eldessandra Santos da Costa, Paulo Renato Vitória Calheiros, Edson dos Santos Farias. **Data analysis and interpretation:** Eldessandra

Santos da Costa, Paulo Renato Vitória Calheiros, Edson dos Santos Farias. **Statistical analysis:** Eldessandra Santos da Costa, Paulo Renato Vitória Calheiros, Edson dos Santos Farias. **Drafting the manuscript:** Eldessandra Santos da Costa, Paulo Renato Vitória Calheiros, Edson dos Santos Farias. **Critical review of the manuscript as to its relevant intellectual content:** Eldessandra Santos da Costa, Paulo Renato Vitória Calheiros, Edson dos Santos Farias.

**All authors approved the final version of the text.**

**Conflict of interest: the authors have declared that there is no conflict of interest.**

Received: Aug 6<sup>th</sup> 2022

Accepted: Aug 24<sup>th</sup> 2023

Associate Editor:  
Carla Aparecida Arena Ventura

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