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Alcohol abuse in older adults with type 2 diabetes mellitus in primary health care: a cross-sectional study

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Abstract *This cross-sectional study aimed to analyze alcohol abuse in older adults with type 2 diabetes mellitus in primary health care. Household data were collected from March to October 2018 in the Family Health Strategy in Ribeirão Preto, São Paulo through face-to-face interviews with a form application. The pattern of alcohol consumption was estimated with the Alcohol Use Disorders Identification Test-C. A total of 338 older adults with type 2 diabetes mellitus participated, and 19.2% (95%CI 15.0-23.4) engaged in alcohol abuse. Among them, we observed a higher frequency of males (63.1%), aged 60 to 64 years (35.4%), economic class C (49.2%), 1-4 schooling years (53.8%), and multimorbidity (92.3%). There was a negative association between alcohol abuse and drug therapy adherence (PR = 0.55; 95%CI 0.36-0.86). The frequency of alcohol abuse and non-adherence to drug treatment among those with a high consumption pattern is troubling since it can lead to diabetes complications. Therefore, we underscore the importance of multidimensional elderly care and health education in primary care.*

Key words *Binge drinking, Health of the elderly, Diabetes mellitus, Delivery of health care, Public health surveillance.*

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Introduction

Diabetes mellitus (DM) is one of the main non-communicable chronic diseases (NCDs), characterized by a multifactorial and complex etiology, with alterations in insulin production/secretion by pancreatic beta cells[1]. Brazil estimated 20.2% of people aged 60 or over with a medical diagnosis of this disease[2] in 2019.

DM is a significant public health problem and a primary care-sensitive condition (PCSC)[3]. Therefore, health promotion, screening, disease control, and disease prevention and rehabilitation actions are intended to occur in Primary Health Care (PHC)[4]. Brazil has care lines for NCDs, one aimed at DM. This initiative aims to implement strategies related to eating habits, regular physical exercise, medication use, and disease self-management[5].

Alcohol consumption has become a concern in comprehensive care for people with DM in PHC, especially among older adults[6]. Alcohol use can cause hypoglycemia or hyperglycemia, which can lead to complications. Furthermore, alcohol can interfere with the action of medications, leading to increased systemic blood pressure, liver cirrhosis, and falls. Other consequences can be listed as global behavior impairments and cognitive and intellectual functioning deficits[7,8].

Alcohol is known to favor the development of acute and chronic DM-related complications[6-8]. However, we should reflect on this practice and the possible impacts on the health-disease process to conduct harm reduction actions and favor DM control from a multidimensional perspective. Thus, this article aims to analyze alcohol abuse in older adults with type 2 DM (T2DM) in PHC.

Methods

This cross-sectional study was conducted in the Family Health Strategy (FHS) in Ribeirão Preto, São Paulo, from March to October 2018[9]. We included male or female older adults (age equal to or greater than sixty years) with a medical diagnosis of T2DM regardless of duration, in continuous use of medication to treat the disease, and registered with the FHS teams selected for the study. Older adults with cognitive impairment recorded in their health records, bedridden or dependent on caregivers, and a history of surgeries or hospitalizations in the three months before the survey were excluded, as were older adults who used medication to treat T2DM and interrupted the seven days preceding the interview to undergo diagnostic tests or some other medical advice.

The sample was calculated considering the frequency of older adults with T2DM and adherence to drug treatment at 50%[10]. We opted for an absolute tolerable error of 5% and a confidence coefficient of 95%. In the study planning, the FHS coverage was 22.4%, and we identified 2.766 registered older adults with T2DM[11]. From this information, we calculated 338 participants. Random sampling by clusters was conducted in two stages. Initially, sixteen clusters were drawn among the forty-five groups (FHS teams). Then, the number of participants was listed proportionally to the frequency of older adults with T2DM through simple random sampling.

The dependent variable, alcohol consumption pattern, was measured by the Alcohol Use Disorders Identification Test-C (AUDIT-C)[12], validated in Brazil[13], consisting of three items, each of which had five response options with 0 to 4 scores assigned. The final score was obtained on a scale ranging from 0 to 12 points. In men, a score of 4 or more is considered positive for alcohol abuse. In contrast, a score of 3 or more is considered positive in women.

The independent variables were gender (male and female), age group (60-64, 65-69, 70-74, 75-79, and equal to or greater than 80 years), economic classification (A, B, C, D/ E)[14], schooling (0, 1-4, and equal to or more than 5 years of study), self-reported tobacco use (yes or no), multimorbidity being the simultaneous occurrence of two or more NCDs[15] (yes or no), self-reported cardiovascular disease (yes or no), self-reported dyslipidemia (yes or no), self-reported overweight/obesity (yes or no), emotional distress in living with T2DM[16] (yes or no), complications resulting from T2DM (yes or no), adherence to drug therapy[17] (yes or no), medications used for T2DM (oral antidiabetic only, insulin only, oral antidiabetic and insulin), and blood glucose control established with glycated hemoglobin less than 8.0%[18] (yes or no). The smoking burden (packs/year) was calculated by the number of daily cigarettes consumed, divided by 20, and multiplied by the number of smoking years[19].

The database was investigated using the R software. The absolute and relative frequencies were presented in the exploratory analysis. Possible associations were verified using Pearson's chi-square test. P-values lower than the adopted significance level (0.05) provided evidence of as-

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sociation. An association measure was presented with the respective 95% confidence interval (95%CI) and the p-value to estimate the strength of association between the dependent and independent variables. We calculated prevalence ratios (PR) using the Poisson regression method with robust variance, crude, and adjusted for gender and age group.

The Research Ethics Committee of the "Dr. Joel Domingos Machado" Health Center School, the Faculty of Medicine of Ribeirão Preto, University of São Paulo, approved the study under Opinion n° 2.487.864 and Presentation Certificate for Ethical Appreciation n° 82225317.0.0000.5414. The interviews were held after the participants had read and signed the Informed Consent Form. All ethical aspects were observed per Resolution n° 466 of 2012 of the National Health Council.

Results

Approximately 19.2% (95%CI 15.0-23.4) of study participants engaged in alcohol abuse. In this group, a higher frequency was observed among men aged 60 to 64 years, economic class C, with 1-4 schooling years, non-smokers, with two or more self-reported NCDs, having cardiovascular disease, using only oral antidiabetic, and non-adherent to drug therapy (Table 1). The mean tobacco use load among those who engaged in alcohol abuse and tobacco use was 43 packs/year (SD = 16.9).

In the AUDIT-C items, we found that 76.9% of older adults reported never consuming alcohol, while 5.6% consumed it four or more times a week (Figure 1a). We observed that 8.0% reported drinking four or five doses of alcohol on a normal day (Figure 1b). The frequency of consumption of five or more doses on a single occasion was 5.3% once a week (Figure 1c).

A negative association was found with adherence to drug therapy PR = 0.55 (95%CI 0.36-0.86) and use of oral antidiabetic and insulin PR = 0.45 (95%CI 0.21-0.96) in the PRs adjusted for gender and age of alcohol abuse among older adults with T2DM (Table 2).

Discussion

There are controversies in the scientific literature about the light and moderate consumption of alcohol to improve insulin sensitivity and blood glucose control[7,20]. However, the frequency of abusive consumption in the sample studied is of concern, especially due to the association with low adherence to drug treatment. The burden of diabetes in Brazil linked to alcohol abuse should guide clinical and public health actions focused on a multidimensional approach to older adults with T2DM in PHC[21].

The 2019 National Health Survey conducted between August 2019 and March 2020 by the Brazilian Institute of Geography and Statistics in partnership with the Ministry of Health estimated that 3.8% (95%CI 3.3-4.3) of people who self-reported living with diabetes engaged in alcohol abuse[2]. The study conducted with people aged 45 years or older with a medical diagnosis of diabetes in Belo Horizonte, Minas Gerais, showed that 17.7% (95%CI 11.1-24.2) of people assisted by the FHS engaged in alcohol abuse[22]. It should be noted that there are differences in the studied samples, and varying measurement techniques were used. However, a higher frequency was observed in this study.

Other important findings refer to the higher frequency of alcohol abuse among men aged close to 60 years with low income and education. In this setting, we highlight the relevance of providing comprehensive care for diabetes in PHC, valuing the social determinants that can influence the health-disease process[23]. Some scientific evidence recommends health education and brief interventions to reduce alcohol consumption[24]. Therefore, we should reflect on the implementation process in PHC, and the clinical, humanistic, and economic results achieved through these strategies.

We noted that 20% of older adults who engaged in alcohol abuse used tobacco, and this characteristic requires attention, especially due to the known risk factor for cardiovascular diseases[25]. Moreover, studies have highlighted that smoking can accelerate microvascular complications from diabetes caused by hyperglycemic harm to small blood vessels[26]. Thus, we underscore the importance of encouraging tobacco cessation programs in PHC guided by actions according to people's uniqueness in the behavioral sphere, drug treatment, and integrative and complementary practices by multidisciplinary teams[27].

The multiple NCDs associated with T2DM, known as multimorbidity, were frequent among older adults engaging in alcohol abuse. One aspect to be analyzed by the health teams is the functionality level of older adults with T2DM

Table 1. Sociodemographic, economic, and clinical characteristics of older adults with T2DM according to alcohol abuse. PHC, Ribeirão Preto, SP, Brazil, 2018 (n = 338).

Variable	Alcohol abuse				P-value[a]
	No (n = 273)		Yes (n = 65)		
	n	%	n	%	
Gender					
Male	73	26.7	41	63.1	< 0.001
Female	200	73.3	24	36.9	
Age group (years)					
60-64	63	23.1	23	35.4	0.019
65-69	67	24.5	21	32.3	
70-74	53	19.4	5	7.7	
75-79	37	13.6	10	15.4	
≥ 80	53	19.4	6	9.2	
Economic class [b]					
A	5	1.8	2	3.1	0.432
B	39	14.3	14	21.5	
C	143	52.4	32	49.2	
D/E	86	31.5	17	26.2	
Schooling (years)					
0	49	17.9	4	6.2	0.029
1-4	147	53.8	35	53.8	
≥ 5	77	28.2	26	40.0	
Tobacco use					
No	248	90.8	52	80	0.023
Yes	25	9.2	13	20	
Multimorbidity15					
No	16	5.9	5	7.7	0.792
Yes	257	94.1	60	92.3	
Cardiovascular disease					
No	42	15.4	12	18.5	0.674
Yes	231	84.6	53	81.5	
Dyslipidemia					
No	110	40.3	33	50.8	0.162
Yes	163	59.7	32	49.2	
Overweight/obesity					
No	207	75.8	48	73.8	0.863
Yes	66	24.2	17	26.2	
Emotional distress in living with T2DM[16]					
No	223	81.7	51	78.5	0.674
Yes	50	18.3	14	21.5	
Complications arising from T2DM					
No	133	48.7	35	53.8	0.545
Yes	140	51.3	30	46.2	
Drug therapy adherence[17]					
No	120	44	41	63.1	0.008
Yes	153	56	24	36.9	
Medications used for T2DM					
Only oral antidiabetic	195	71.4	54	83.1	0.066
Only insulin	18	6.6	5	7.7	
Oral antidiabetic and insulin	60	22	6	9.2	
Blood glucose control c (n = 243)					
No	54	26.9	9	21.4	0.591
Yes	147	73.1	33	78.6	

[a] Pearson's chi-square test. [b] 2018 Brazil Economic Classification Criteria[14]. [c] Glycated hemoglobin less than 8.0%[18].

Source: Authors.

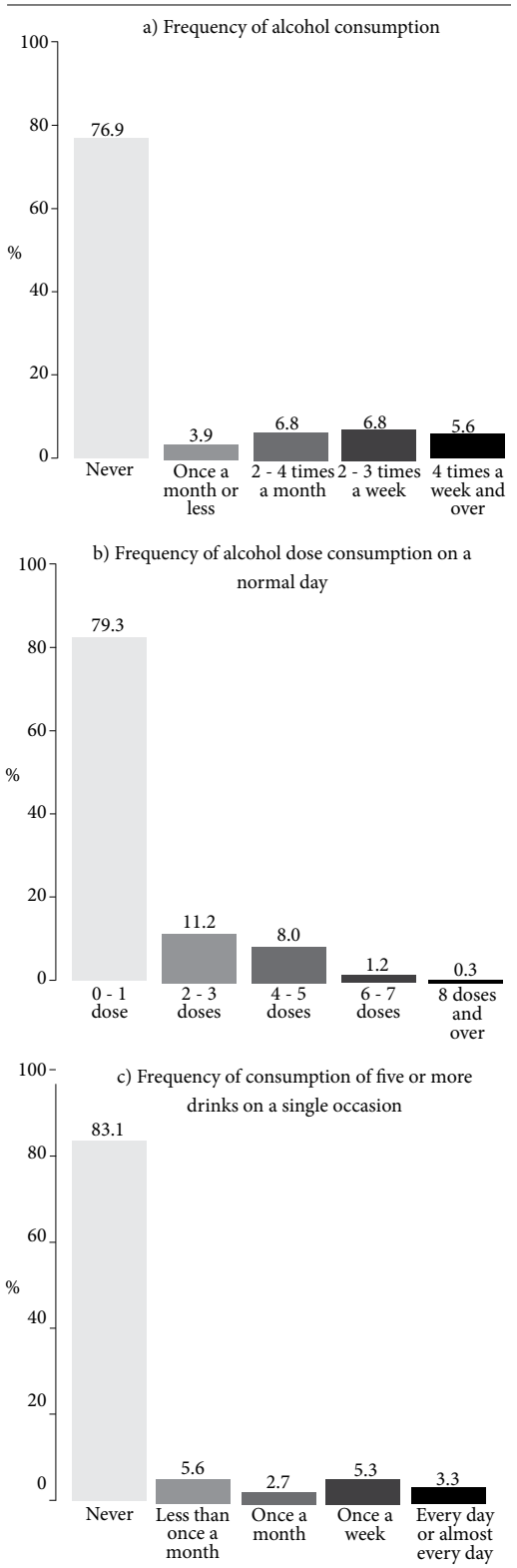

Figure 1. Panel with the frequencies of the AUDIT-C items[12,13].

Source: Authors.

and the possible limitations in their activities of daily living and leisure. Furthermore, alcohol's hypoglycemic action can lead to body dysfunctions and increase the risk of falls. Thus, it is necessary to encourage disease self-management to avoid harm[28].

Non-adherence to drug therapy among older adults engaging in alcohol abuse is a warning sign in the studied sample. Notably, the responsible use of drugs prescribed for T2DM contributes to the control of the disease. In contrast, inappropriate or irregular use can lead to aggravating factors such as glycemic and metabolic changes[29]. In this sense, we suggest individual and collective actions in PHC, and we recommend elaborating and implementing unique therapeutic projects that involve the family and the community to help older adults manage medications and the periodic monitoring of community health workers and other professionals[30].

The present study's design is a limitation. Moreover, the alcohol consumption frequency was underestimated in the sample since non-authentic reporting of behavioral aspects that influence health may occur in epidemiological surveys. However, this investigation shows the pattern of alcohol consumption in older adults with a high-impact disease and contributes to supporting discussions related to the topic. Thus, there is a need to improve brief and early interventions in PHC with a focus on diabetes education to reduce alcohol abuse in older adults and ensure better disease control with quality of life.

Table 2. Crude and adjusted prevalence ratios (by gender and age group) of alcohol abuse among older adults with T2DM, according to sociodemographic, economic, and clinical variables. PHC, Ribeirão Preto, SP, Brazil, 2018.

Variável	Crude analysis		Adjusted analysis	
	PR a (95%CI) [b]	p [c]	PR (95%CI)	p
Gender				
Male	-	-	-	-
Female	0.29 (0.18-0.46)	< 0.01	-	-
Age group (years)				
60-64	-	-	-	-
65-69	0.89 (0.53-1.48)	0.66	-	-
70-74	0.32 (0.13-0.79)	0.01	-	-
75-79	0.79 (0.41-1.52)	0.49	-	-
≥ 80	0.38 (0.16-0.87)	0.02	-	-
Economic class [d]				
A	-	-	-	-
B	0.92 (0.26-3.24)	0.90	0.93 (0.26-3.33)	0.92
C	0.64 (0.19-2.15)	0.47	0.62 (0.18-2.10)	0.44
D/E	0.57 (0.16-2.01)	0.38	0.64 (0.18-2.26)	0.49
Schooling (years)				
0	-	-	-	-
1-4	2.54 (0.94-6.84)	0.06	1.95 (0.73-5.16)	0.17
≥ 5	3.34 (1.23-9.08)	0.01	2.50 (0.90-6.93)	0.07
Tobacco use				
No	-	-	-	-
Yes	1.97 (1.19-3.27)	< 0.01	1.46 (0.87-2.46)	0.15
Multimorbidity[15]				
No	-	-	-	-
Yes	0.79 (0.35-1.76)	0.57	1.01 (0.43-2.36)	0.96
Cardiovascular disease				
No	-	-	-	-
Yes	0.83 (0.48-1.46)	0.53	0.99 (0.56-1.76)	0.99
Dyslipidemia				
No	-	-	-	-
Yes	0.71 (0.45-1.09)	0.12	0.89 (0.58-1.36)	0.61
Overweight/obesity				
No	-	-	-	-
Yes	1.08 (0.66-1.78)	0.73	1.41 (0.88-2.25)	0.15
Emotional distress in living with T2DM[16]				
No	-	-	-	-
Yes	1.17 (0.69-1.98)	0.54	1.24 (0.77-2.02)	0.36
Complications arising from T2DM				
No	-	-	-	-
Yes	0.84 (0.54-1.31)	0.45	0.86 (0.57-1.29)	0.47
Drug therapy adherence[17]				
No	-	-	-	-
Yes	0.53 (0.33-0.84)	<0.01	0.55 (0.36-0.86)	<0.01
Medications used for T2DM				
Only oral antidiabetic	-	-	-	-
Only insulin	1.00 (0.44-2.25)	0.99	1.09 (0.44-2.69)	0.85
Oral antidiabetic and insulin	0.41 (0.18-0.93)	0.03	0.45 (0.21-0.96)	0.03
Blood glucose control e (n = 243)				
No	-	-	-	-
Yes	1.28 (0.65-2.53)	0.47	1.28 (0.67-2.47)	0.44

[a] Prevalence ratio. [b] 95% confidence interval. [c] Pearson's chi-square test. [d] 2018 Brazil Economic Classification Criteria[14]. [e] Glycated hemoglobin less than 8.0%[18].

Source: Authors.

Collaborations

All authors participated in the conception, design, analysis, interpretation of data, and drafting of the article, and they approved the version to be published.

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