

Post-Acute Coronary Syndrome Alcohol Abuse: Prospective Evaluation in the ERICO Study

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Abstract

Background: Some studies have indicated alcohol abuse as one of the contributors to the development of cardiovascular disease, particularly coronary heart disease. However, this relationship is controversial.

Objective: To investigate the relationship between post-acute coronary syndrome (ACS) alcohol abuse in the Acute Coronary Syndrome Registry Strategy (ERICO Study).

Methods: 146 participants from the ERICO Study answered structured questionnaires and underwent laboratory evaluations at baseline, 30 days and 180 days after ACS. The Alcohol Use Disorders Identification Test (AUDIT) was applied to assess harmful alcohol consumption in the 12 months preceding ACS (30 day-interview) and six months after that.

Results: The frequencies of alcohol abuse were 24.7% and 21.1% in the 12 months preceding ACS and six months after that, respectively. The most significant cardiovascular risk factors associated with high-risk for alcohol abuse 30 days after the acute event were: male sex (88.9%), current smoking (52.8%) and hypertension (58.3%). Six months after the acute event, the most significant results were replicated in our logistic regression, for the association between alcohol abuse among younger individuals [35-44 year-old multivariate OR: 38.30 (95% CI: 1.44-1012.56) and 45-54 year-old multivariate OR: 10.10 (95% CI: 1.06-96.46)] and for smokers [current smokers multivariate OR: 51.09 (95% CI: 3.49-748.01) and past smokers multivariate OR: 40.29 (95% CI: 2.37-685.93)].

Conclusion: Individuals younger than 54 years and smokers showed a significant relation with harmful alcohol consumption, regardless of the ACS subtype. (Arq Bras Cardiol. 2015; 104(6):457-467)

Keywords: Alcoholism; Acute Coronary Syndrome; Myocardial Infarction; Alcohol Drinking; Questionnaires.

Introduction

According to recent data from the World Health Organization (WHO), the prevalence of alcohol dependence can reach 12% of the adult population. The probability of alcohol dependence of subjects with any mental disorder can be at least two times greater than that of individuals without the disorder¹. The burden is not equally distributed among the countries. Alcohol consumption is the leading risk factor for the burden of disease in developing countries and the third largest risk factor in developed countries¹. It should be noted that drinking patterns have not only been linked to acute health outcomes, such as injuries^{2,3}, but also to chronic diseases, such as coronary heart disease (CHD)⁴⁻⁷. In fact, some studies even indicate alcohol abuse as one of the contributors to the development of cardiovascular diseases (CVD), particularly CHD⁴⁻⁹. However, this

relationship is controversial⁸. Although some beneficial effects of moderate alcohol intake have been described, it can become a risk factor for CHD if the alcohol consumption pattern is characterized as "binge drinking or heavy episodic drinking", which is defined as more than five drinks for men and four drinks for women in just one occasion^{1,6-9}.

In developing countries, such as Brazil, alcohol is also considered a risk factor that contributes most to the burden of diseases, such as cirrhosis of the liver and several types of cancer¹.

Therefore, we aimed to evaluate the hazardous and harmful uses of alcohol and its dependence symptoms 30 days and 180 days after an acute coronary event among participants from the ERICO study (Acute Coronary Syndrome Registry Strategy)¹⁰.

Materials and Methods

Study design and population

This sub-study assessed harmful alcohol consumption, hazardous alcohol consumption and dependence symptoms in a subsample of the ERICO study, a prospective cohort study, ongoing since 2009, which included potential participants with ACS admitted to the São Paulo University-affiliated hospital (HU-USP) in the city of São Paulo, Brazil¹⁰.

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After signing the Informed Consent Form, patients with confirmed medical diagnosis of ACS [ST-elevation myocardial infarction (STEMI), non-ST-elevation acute myocardial infarction (NSTEMI) or unstable angina (UA)] were invited to participate in our sub-study 30 days after the acute event. The eligibility criteria were: age ≥ 18 years, confirmed diagnosis of ACS, and ability to understand and speak Portuguese. The usual treatment for ACS has not changed and the procedures followed were in accordance with the ethical standards approved by the HU-USP Institutional Review Board.

Exclusion criteria were based on a Psychological Screening Questionnaire built on Structured Clinical Interview for DSM Disorders (SCID - I)¹¹ to identify individuals with psychotic, schizophrenia or bipolar disorders, and on a test based on the Mini-Mental State Exam (MMSE)¹² to exclude those with cognitive impairment or dementia 30 days after the acute event.

30- and 180-day follow-up

All participants who fulfilled the eligibility criteria answered structured questionnaires and underwent clinical and laboratory evaluations, including depression evaluation using the Brazilian-Portuguese version of the Patient Health Questionnaire (PHQ-9), which is composed of nine questions that assess depressive mood and anhedonia based on the Diagnostic and Statistical Manual of Mental Disorders fourth edition (DSM-IV). The PHQ-9 scores each of the nine DSM-IV criteria as "0" (not at all) to "3" (nearly every day), the total score ranging from 0 to 27, and, in this study, PHQ-9 was applied at baseline, and 30 and 180 days after ACS^{13,14}.

In addition, hazardous and harmful alcohol consumption and dependence symptoms were assessed by using the Alcohol Use Disorders Identification Test (AUDIT) in a personal and in a telephone interview, 30 and 180 days after ACS, respectively¹⁵. Of note, 30 days after ACS, participants were asked about alcohol abuse during the last 12 months, and, during the 180-day interview, they were asked about changes in their alcohol behavior six months after ACS.

Acute coronary syndrome definition

Myocardial infarction (MI) was defined as the presence of symptoms consistent with cardiac ischemia in the 24 hours preceding hospital presentation and troponin I levels above the 99th percentile with a test-specific coefficient of variation $< 10\%$ ^{16,17}. STEMI was defined as the presence of MI criteria plus one of the following: (a) persistent ST-segment elevation ≥ 1 mm in two contiguous electrocardiographic leads or (b) the presence of a new or presumably new left bundle branch block. NSTEMI was defined as the presence of MI criteria, but not of STEMI. The UA diagnosis required the presence of symptoms consistent with cardiac ischemia 24 hours prior to hospital admission, absence of MI criteria and at least one of the following: (a) history of CHD; (b) positive coronary disease stratification test (invasive or non-invasive); (c) transient

ST-segment changes ≥ 0.5 mm in two contiguous leads, new T-wave inversion ≥ 1 mm, and/or pseudonormalization of previously inverted T waves; (d) troponin I > 0.4 ng/mL (which guarantees a troponin I level above the 99th percentile regardless of the kit used); or (e) diagnostic concordance between two independent doctors.

Alcohol abuse definition

Based on the AUDIT score that ranges from 1 to 40, the following cutoff points were considered for main analyses: ≤ 7 , low-risk drinking; and ≥ 8 , high-risk alcohol abuse¹⁸⁻²⁰.

In secondary analysis, the following three AUDIT domains were also evaluated:

- Hazardous alcohol use (1-7 points) - characterized as a pattern that increases the risk of harmful consequences for the user and/or others. These patterns are of public health significance despite the absence of any current disorder in the user;
- Harmful alcohol use (8-19 points) - refers to alcohol intake that might result in consequences for physical and mental health. Some would also consider the social consequences of the harm caused by alcohol;
- Alcohol dependence symptoms (≥ 20 points) - characterized by a cluster of behavioral, cognitive and physiological phenomena, which may develop after repeated alcohol use. Typically, these phenomena include a strong desire to consume alcohol, impaired control of its use, persistent drinking, despite harmful consequences, a higher priority given to consumption than to other activities and obligations, increased substance tolerance and physical withdrawal reaction when the substance use is discontinued¹⁸⁻²⁰.

Two trained psychologists administered all questionnaires during the follow-up.

Statistical analysis

The participants' baseline characteristics, including ACS subtypes, were described according to the alcohol abuse symptoms assessed by using the AUDIT questionnaire, with the following cutoff points suggested in the literature¹⁹⁻²¹: ≤ 7 , low-risk drinking; and ≥ 8 , high-risk alcohol abuse¹⁸⁻²⁰. In addition, the baseline characteristics were classified according to the AUDIT domains (hazardous alcohol use, harmful alcohol use and alcohol dependence symptoms).

Categorical variables were analyzed by using chi-square test, and continuous variables, by using Student *t* or Mann-Whitney test, according to continuous variables distribution. Additionally, we performed multivariate logistic regression adjusted to potential confounders (or those with a *p*-value < 0.2 on univariate analysis) identified at 30 days to evaluate the odds ratios (OR) with 95% confidence intervals (CI) for the possible association of some classical cardiovascular risk factors (CVRF) with alcohol abuse 180 days after the acute event. All analyses with a *p*-value < 0.05 were considered statistically significant. The SPSS software, version 19.0, was used to perform all statistical analyses.

Results

Case series

Of 225 patients with a confirmed diagnosis of ACS (STEMI, NSTEMI or UA) and included in the main study, 146 (64.9%) were enrolled in the present sub-study. At 180 days, 142 (63%) were evaluated, because four died during the period.

The reasons for no inclusion in this study were early death (16/225, 7.1%) within 30 days and exceeded time limit for the interview (63/209, 30.1%).

Evaluation of alcohol abuse during follow-up

30-day follow-up

The baseline characteristics of all 146 participants in the main study were described according to alcohol abuse symptoms assessed by using the information obtained from AUDIT (Table 1) in a personal interview 30 days after ACS. The frequency of alcohol abuse was 24.7% in the first period, reflecting the alcohol abuse in the 12 months preceding ACS.

The overall mean AUDIT score was 4.8 points, being higher in men as compared to women (6.3 vs. 2.0, $p \leq 0.001$). In addition, the frequency of alcohol abuse (score ≥ 8) was higher among men as compared to women (88.9% vs. 11.1%, $p = 0.001$) and among current smokers as compared to past or non-smokers (52.8% vs. 38.9% vs. 8.3%, $p = 0.004$) and patients with hypertension (58.3%, $p = 0.03$) (Table 1). Interestingly, the sample with alcohol abuse suggested by AUDIT showed a statistically lower frequency of classical CVRF, such as dyslipidemia, diabetes and sedentary lifestyle, as compared to individuals without alcohol abuse, but with no statistical significance (Table 1). The frequency of alcohol abuse did not differ in the ACS subtypes during follow-up (Figure 1).

At 30 days, we also found statistically significant associations between some sociodemographic and cardiovascular risk factors and each item of the AUDIT domains, except for questions 7 (*"Guilt after drinking"*) and 8 (*"Blackouts"*) in the *"Harmful alcohol use"* domain. In general, high frequencies of positive answers were found among men and smokers (Table 2). Interestingly, we found higher frequencies of positive answers for question 5 (*"Increased salience of drinking"*) from the *"Dependence symptoms"* domain among those who had STEMI as compared to the other ACS subtypes (Table 2). Further, we found higher frequencies of positive answers among participants who had hypertension, diabetes, dyslipidemia and a sedentary lifestyle as compared to those without these comorbidities in the three domains, particularly in the *"Dependence symptoms"* and the *"Harmful alcohol use"* domains (Table 2).

180-day follow-up

Six months after the acute event, we observed a slight reduction in the alcohol abuse frequency, which was 21.1% among the 142 survivors by the end of the follow-up. In addition, the mean

AUDIT score was almost the same (3.8 points) for the entire sample and by sex (men: 5.1 vs. women: 1.6). The most significant results observed at 30 days were replicated in our logistic regression after 180 days, for the association between alcohol abuse among younger individuals [35-44 year-old multivariate OR: 38.30 (95% CI: 1.44-1012.56) and 45-54 year-old multivariate OR: 10.10 (95% CI: 1.06-96.46)] and for smokers [current smokers multivariate OR: 51.09 (95% CI: 3.49-748.01) and past smokers multivariate OR: 40.29 (95% CI: 2.37-685.93)] (Table 3).

Depression versus alcohol abuse during follow-up

In this sub-sample, no statistical association was found between depression and alcohol use after multivariate analysis during the follow-up.

Sensitivity analyses

In additional analyses, we compared ERICO participants who were excluded (79) or did not complete the entire follow-up (four deaths between 30 days and 180 days after the acute event) with those who completed the 180-day follow-up (142) in this sub-study. Individuals who were followed up for six months after an acute event in this sub-study had a higher educational level (9-11 years of formal education: 59.9% vs. 56.1, $p = 0.04$), were mostly white or of mixed self-reported heritage (96.4% vs. 89%, $p = 0.03$) and had a more sedentary lifestyle (63.8% vs. 81.5%, $p = 0.006$) than those who were not followed-up (Table 4). Moreover, comparing ERICO participants included in this sub-study of alcohol abuse (146) with the ERICO population (820), we found that the former had a higher educational level (≥ 11 years of formal education: 12.3% vs. 6.8%, $p=0.02$) and most were married (69.2% vs. 59.6%, $p = 0.03$). In addition, their frequencies of diabetes (30.8% vs. 41.2%, $p=0.02$) and of sedentary lifestyle (64.8% vs. 73.0%, $p = 0.05$) were lower than those found in the ERICO population. Finally, a high proportion of STEMI cases (36.3% vs. 26.5%, $p = 0.02$) was detected in this sub-study (Table 5).

Discussion

This sub-study showed that three of ten patients were at high risk for alcohol abuse. The alcohol abuse frequency was 24.7% 30 days after ACS, and decreased by 4% six months later. As expected, higher frequencies of alcohol abuse were observed in men, younger individuals and smokers.

Data from a Brazilian population-based study, the Megacity Mental Health Survey, performed with 5,037 individuals in the city of São Paulo, reported an overall lifetime prevalence of alcohol abuse of 9.8%. In a sex-stratified analysis, a higher prevalence of alcohol abuse was found among men (16.4% vs. 4.0%) based on the DSM-VI and WHO-Composite International Diagnostic Interview (WMH-CIDI)²¹.

Another Brazilian hospital-based study performed with 345 patients with ACS (206 with MI and 139 with UA) interviewed about sociodemographic data, smoking status, screening for depression (Prime-MD and Beck Depression Inventory - BDI) and anxiety (State-Trait Anxiety Inventory for

Table 1 – Baseline characteristics of the 146 participants in the sub-study of alcohol abuse/dependence in the ERICO study, according to the presence of harmful alcohol use 30 days after an acute coronary event

Sociodemographic characteristics	Low-risk n = 110 (75.3%)	High-risk* n = 36 (24.7%)	Total n = 146 (100%)	p value
Age range (%)				
35-44 years	4 (3.6)	3 (8.3)	7 (4.8)	
45-54 years	19 (17.3)	13 (36.1)	32 (21.9)	
55-64 years	39 (35.5)	12 (33.3)	51 (34.9)	0.046
65-74 years	28 (25.5)	3 (8.3)	31 (21.2)	
≥ 75 years	20 (18.2)	5 (13.9)	25 (17.1)	
Gender (%)				
Male	63 (57.3)	32 (88.9)	95 (65.1)	
Female	47 (42.7)	4 (11.1)	51 (34.9)	0.001
Educational level (%)				
Illiterate	9 (8.2)	2 (5.6)	11 (7.5)	
1-7 years of education	42 (38.2)	18 (50.0)	60 (41.1)	0.47
≥ 8 years of education	59 (53.6)	16 (44.4)	75 (51.4)	
Marital Status (%)				
Single	8 (7.3)	4 (11.1)	12 (8.2)	
Married	73 (66.4)	28 (77.8)	101 (69.2)	
Separated	8 (7.3)	3 (8.3)	11 (7.5)	0.20
Widow(er)	21 (19.1)	1 (2.8)	22 (15.1)	
Self-reported ethnicity (%)				
White	75 (68.2)	19 (54.3)	94 (64.8)	
Brown	31 (28.2)	14 (40.0)	45 (31.0)	
Black	2 (1.8)	2 (5.7)	4 (2.8)	0.25
Yellow	2 (1.8)	-	2 (1.4)	
Clinical comorbidities (%)				
Smoking				
Current	30 (27.3)	19 (52.8)	49 (33.6)	
Past	45 (40.9)	14 (38.9)	59 (40.4)	0.004
Never	35 (31.8)	3 (8.3)	38 (26.0)	
Hypertension	83 (76.9)	21 (58.3)	104 (72.2)	0.03
Diabetes mellitus	37 (33.9)	7 (20.6)	44 (30.8)	0.14
Dyslipidemia	57 (56.4)	13 (39.4)	70 (52.2)	0.09
Sedentary lifestyle	73 (68.9)	18 (51.4)	91 (64.5)	0.06
Major depression [†]	37 (33.6)	15 (41.7)	52 (35.6)	0.38
Acute Coronary Syndrome subtype (%)				
Unstable angina	28 (25.5)	4 (11.1)	32 (21.9)	
NSTEMI	46 (41.8)	16 (44.4)	62 (42.5)	0.16
STEMI	36 (32.7)	16 (44.4)	52 (35.6)	

STEMI: ST-elevation myocardial infarction; NSTEMI: non-ST-elevation myocardial infarction.

Some proportions might not add up to 100% due to rounding or missing values. *Individuals who scored 8 points or more on the AUDIT were considered with tendency to alcohol abuse. [†]The PHQ-9 score ≥ 10 points suggested major depression. P-values are derived from the Chi-square test.

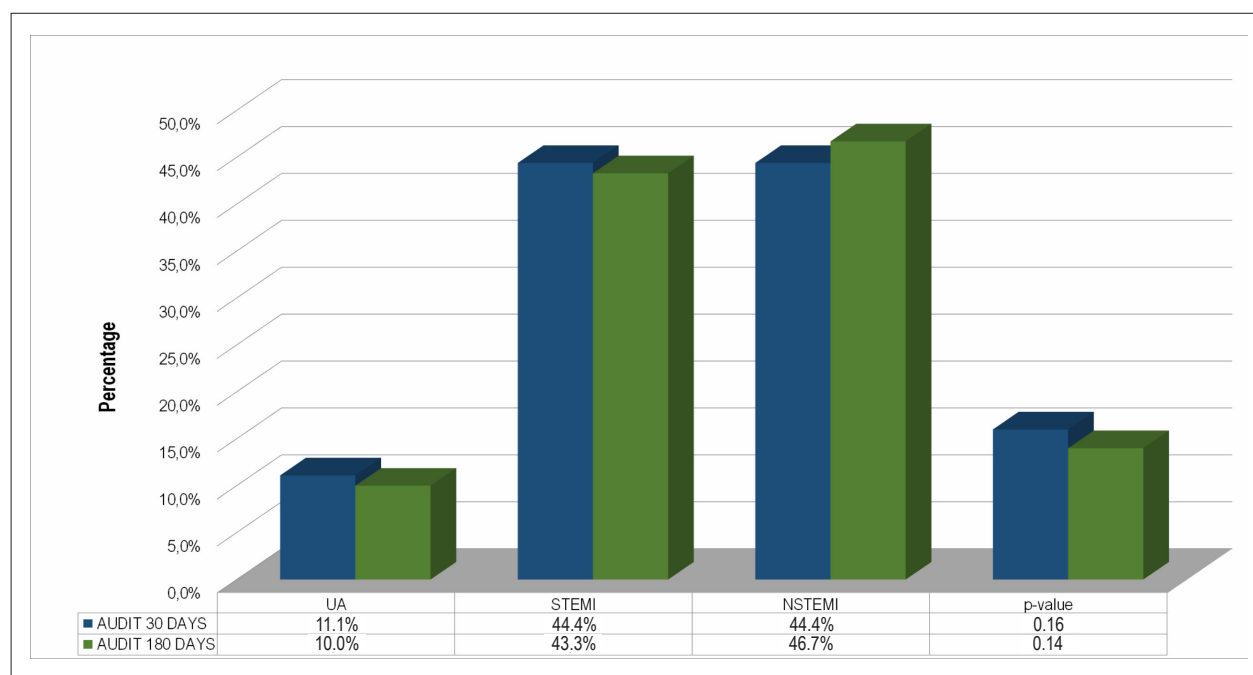


Figure 1 – Alcohol consumption suggestive of alcohol abuse detected by AUDIT in the subsample from the ERICO study. UA: Unstable Angina; NSTEMI: non-ST-elevation acute myocardial infarction; STEMI: ST-elevation myocardial infarction.

Adults - STAI), and alcohol consumption (AUDIT) has reported lower AUDIT scores for both sexes as compared to those found in our study. Similar to our findings, that study has reported no association between alcohol intake and depression²².

Regarding CVRF, participants at high risk for alcohol abuse had a higher frequency of smoking but lower frequencies of hypertension, dyslipidemia, diabetes and sedentary lifestyle as compared to low-risk participants. However, when analyzing each item separately, significant associations were observed with some bingeing behaviors in the AUDIT domains, such as “increased salience of drinking” and “morning drinking”, and smoking, sedentary lifestyle, hypertension, diabetes, and even ACS subtype. After six months, a high risk of alcohol abuse remained among younger individuals (≤ 54 years) and smokers.

The relationship between alcohol consumption and CVD, particularly CHD, is controversial^{4-9,23}.

Some studies have suggested that a light-moderate alcohol consumption may have a favorable impact on morbidity and mortality from ischemic heart disease⁶⁻⁸. However, the cardioprotective effect of drinking disappears with heavy drinking (binge)⁶⁻⁸. Russel et al.⁶ have tested a linear dose-response model for the association between drinking patterns and MI⁶. A lower MI risk was associated with the consumption of less than 4.55 drinks per day for men (95% CI: 2.77 to 7.18) and less than 3.08 drinks per day for women (95% CI: 1.35 to 5.16), and that risk increased after these crossover points were exceeded. The MI risk increased as drinking dosage doubled, regardless of sex⁶.

The Prospective Epidemiological Study of Myocardial Infarction (PRIME) has investigated the effect of alcohol intake patterns on ischemic heart disease in Northern Ireland and France in 9,778 men aged 50-59 years, free of ischemic heart disease at baseline, during a 10-year follow-up⁷. After multivariate analysis for classic CVRF and center, the hazard ratio for hard coronary events (incident MI and coronary death) compared with regular drinkers was as follows: 1.97 (95% CI: 1.21 to 3.22) for binge drinkers; 2.03 (95% CI: 1.41 to 2.94) for never drinkers; and 1.57 (95% CI: 1.11 to 2.21) for former drinkers for the entire cohort. Only wine drinking was associated with a lower risk of hard coronary events, irrespective of the country⁷.

A systematic review that investigated the relationship between alcohol consumption and some CVD endpoints performed with more than 4,000 studies has described a dose-response effect, demonstrated by the lowest risk of CHD mortality occurring with one to two drinks per day²³.

Another systematic review including 44 observational studies (case-control or cohort) has reported a relative risk of alcohol intake in relation to ischemic heart disease risk. The analyses included 957,684 participants and substantial heterogeneity across studies was found, making it difficult to confirm any cardioprotective effect of alcohol use on ischemic heart disease for all drinkers, even at low intake levels⁸.

The pathophysiology of the cardioprotective effects of most alcoholic beverages is probably due to a high-density lipoprotein elevation and the ability of alcohol to prevent platelet aggregation and increase fibrinolysis; particularly an increased favorable effect from red wine²⁴.

Table 2 – Distribution of positive answers according to baseline characteristics by AUDIT domains 30 days after an acute event in the sub-sample of 146 participants from the ERICO study

Subgroup of risk	Domains	
	Hazardous alcohol consumption	p-value
	Frequency of drinking (question 1)	
Male gender (%)	46 (79.3)	0.003
Marital status (%)		
Single	6 (10.3)	0.04
Married	43 (74.1)	
Separated	6 (10.3)	
Widow(er)	3 (5.2)	
Smoking (%)		
Current	28 (48.3)	< 0.001
Past	24 (41.4)	
Never	6 (10.3)	
	Typical quantity (question 2)	
Male gender (%)	21 (84,0)	0.003
Smoking (%)		
Current	17(68,0)	< 0.001
Past	7 (28,0)	
Never	1(4,0)	
	Frequency of heavy drinking (question 3)	
Male gender (%)	36 (87.8)	< 0.001
Smoking (%)		
Current	20 (48.8)	0.02
Past	16 (39.0)	
Never	5 (12.2)	
	Dependence Symptoms	
	Impaired control over drinking (question 4)	
Acute coronary syndrome subtype (%)		
Unstable angina	0 (0)	0.053
NSTEMI	5 (38.5)	
STEMI	8 (61.5)	
Acute coronary syndrome subtype (%)	Increased salience of drinking (question 5)	
Unstable angina	0 (0)	0.046
NSTEMI	2 (25.0)	
STEMI	6 (75.0)	
	Morning drinking (question 6)	
Male gender (%)	18 (85.7)	0.03
Hypertension (%)	11 (52.4)	0.03
Diabetes mellitus (%)	2 (10.0)	0.03
	Harmful alcohol consumption	
	Guilt after drinking(question 7)	
None		

Continuation

	Blackouts (question 8)	
None		
	Alcohol-related injuries (question 9)	
Male gender	9 (100,0)	0.02
Dyslipidemia (%)	1 (12,5)	0.02
	Others concerned about drinking consumption (question 10)	
Age range (years) (%)		
35-44	4 (9.8)	0.02
45-54	14 (34.1)	
55-64	14 (34.1)	
65-74	3 (7.3)	
≥ 75	6 (14.6)	
Male gender (%)	34 (82.9)	0.005
Smoking (%)		
Current	24 (58.5)	< 0.001
Past	15 (36.6)	
Never	2 (4.9)	
Hypertension (%)	23 (56.1)	0.006
Sedentary lifestyle (%)	19 (47.5)	0.008

*P-values are derived from the Chi-square test. Some proportions may not round up to 100% because of missing data
STEMI: ST-elevation myocardial infarction; NSTEMI: non-ST-elevation myocardial infarction.*

Limitations

We did not evaluate the alcohol intake with a specific food questionnaire. However, we used a very reliable instrument to screen alcohol abuse/dependence¹⁶. In the present study, two well-trained and experienced psychologists interviewed our patients; however the presence of a psychiatrist during the study could have contributed further to the detection of new cases of alcohol abuse or even depression.

We found some significant differences in the frequency of some sociodemographic factors, such as educational level, self-reported ethnicity and marital status, as well as, some CVRF, such as diabetes and sedentary lifestyle, comparing participants from the alcohol abuse study with those who did not participate in this sub-study. Of note, all these characteristics are very subject to recall bias and had no interference on the alcohol abuse pattern in our main analyses.

Additionally, the extent to which the findings can be generalized is limited due to the small sample size from one single center. Thus, we cannot rule out the possibility of a selection bias.

Conclusions

We found high frequency of alcohol abuse, which remained during the six-month follow-up, regardless of the ACS subtype. Hazardous alcohol consumption was strongly evident among younger individuals aged 35-54 years and smokers. In the present study, the binge drinking pattern was observed among smokers, individuals with a sedentary lifestyle, hypertension, diabetes and STEMI.

Author contributions

Conception and design of the research: Morilha A, Karagulian S, Goulart AC. Acquisition of data: Morilha A, Karagulian S, Goulart AC. Analysis and interpretation of the data: Lotufo PA, Santos IS, Goulart AC. Statistical analysis: Morilha A, Lotufo PA, Santos IS, Benseñor IM, Goulart AC. Obtaining financing: Goulart AC. Writing of the manuscript: Morilha A, Karagulian S, Lotufo PA, Santos IS, Benseñor IM, Goulart AC. Critical revision of the manuscript for intellectual content: Morilha A, Karagulian S, Lotufo PA, Santos IS, Benseñor IM, Goulart AC. Supervision / as the major investigator: Morilha A, Goulart AC.

Table 3 – Factors associated with alcohol abuse/dependence assessed on logistic regression by AUDIT on 142 participants of the ERICO study 180 days after an acute coronary event

Acute Coronary Syndrome	Low-risk OR (95%CI)	High-risk * multivariate OR (95%CI)
UA	Reference (1.0)	Reference (1.0)
NSTEMI	Reference (1.0)	1.27 (0.18-8.92)
STEMI	Reference (1.0)	1.77 (0.24-12.99)
Gender		
Female	Reference (1.0)	Reference (1.0)
Male	Reference (1.0)	3.51 (0.78-15.82)
Age Range		
35-44 years	Reference (1.0)	38.30 (1.44-1021.56)
45-54 years	Reference (1.0)	10.10 (1.06-96.46)
55-64 years	Reference (1.0)	0.71 (0.09-5.87)
65-74 years	Reference (1.0)	1.07 (0.11-10.81)
≥ 75 years	Reference (1.0)	Reference (1.0)
Smoking		
Current	Reference (1.0)	51.09 (3.49-748.01)
Past	Reference (1.0)	40.29 (2.37-685.93)
Never	Reference (1.0)	Reference (1.0)
Hypertension	Reference (1.0)	1.43 (0.36-5.68)
Diabetes mellitus	Reference (1.0)	0.90 (0.19-4.25)
Dyslipidemia	Reference (1.0)	0.36 (0.10-1.30)
Sedentary lifestyle	Reference (1.0)	0.29 (0.09-0.99)

* Subjects who scored 8 points or more on the AUDIT were considered with high-risk alcohol abuse.

STEMI: ST-elevation myocardial infarction; NSTEMI: non-ST-elevation myocardial infarction; UA: unstable angina. OR (odds ratio), 95% confidence interval (95%CI). Multivariate OR was adjusted for ACS subtype, gender, age, smoking, medical diagnosis or medication use for hypertension, diabetes mellitus and dyslipidemia, and sedentary lifestyle. Except itself.

Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Study Association

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Table 4 – Comparison of baseline characteristics of 142 individuals from the alcohol abuse sub-study and those of 83 individuals who were not followed-up 180 days post-ACS in the ERICO study

Baseline characteristics	ERICO participants with 180-day follow-up in the alcohol abuse sub-study		p-value
	YES (n = 142)	NO (n = 83)	
Age range (years) (%)			0.21
35-44	7 (4.9)	2 (2.4)	
45-54	34 (23.9)	14 (16.9)	
55-64	50 (35.2)	24 (28.9)	
65-74	28 (19.7)	23 (27.7)	
≥ 75	23 (16.2)	20 (24.1)	
Gender (%)			0.35
Male	91 (64.1)	48 (57.8)	
Female	51 (35.9)	35 (42.2)	
Educational level (years) (%)			0.04
Up to 8	28 (19.7)	15 (18.3)	
9-11	85 (59.9)	46 (56.1)	
≥ 11	29 (20.4)	20 (24.4)	
Marital status (%)			0.18
Single	12 (8.5)	11 (13.4)	
Married	99 (69.7)	44 (53.7)	
Divorced	9 (6.3)	9 (11.0)	
Widow(er)	22 (15.5)	18 (22.0)	
Self-reported ethnicity (%)			0.03
White	91 (64.5)	57 (69.5)	
Brown	45 (31.9)	16 (19.5)	
Black	3 (2.1)	8 (9.8)	
Asian	2 (1.4)	1 (1.2)	
Clinical comorbidities (%)			0.34
Smoking			
Current	49 (34.5)	25 (30.5)	
Past	56 (39.4)	28 (34.1)	
Never	37 (26.1)	29 (35.4)	
Hypertension	100 (71.4)	63 (75.9)	0.47
Diabetes mellitus	41 (29.5)	32 (38.6)	0.17
Dyslipidemia	67 (51.5)	41 (56.9)	0.46
Sedentary lifestyle	88 (63.8)	66 (81.5)	0.006
Acute coronary syndrome (%)			0.09
Unstable angina	36 (25.4)	30 (36.1)	
NSTEMI	54 (38.0)	34 (41.0)	
STEMI	52 (36.6)	19 (22.9)	

STEMI: ST-elevation myocardial infarction; NSTEMI: non-ST-elevation myocardial infarction

Some proportions might not add up to 100% due to rounding or missing values. P-values are derived from the Chi-square test.

Table 5 – Comparison of baseline characteristics of 146 participants from the alcohol abuse sub-study and those of the ERICO study population

Baseline characteristics	Participants (n = 146)	Non participants (n = 820)	p-value
Mean age (± SD)	62 (11.8)	63 (13.6)	0.26
Gender (%)			
Male	95 (65.1)	476 (58.0)	0.11
Female	51 (34.9)	344 (42.0)	
Educational level (years) (%)			0.02
Up to 8	98 (67.1)	631 (77.1)	
9-11	30 (20.5)	131 (16.0)	
≥ 11	18 (12.3)	56 (6.8)	
Marital status (%)			0.03
Single	45 (30.8)	329 (40.4)	
Married	101 (69.2)	486(59.6)	
Self-reported ethnicity (%)			
White	94 (64.4)	538(65.6)	
Brown	45 (30.8)	224 (27.3)	
Black	4 (2.7)	46(5.6)	
Asian	3 (2.1)	12 (1.5)	
Clinical comorbidities (%)			
Smoking			0.12
Current	49 (33.6)	257 (28.8)	
Past	59 (40.4)	325 (36.5)	
Never	38 (26.0)	309 (34.7)	
Hypertension	104 (72.2)	624 (78.0)	0.13
Diabetes mellitus	44(30.8)	326 (41.2)	0.02
Dyslipidemia	70 (52.2)	386 (55.4)	0.50
Sedentary lifestyle	92 (64.8)	552 (73.0)	0.05
Acute coronary syndrome (%)			0.02
Unstable angina	36 (24.7)	282 (34.4)	
NSTEMI	57 (39.0)	321 (39.1)	
STEMI	53 (36.3)	217 (26.5)	

Some proportions might not add up to 100% due to rounding or missing values.

P-values are derived from the Chi-square test. STEMI: ST-elevation myocardial infarction; NSTEMI: non-ST-elevation myocardial infarction

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