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Frequency of Hazardous and Binge Drinking Alcohol Among Hospitalized Cardiovascular Patients

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Abstract

Excessive alcohol use is a risk factor for most cardiac diseases. The prevalence of unhealthy alcohol use among hospitalized cardiac patients is uncertain as is the frequency with which it is addressed. We performed a single center, patient-level anonymous survey among hospitalized cardiac patients eligible for cardiac rehabilitation. Hazardous drinking was defined as an Alcohol Use Disorders Identification Test (AUDIT) score of 8 or greater. Binge drinking was defined as 5+ drinks for men or 4+ for women on 1 occasion within the past 30 days. Unhealthy drinking was defined as either hazardous or binge drinking. Of 300 patients approached, 290 (96.7%) completed the survey. Mean (\pm SD) age was 69 ± 11 years; 70% were male and 31% were cardiac surgical patients. The proportion (95% CI) of hazardous, binge, and unhealthy drinking was 12% (9–16), 16% (12–20), and 18% (14–23), respectively. Overall, 58% of subjects reported being screened for alcohol use, mostly by nurses (56%). Those with unhealthy drinking reported being counseled

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CRediT Statement

Kyle Gobeil: Conceptualization, Methodology, Investigation, Writing – Original Draft, Writing – Review & Editing, Visualization, Project Administration. **Theodore Medling:** Investigation, Writing – Review & Editing. **Paolo Tavares:** Investigation, Writing – Review & Editing. **Khalid Sawalha:** Investigation, Writing – Review & Editing. **Mohammed Abozenah:** Investigation, Writing – Review & Editing. **Peter D. Friedmann:** Conceptualization, Writing – Review & Editing. **Timothy Naimi:** Conceptualization, Writing – Review & Editing. **Quinn R. Pack:** Conceptualization, Methodology, Formal Analysis, Writing – Review & Editing, Visualization, Supervision, Project Administration.

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CONFLICTS/DISCLOSURES

All authors report no conflicts of interest.

more frequently about their alcohol use compared to non-unhealthy drinkers (11% vs 3%, $p=0.03$), but the large majority (89%) of unhealthy drinkers reported receiving no advice about their alcohol use while admitted. In conclusion, almost one-fifth of hospitalized cardiac patients reported unhealthy drinking, these patients were only screened about half of the time, and were rarely counseled about their alcohol use.

Keywords

Alcohol Use Disorder; Quality of Care; Hospital Screening

INTRODUCTION

A variety of old observational studies suggested that moderate alcohol consumption, defined as one drink per day for women and two drinks per day,¹ might be cardioprotective.²⁻⁵ As a result, cardiovascular clinicians may be less apt to screen or counsel patients on alcohol use, despite a known 7% prevalence of hazardous drinking in the general public and guidelines that recommend universal screening.⁶⁻⁷ This is particularly problematic as, emerging research now concludes that alcohol confers no health benefits and that the safest level of use is none.⁸ Moreover, heavy alcohol use, especially binge drinking, has long been associated with increased risk of cardiovascular death from myocardial infarction (MI), heart failure (HF), and stroke,⁹⁻¹² but little is known about the prevalence of unhealthy drinking among hospitalized cardiac patients and how often they are screened or counseled. To address this question, we surveyed inpatients with acute cardiac illness regarding their alcohol use, receipt of screening, and reported counseling from healthcare professionals during admission.

METHODS

We performed an anonymous, single-center, patient-level survey among consecutive patients hospitalized with acute cardiac illnesses and referred for cardiac rehabilitation at Baystate Medical Center, a 760-bed tertiary care center, which serves as the only regional percutaneous coronary intervention (PCI) and cardiac surgical capable center in Western Massachusetts and is also affiliated with the University of Massachusetts of Medical School. Between June 2019 and September 2019, we approached adults, aged 18 years or older, admitted to hospital with acute coronary syndromes [MI or unstable angina], atherosclerotic peripheral vascular disease (PVD), and chronic systolic HF, as well as those undergoing coronary artery bypass grafting (CABG), PCI, and/or heart valve repair/replacement. In order to maximize generalizability and survey representativeness, exclusion criteria were minimized and excluded only those who spoke a language other than Spanish or English, were cognitively unable to complete the survey, or were deemed too frail to participate in cardiac rehabilitation, such as those with a planned discharge to hospice or long-term nursing home.

To maximize our response rate and reduce the risk of social desirability bias, several steps were taken to keep the survey anonymous. First, patients were specifically told not to put their name or any identifying information on the survey. Second, no links to the name or

medical record number or participants were ever made. Third, at the end of each week, the list used to recruit patients was destroyed. In order to assure patient eligibility, all patient charts were evaluated by phase I cardiac rehabilitation staff members who confirmed their diagnosis and eligibility allowing us verify eligibility while maintaining anonymity. At no point was any protected health information retrieved, recorded, or verified from the electronic medical record by the research team.

A member of the research team approached eligible patients, and verbally verified the reason for admission to the hospital. If a patient was busy or unavailable, the team returned up to three additional times to ask for participation. If a patient declined to participate, they were no longer approached. Consistent with patterns known in inpatient cardiac rehabilitation,¹³ patients were typically approached towards the end of their hospitalization. No patients were surveyed on the day of admission or while in an intensive care unit. This procedure allowed the hospital team the maximal chance to screen the patient for alcohol use, while still allowing time for the research team to approach patients. The purpose and intent of the survey was then explained in detail including risks and benefits of participation. Patients were allowed to skip any questions which they preferred not to answer. The study protocol was approved by the Institutional Review Board of Baystate Medical Center, who deemed survey completion to be adequate documentation of consent. No compensation was included for study participation. Survey results were collected and managed using REDCap electronic data capture tools hosted at Tufts Medical Center.

The survey itself consisted of three sections. The first section used the Alcohol Use Disorders Identification Test (AUDIT), a 10-question validated screen for alcohol use disorders.¹⁴ This section included a both visual and written description of the definition of a standard drink of alcohol. The second section included 16 questions that assessed the patient's experience of alcohol use screening and counseling while in the hospital, as well as any prior experience patients may have had with alcohol counseling from healthcare providers. These 16 questions were then cognitively tested for content clarity with a convenience sample of 15 eligible patients admitted to inpatient cardiac units. Cognitive testing was used to ensure ease of use, comprehensiveness, appropriate length, and clarity.¹⁵ The survey was written at a Flesch-Kincaid Grade Level of 8.2. The final section of the survey included 9 questions that assessed demographic, medical, and social factors. The complete survey tool is found in the supplementary material. Certified medical translators translated the survey into Spanish.

The National Institute of Health definition of a "standard drink," 14 grams of pure alcohol, was utilized and included in the survey.¹⁶ Hazardous alcohol consumption was defined as an AUDIT score of ≥ 8 .¹⁴ Binge drinking was defined as 5 or more alcoholic drinks for males or 4 or more alcoholic drinks for females on the same occasion (i.e., at the same time or within a couple of hours of each other) at least once in the past month.¹⁷ For the purposes of this study, we defined "unhealthy drinking" as either hazardous alcohol use or binge drinking.

The primary outcome assessed was the rate of unhealthy drinking among patients admitted for acute cardiac illnesses. Secondary outcomes evaluated patients' experience with alcohol

use screening and counseling both in the acute inpatient setting as well as what, if any, prior experience they had with screening or counseling with healthcare professionals.

Although definitions of alcohol use vary, about 9% of US adults meet the criteria for an alcohol use disorder.⁵ The 2015 US National Survey on Drug Use and Health, reports the incidence of heavy drinking and binge alcohol use to be around 7% and 25%, respectively,⁷ although these proportions vary substantially based on age. To allow us to assess a range of proportions for hazardous, binge, and unhealthy drinking with modest precision, we planned to survey 300 patients, which would allow us to calculate these proportions with a 3% margin of error. Categorical data was summarized with frequencies and proportions. Continuous variables were reported as means, medians and interquartile ranges for continuous variables with 95% confidence intervals. For univariable analyses, t-tests were employed for continuous variables and chi-square or odds ratio for categorical variables, as appropriate with 95% confidence intervals. Finally, to understand patterns in screening and counseling, we used multivariable logistic regression to estimate the cross-sectional associations between patient characteristics and these outcomes. Software used included JMP 12.01 (Cary NC) and MedCalc Version 15.0 Software (Ostend, Belgium). A p-value of <0.05 was considered significant.

RESULTS

Over 4-months, we approached 300 patients of whom 290 (96.7%) completed the survey. Most survey participants were male, white, with and about 69 years old (Table 1). Most common admitting diagnosis was MI with 32% of patients having undergone cardiac surgery. Most patients drank only occasionally and roughly 17% of patients identified themselves as daily drinkers. On days when alcohol was consumed, the mean number of patient-reported standard alcohol drinks consumed was 1.8 ± 2.4 . Median and mean AUDIT scores were 1 (0, 4) and 3.0 ± 3.9 , respectively. The frequency of self-reported hazardous alcohol use (AUDIT ≥ 8) was 12% (n=35, 95% CI 9–16). The rate of binge drinking was 15% (n=45, 95% CI 12–20). Binge drinking behavior was more common in men and in older patients, specifically, 91% of binge drinkers were men (41 men vs. 4 women, $p = 0.0006$) with a 10-year difference between binge drinkers and non-binge patients (60.5 ± 12.3 vs 70.0 ± 11 , $p < 0.001$). Overall, the rate of unhealthy drinking (either hazardous or binge drinking) was 18% (n=53, 95% CI 14–23).

During admission, 58% of subjects reported being screened about alcohol use at any point during the hospitalization. (Figure 1.) Patients reported that nurses were the most likely to ask about alcohol use followed by physicians or therapists. On multivariable analysis, only increasing age was associated with increased alcohol screening (rate increase by 2.9% per 10-year increase, $p = 0.007$). Notably, there was no association between screening for alcohol use and the presence of unhealthy drinking (58% vs 59%, $p = 0.92$).

Those who were screened for alcohol use, most (91%) reported having not received any counseling on alcohol use. Of the patients that were counseled, half were counseled to reduce alcohol use. Patients were more likely to report counseling if they were screened by a

doctor or nurse practitioner (16 vs 4% $p = 0.013$) or if they had a higher AUDIT score ($\chi^2 = 5.1$, $p = 0.02$).

In total, 53 patients reported unhealthy drinking, and on average consumed 5 standard alcoholic drinks per day. The average AUDIT score for these patients was 9.5. The rate of alcohol use screening in the unhealthy drinking cohort was similar to the entire group (59%), counseling was more frequent (19%, $n = 6$), 5 patients were counseled to reduce alcohol use, and 1 patient was told to make no change in their alcohol use. Thus, the vast majority (89%) of unhealthy drinkers reported having received no advice from a healthcare professional regarding their alcohol use while admitted to the hospital.

Finally, of those surveyed, 23 patients (8%) reported having been told by a healthcare professional, at any point in the past, that alcohol use was good for their general health. Only 12% of patients reporting having ever received a recommendation on alcohol use from their cardiologist or cardiac surgeon. Of those patients, 70% reported having received counseling to decrease their alcohol intake and 12% patients reporting counseling to increase their intake, the rest (18%) were unsure if they ever received counseling on alcohol use from their cardiologist or cardiac surgeon.

DISCUSSION

In this survey, of nearly 300 patients admitted to the hospital for a cardiac illness with an excellent response rate, we found that a sizeable fraction of patients were unhealthy drinkers, screening for alcohol use was reported by only half of patients and rates of counseling were overall very low. Nurses did most of the screening, however, most screening appears to have been fairly cursory, as many patients with unhealthy drinking were not identified in this process.

The present understanding of the relationship between alcohol use and cardiovascular disease continues to evolve, mainly with respect to issue of alcohol use in moderation.^{2,4,18,19} That said, the fact remains heavy alcohol consumption is cardiotoxic, even after adjustment for other risk factors.⁹ Additionally, the rate of binge and hazardous drinking is increasing within the general population and is associated with an increase in all-cause mortality.^{8,20-21} Alarming, we also identified a small portion of patients who had actually been counseled to increase their alcohol use, despite guidelines that clearly recommend against such advice.²²

Our report is consistent with prior studies, showing that, among the general inpatient population, about 16% of patients have unhealthy alcohol consumption, as assessed by the 3-item AUDIT-C.^{23,24} Given this substantial prevalence, the key necessary first step in addressing unhealthy alcohol use is consistent screening. Multiple validated tools are readily accessible, including the AUDIT-C, CAGE questionnaire and the 'single-question' alcohol screen from National Institute on Alcohol Abuse and Alcoholism (NIAAA).⁵ These tools are essential parts of effective screening strategies within a variety of clinical settings.^{6,25} Once appropriately identified, inpatient motivational counseling may represent an effective method to address unhealthy drinking behavior, with prior research demonstrating heavy

drinkers are 2 times as likely to moderate their use after such interventions.²⁶ Implementing screening/counseling initiatives in the emergency room setting have been explored in a randomized fashion but have fallen short on achieving sustained alcohol use moderation,²⁷ whereas a similar approach in the primary care setting found lower rates of self-reported drinking at 12-months.²⁸ Reports on reducing excessive drinking via brief counseling interventions are plentiful, including multiple meta-analyses. Conversely, experience with integrating an approach aimed solely at screening initiatives, particularly in an inpatient cardiac population, is an area of research that is missing. More effort is needed in the realm of efficacious screening strategies, especially on admission, which should afford the ability to identify those with unhealthy alcohol use, potentially mitigating the dangerous consequences of acute alcohol withdrawal and facilitate more proactive motivational counseling, treatment, and resource referrals.

The reasons for our low screening rates are unclear but likely multifactorial. First, as a general rule screening for substance use disorders in hospitalized patients is generally poor. Second, among cardiac patients, the belief that moderate alcohol use may imparting a cardiovascular benefit may dissuade clinicians from consistently screening for harmful alcohol use. Lastly, alcohol use may be a socially difficult topic to broach, influenced by different age groups, genders, and cultural backgrounds. A simple universal approach to this at-risk group may be difficult to employ broadly and would likely be inadequate to fully address the scope and nuances of the issue.

Our report has several strengths. First, we had extremely high participation rates, with nearly 97% of patients completing the survey. This is likely the result of the anonymity provided, clarity and ease of the survey itself. The use of the AUDIT questionnaire also provided a well validated means of assessing alcohol use consumption. An important limitation of this study is that it does not comprise the totality of cardiac patients, including patients with arrhythmias, hypertension, or those with heart failure from diastolic dysfunction. That said, the eligibility for cardiac rehabilitation implies that each of these patients had a reasonable prognosis and should have been screened and counseled for harmful alcohol use. The nature of being a single-centered study means our results may not uniformly apply to other institutions with significantly different patient populations or clinical settings, although our results are generally consistent with prior studies.^{29,30} Because all survey answers were self-reported, it is possible that our reported rates of screening and counseling are lower than what actually happened in the hospital because some patients did not recall being screened or counseled. Similarly, it is possible that patients may have been screened for alcohol use after survey completion, however, we know that most cardiac rehabilitation evaluations actually occur in the latter half of the hospitalization, based on national estimates.¹³ Patients may have also given incorrect answers about their medical history, but due to the cardiac rehab staff evaluation, we know that all patients at least had active cardiac disease. Additionally, alcohol use may have been underreported by participants due to social desirability bias, however, if this bias were present to a significant extent, such a bias would underestimated the true extent of the problem and would only add to the significance of our findings.

In our study of patients hospitalized with a cardiovascular diagnosis, unhealthy alcohol use appears to be quite common. We identified significant gaps in alcohol use screening and counseling of unhealthy alcohol consumption, which is of particular concern given that this level of alcohol use has been shown to increase cardiovascular mortality. This study highlights the need for more robust screening and counseling initiatives aimed at proper identification and treatment of those at risk to the deleterious effects of alcohol use when consumed in excess.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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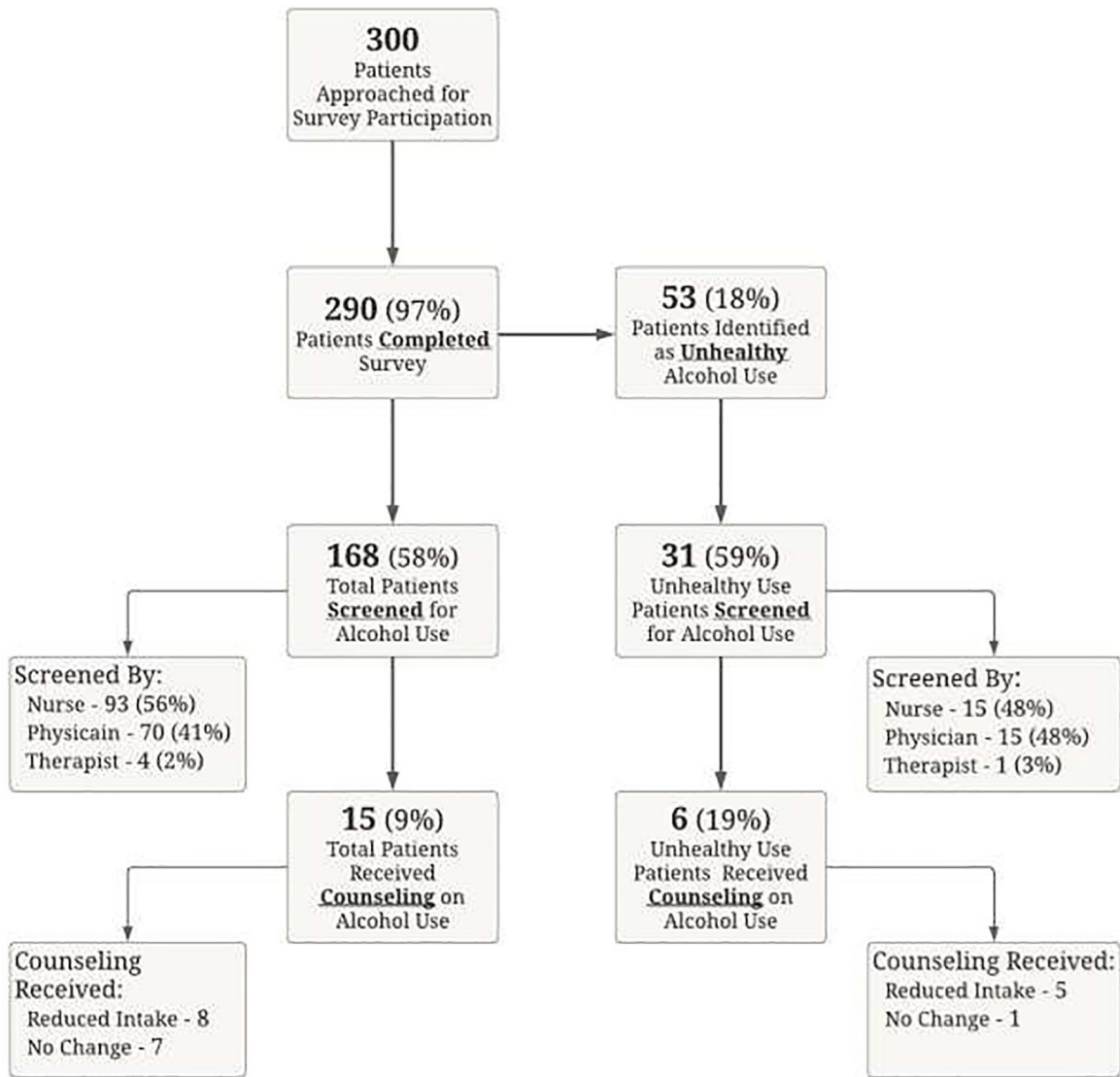


Figure 1. Flow chart depicting rates of alcohol use screening and counseling of those patients surveyed, including those identified as unhealthy use behavior.

Table 1.

Patient characteristics of those admitted for acute cardiac illnesses and surveyed about alcohol use.

Patient Characteristics (N = 290)	
Age, years	68 ± 11
Men	203 (70%)
Body mass index (kg/m ²)	29 ± 6
Spanish speaking	12 (4%)
White	253 (87%)
Asian	3 (1%)
Black / African American	12 (4%)
Hispanic / Latino	20 (7%)
Native American	1 (<1%)
Other	1 (1%)
Hypertension	239 (82%)
Hyperlipidemia	214 (74%)
Type II diabetes mellitus	135 (47%)
Stroke	35 (12%)
Heart failure	76 (26%)
Peripheral vascular disease	26 (9%)
Myocardial infarction	92 (32%)
Obstructive sleep apnea	69 (24%)
Atrial fibrillation	73 (25%)
Chronic kidney disease	56 (19%)
Cirrhosis	4 (1%)
Pancreatitis	11 (4%)
Cancer	40 (14%)
Reason for Admission*	
Myocardial infarction	101 (35%)
Coronary artery bypass grafting	52 (18%)
Percutaneous coronary intervention	47 (16%)
Stable angina	3 (1%)
Peripheral vascular disease	1 (<1%)
Chronic heart failure	55 (19%)
Heart valve repair / replacement	39 (14%)
Education Level (n=287)	
Did not graduate high school	37 (13%)
Graduated high school/GED or equivalent	108 (38%)
Some college, no degree	50 (17%)
Associates degree	35 (12%)
Bachelor's degree	32 (11%)
Advanced degree, masters	20 (7%)
Doctorate	5 (2%)

Patient Characteristics (N = 290)

Income Level (n=225)

<20,000	45 (20%)
20,000 – 34,999	49 (21%)
35,000 – 49,999	51 (23%)
50,000 – 74,999	51 (23%)
75,000 – 99,999	22 (9%)
>100,000	7 (3%)

Data reported as either mean \pm standard deviation or frequency (n, %).

* More than one response was considered acceptable.

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