Research Article ISSN 2639-8451

Addiction Research

Alcohol Use Disorder among General Hospital Medical Inpatients

Itai Danovitch, MD, MBA[1*], Teryl Nuckols MD, MSHS[1,2], Katherine E. Watkins, MD, MSHS[2], Allison J. Ober, PhD[2], James Mirocha MS[1], Philip Ros MPH[1], Kailee Marin DO[1,4], Paloma Garcia, BA Candidate[1,5] and Waguih William IsHak MD, FAPA[1,3]

[1]*Cedars-Sinai Medical Center, USA.*

[2]*Rand Corporation, USA.*

[3]*David Geffen School of Medicine at UCLA, USA.*

[4]*University of Arizona College of Medicine – Tucson, USA.*

[5]*Brown University, USA.*

[*]Correspondence:
Itai Danovitch, MD, MBA, Chairman, Department of Psychiatry and Behavioral Neurosciences, Cedars-Sinai Medical Center, Los Angeles, California 90048, USA.

Received: 21 March 2021; **Accepted:** 10 April 2021

Citation: Danovitch I, Nuckols T, Watkins KE, et al. Alcohol Use Disorder among General Hospital Medical Inpatients. Addict Res. 2021; 5(1): 1-5.

ABSTRACT

Objectives: *We sought to examine alcohol use disorder (AUD) among general hospital medical inpatients with respect to identification, service utilization, and initiation of medication treatment.*

Methods: *We performed a retrospective chart review for all adult inpatients over one full calendar year. Subjects were separated into two categories: patients with chart documentation of an AUD diagnosis and those without such documentation. We extracted from the electronic health record and analyzed information on demographics, service utilization, and treatment initiation of medication for AUD such as naltrexone, disulfiram, or acamprosate.*

Results: *The study revealed three main findings: 1) Less than one percent of patients discharged from the hospital in one full calendar year had an identified AUD diagnosis. 2) Patients with an AUD diagnosis had a significantly higher number of emergency department (ED) visits and longer hospital length of stay (LOS) but did not have significantly higher 30-day hospital readmissions, compared to patients with no AUD diagnosis. 3) Among patients diagnosed with AUD, only 1.8% received FDA-approved medication for AUD.*

Conclusions: *The AUD identification rate we detected was markedly lower than prevalence rates reported in the literature. Patients who were identified with AUD had higher counts of ED visits and longer LOS. Initiation rates of medication for AUD were low. The study findings suggest that concerted efforts are needed to improve detection and diagnosis of AUD in order to support the delivery of effective AUD treatment including the initiation of evidence-based pharmacotherapy for AUD in the general hospital setting.*

Keywords

Alcohol Use Disorder, General Hospital, Screening, ED Visits, Length of Stay, Pharmacotherapy.

Introduction

Alcohol use disorder (AUD) is the third leading cause of preventable death in the United States, a leading cause of morbidity [1], and costs an estimated $223 billion each year [2]. AUD impacts every organ system and contributes to liver disease, heart disease, gastro-intestinal disorders, head and neck cancer, neurological disorders, and psychiatric disorders such as anxiety, depression, and suicidality [3,4]. Previous research estimates that one fifth of medical inpatients have unhealthy alcohol use [5-9], and up to three quarters of those with unhealthy use are thought to have AUD [10]. Among medical inpatients, AUD is associated with increased physical health problems, poor outcomes, decreased follow-up with after-care recommendations, and high rates of comorbid mental health problems [11,12]. Importantly, AUD is

consistently among the top five conditions leading to hospital readmission among Medicaid beneficiaries and the uninsured [7].

Despite the importance of AUD in the hospital setting, current estimates of the prevalence of AUD in hospitalized inpatients vary widely. AUD prevalence data among hospital inpatients is drawn from heterogeneous literature, with some data dating back several decades, and are based on various screening tools, criteria, and diagnostic thresholds [7]. Moreover, it remains unclear if rates of AUD identification differ by provider type, whether individuals with AUD differ in their service utilization patterns compared to individuals without AUD, or how often do hospitalized individuals with AUD receive treatment for their AUD during hospital admissions. In the outpatient setting, inconsistent AUD screening practices and lack of uptake of evidence-based treatments have prompted calls to improve AUD screening in primary care [13] and trauma centers [14]. In the inpatient setting, the Joint Commission recommends screening, brief intervention, and referral to treatment (SBIRT) for all medical inpatients admitted for reasons related to AUD and has endorsed National Quality Forum (NQF) performance measures [15]. Nevertheless, these recommendations are inconsistently applied, and data on rates of screening, identification and treatment initiation continue to be unavailable. Lack of data on rates of AUD identification, service utilization and treatment initiation in acute medical settings impedes the ability to prioritize, target, and address AUD [16].

We conducted the present study among general hospital medical inpatients in a large diverse urban medical center to examine: (1) Rates of AUD identification. (2) Rates of service utilization as evidenced by emergency department (ED) visits, hospital length of stay (LOS), and 30-day hospital readmission rates, for individuals with AUD diagnosis compared with patients with no AUD. (3) Rates of treatment initiation of evidence-based pharmacotherapy using FDA-approved medication for AUD (oral naltrexone, disulfiram, or acamprosate).

Methods

Study Setting

The study was conducted using data from Cedars-Sinai Medical Center (CSMC) in Los Angeles, California, a non-profit, 886-bed general medical and surgical facility and Level I trauma center. CSMC receives 83,000 ED visits and 50,000 admissions per year.

At CSMC, all patients admitted are screened for alcohol use by nursing staff with the following question: "How many drinks do you have?" A standard drink is depicted in Figure 1 as defined by the US National Institute of Alcohol Abuse and Alcoholism (NIAAA).

Positive responses, based on NIAAA criteria for risky drinking (for women: >3 drinks per occasion OR >7 drinks per week; for men: >4 drinks per occasion OR >14 drinks per week), trigger notification to the admitting physician for further assessment, diagnosis, and management.

Procedures and Participants

We performed a retrospective chart review of all adult inpatients aged 18 to 65 years discharged from CSMC in one full calendar year between January 1, 2014 and December 31, 2014. The study procedures were approved by the Cedars-Sinai Institutional Review Board. The subjects were separated into two categories: those with chart documentation of AUD, and those without chart documentation of AUD. Chart documentation of AUD was ascertained based on the presence of diagnostic codes indicative of AUD, documented at any point during the inpatient encounter in an administrative field of the electronic health record such as

Figure 1: NIAAA Definition of a Standard Drink.

Source: https://www.niaaa.nih.gov/alcohols-effects-health/overview-alcohol-consumption/what-standard-drink. Public domain figure and may be used or reproduced without permission from NIAAA.

admission diagnosis, discharge diagnosis, or problem list. Table 1 shows the diagnostic codes indicative of AUD.

Table 1: Diagnostic codes indicative of AUD.

Alcohol abuse	305.0-305.03
Alcohol dependence	303.0-303.93
Alcohol use disorder	F10.1-F10.99
Excessive blood alcohol level	790.3
Alcohol toxicity	980-980.9
Alcohol poisoning	E860-E860.9
Alcohol psychoses	291-291.9
Alcoholic polyneuropathy	357.5
Alcoholic cardiomyopathy	425.5
Alcoholic gastritis	535.3-535.31
Alcoholic liver disease	571.0-571.3
Personal history of alcoholism	V11.3
Alcoholism counseling	94.46
Referral for alcohol rehabilitation	94.53
Alcohol rehabilitation, detoxification, rehabilitation/detoxification,	94.61-94.63
Combined alcohol and drug rehabilitation, detoxification, rehabilitation/detoxification	94.67-94.69

Measures

We extracted the following information from the electronic health record (EHR):

1. Demographic characteristics. Age, gender, race, insurance status, and insurance plan.
2. Service utilization in calendar year 2014
a. ED Visits: Number of visits to the ED
b. LOS: Number of days of the most recent hospital stay
c. 30-day readmission rate
3. Initiation of pharmacotherapy among patients with AUD.

Among those diagnosed with AUD during the study period, the proportion who received an inpatient order for the following FDA-approved medication for AUD: oral naltrexone (depot naltrexone was not available on the hospital formulary during the study period), disulfiram, or acamprosate, as recorded in the medication section of the EHR.

Statistical Analysis

Results were considered statistically significant when $p < 0.05$. We used SAS version 9.4 (SAS Institute Inc., Cary, North Carolina, USA) to perform all analyses.

Descriptive Analyses

We conducted univariate analyses to examine distribution, central tendencies and dispersion (range and standard deviation) of all variables. We report summary values as means and standard deviations or median and interquartile range [IQR] for continuous variables, and frequencies (%) for categorical variables.

Comparison of service utilization among those identified with and without AUD

We conducted independent samples t-tests and Wilcoxon rank sum tests to assess group differences for continuous variables and Chi-square tests to assess group differences in categorical variables.

Results

AUD Identification and Demographics Characteristics

Among a total of 30,616 discharged patients in the 2014 calendar year, AUD was identified in 227 unique patients, or 0.74% of our sample. Table 2 shows the demographic characteristics of individuals identified with and without AUD. Compared to those without an identified AUD, patients with AUD were more likely to be male (62% vs. 33%; $p<0.0001$) and were slightly younger (53.3 vs. 55.6; $p=0.031$). Race was similarly distributed across the two groups, with the majority in each group being Caucasian. The payer mix showed more Medicaid and uninsured patients in the AUD group.

Table 2: Demographic Characteristics of Patients with and without an alcohol use disorder (AUD), of all Patients Discharged in 2014.

	AUD N = 227	No AUD N = 30389	Overall N = 30616	P-value
Age, Mean ± SD	53.3 ± 15.8	55.6 ± 20.5	55.6 ± 20.4	0.031
Female	75 (33.0%)	18861 (62.1%)	18936 (61.9%)	< 0.0001
Race				
Caucasian	181 (79.7%)	22263 (73.3%)	22444 (73.3%)	
Asian	10 (4.4%)	2174 (7.2%)	2184 (7.1%)	0.15
African American	25 (11.0%)	4054 (13.3%)	4079 (13.3%)	
Other	11 (4.8%)	1898 (6.2%)	1909 (6.2%)	

AUD = Alcohol Use Disorder.

Utilization Outcomes

ED Visits among Patients identified with and without AUD

The number of ED visits ranged from 0 to 82 among AUD patients and from 0 to 57 among patients without AUD. Compared to patients with no AUD, patients with AUD had a significantly higher number of ED visits, $p<0.0001$: Median [IQR] 1.0 [1 to 3] vs. 1.0 [0 to 3] and mean ± standard deviation 3.4 ± 7.6 vs. 1.0 ± 1.7.

Hospital Length of Stay (LOS)

Patients with AUD had longer LOS compared to patients without AUD, $p=0.035$: Median [IQR] 3.62 [2.04 – 5.91] vs. 3.17 [2.18 – 5.13] and mean 6.00 ± 11.98 vs. 4.97 ± 7.20.

30-day Readmission Rates

Thirty-day readmission rates were not significantly different between the two groups (15.4% vs. 12.6%, $p=0.19$).

Initiation of Pharmacotherapy among Patients identified with AUD

Among patients with AUD, only 1.8% received an FDA-approved medication for AUD during their inpatient stay. The only pharmacotherapy prescribed was naltrexone. There were no orders for disulfiram or acamprosate.

Discussion

The study revealed three main findings: 1) Only 0.74% of patients discharged from the hospital in 2014 received the diagnosis of AUD. 2) Patients with AUD had a significantly higher number of ED visits and longer LOS but did not have significantly higher 30-day readmission rates, compared to patients with no AUD

diagnosis. 3) Among patients diagnosed with AUD, only 1.8% received FDA-approved medication for AUD.

The AUD identification rate we detected was markedly lower than prevalence rates reported in the literature [5-7,9,10]. We suspect that the comparatively low detection rate found in our naturalistic study does not reflect true prevalence; rather, it reflects the barriers to detection and documentation in the medical inpatient care setting. Saitz et al. found that 17% of medical inpatients at an urban teaching hospital drank risky amounts of alcohol, and upon further evaluation, 77% of this subsample had alcohol dependence according to DSM IV criteria [10]. Wei et al. reported that among all patients discharged from an urban hospital setting, one quarter had an ICD9 diagnosis related to alcohol. A systematic review of hospital screening studies conducted by Roche et al. identified 32 studies set in hospital wards, with an average prevalence of 16.5% positive AUD screens based on self-report measures and a range of 7 to 29%. The broad range of AUD detection rates reflects differing assessment tools, definitions of alcohol risk, patient populations, screening personnel, and specific location and timing for screening [14]. The highest estimates arose from those studies that utilized research staff rather than point of service health care providers to conduct screening [7]. A subsequent evaluation of a national sample of hospital admissions with a research-based diagnosis of AUD (determined through a structured approach by trained staff conducting face-to-face, computer-assisted, personal interviews) found 40-42% of the sample had clinical documentation of AUD [17], an order of magnitude higher than detection rates in usual practice. The inconsistency between research-based and naturalistic studies is not surprising, as clinicians in hospital settings face several barriers regarding alcohol screening and treatment, including lack of knowledge, lack of time, lack of resources, and personal discomfort [18]. Altogether, the discrepancy between detection rates in research-based versus naturalistic studies such as ours highlights the need for quality improvement interventions to enhance the effectiveness of clinical screening pathways.

The finding of higher ED admissions and mean LOS among AUD patients compared with patients without AUD is consistent with prior studies [19-21]. However, we did not detect a higher hospital readmission rate among those with AUD. In prior studies, inpatients with AUD have been shown to be nearly twice as likely to be readmitted within 30 days [22] even when controlling for insurance status [20]. Among patients with Medicaid, AUD is the fifth leading cause of 30-day all-cause readmission, and among uninsured patients, AUD is the second leading cause [22]. The lack of higher hospital readmissions among patients with AUD in our sample could reflect that our readmissions data was limited to one site, or it may be a product of the low detection rates.

Among patients with AUD, very few received FDA-approved medication for AUD. We were not able to determine whether patients received other evidence-based treatments, such as brief bedside interventions or referral to appropriate community treatment programs. However, the low rate of pharmacotherapy we detected is consistent with other work, suggesting that care for hospitalized patients with AUD does not meet the needs of patients with a moderate to severe AUD [10,23], and that uptake of pharmacotherapy for substance use disorders remains low [24]. Thus, AUD frequently goes undetected, and even when recognized, is often not treated with effective interventions [17]. This points to a critical opportunity to develop treatments that translate to evidence-based interventions into the hospital setting, particularly motivational interviewing, medication, and addiction-specific linkage to aftercare.

Our study had several limitations. The study was confined to one institution, during a single calendar year, limiting its generalizability. Utilization data was limited to one hospital system, and we did not capture ED or hospital admissions at other sites. Furthermore, our study utilized a retrospective chart review design, which enabled us to identify associations but not causal relationships. Finally, our study, by design, relied on diagnoses generated by hospital providers during standard care. While this finding is important and reflects the practical challenges involved in a natural setting, it likely artificially limited the size of the population of inpatients who had an AUD diagnosis during the study period. However, the use of naturalistic data was also a strength, as it allowed us to identify important disparities between findings from research versus real world settings.

Conclusion

Using a retrospective chart review of AUD patients in the naturalistic setting of a large urban academic general hospital, we found that AUD identification rates among providers were substantially lower than prevalence rates conducted using research-based screening. When identified, patients rarely receive FDA-approved medication for AUD such as naltrexone, disulfiram, or acamprosate. Patients with AUD also had higher numbers of ED visits and longer lengths of stay. Because many individuals with AUD suffer from physical sequelae and medical comorbidities necessitating hospitalization, and because failure to address AUD is associated with adverse health outcomes, hospitals must focus on identification and effective management during the inpatient stay. Although there are validated screening tools and effective interventions, implementing them into clinical practice has proven to be a challenge. There is a pressing need for measures to encourage and support the delivery of effective AUD treatment in the hospital setting. Our study suggests that this process should begin with concerted efforts to improve detection and diagnosis of AUD, followed by appropriate assessment, management, and linkage to aftercare.

References

1. Stahre M, Roeber J, Kanny D, et al. Contribution of excessive alcohol consumption to deaths and years of potential life lost in the United States. Preventing chronic disease. 2014; 11: E109.
2. Bouchery E E, Harwood H J, Sacks J J, et al. Economic costs of excessive alcohol consumption in the U.S., 2006. American journal of preventive medicine. 2011; 41: 516-524.

3. Mehta A J. Alcoholism and critical illness: A review. World journal of critical care medicine. 2016; 5: 27-35.
4. Odlaug B L, Gual A, DeCourcy J, et al. Alcohol Dependence, Co-occurring Conditions and Attributable Burden. Alcohol and alcoholism (Oxford, Oxfordshire). 2016; 51: 201-209.
5. Dawson N V, Dadheech G, Speroff T, et al. The effect of patient gender on the prevalence and recognition of alcoholism on a general medicine inpatient service. Journal of general internal medicine. 1992; 7: 38-45.
6. Doering-Silveira J, Fidalgo T M, Nascimento C L, et al. Assessing alcohol dependence in hospitalized patients. International journal of environmental research and public health. 2014; 11: 5783-5791.
7. Roche A M, Freeman T, Skinner N. From data to evidence, to action: findings from a systematic review of hospital screening studies for high risk alcohol consumption. Drug and alcohol dependence. 2006; 83: 1-14.
8. Saitz R. Candidate performance measures for screening for, assessing, and treating unhealthy substance use in hospitals: advocacy or evidence-based practice?. Annals of internal medicine. 2010; 153: 40-43.
9. Wei J, Defries T, Lozada M, et al. An inpatient treatment and discharge planning protocol for alcohol dependence: efficacy in reducing 30-day readmissions and emergency department visits. Journal of general internal medicine. 2015; 30: 365-370.
10. Saitz R, Freedner N, Palfai T P, et al. The severity of unhealthy alcohol use in hospitalized medical patients. The spectrum is narrow. Journal of general internal medicine. 2006; 21: 381-385.
11. Makdissi R, Stewart S H. Care for hospitalized patients with unhealthy alcohol use: a narrative review. Addiction science & clinical practice. 2013; 8: 11.
12. Stewart S H. Alcoholics in acute medical settings have increased risk for other drug, mood, and personality disorders. International journal of psychiatry in medicine. 2007; 37: 59-67.
13. Jonas D E, Garbutt J C, Amick H R, et al. Behavioral counseling after screening for alcohol misuse in primary care: a systematic review and meta-analysis for the U.S. Preventive Services Task Force. Annals of internal medicine. 2012; 157: 645-654.
14. Forsythe M, Lee G A. The evidence for implementing alcohol screening and intervention in the emergency department - time to act. International emergency nursing. 2012; 20: 167-172.
15. https://manual.jointcommission.org/releases/archive/TJC2010B/ScreeningandTreatingTobaccoandAlcoholUse.html.
16. Johnson M, Jackson R, Guillaume L, et al. Barriers and facilitators to implementing screening and brief intervention for alcohol misuse: a systematic review of qualitative evidence. Journal of public health (Oxford, England). 2011; 33: 412-421.
17. Smothers B A, Yahr H T, Ruhl C E. Detection of alcohol use disorders in general hospital admissions in the United States. Archives of internal medicine. 2004; 164: 749-756.
18. Gargaritano K L, Murphy C, Auyeung A B, et al. Systematic Review of Clinician-Reported Barriers to Provision of Brief Advice for Alcohol Intake in Hospital Inpatient and Emergency Settings. Alcoholism, clinical and experimental research. 2020; 44: 2386-2400.
19. Choi N G, Marti C N, DiNitto D M, et al. Alcohol Use as Risk Factors for Older Adults' Emergency Department Visits: A Latent Class Analysis. The western journal of emergency medicine. 2015; 16: 1146-1158.
20. https://pubmed.ncbi.nlm.nih.gov/29578669/
21. Smith M W, Stocks C, Santora P B. Hospital readmission rates and emergency department visits for mental health and substance abuse conditions. Community mental health journal. 2015; 51: 190-197.
22. https://pubmed.ncbi.nlm.nih.gov/24901179/
23. Stewart S, Swain S, NICE Royal College of Physicians, et al. Assessment and management of alcohol dependence and withdrawal in the acute hospital: concise guidance. Clinical medicine (London, England). 2012; 12: 266-271.
24. Lee J, Kresina T F, Campopiano M, et al. Use of pharmacotherapies in the treatment of alcohol use disorders and opioid dependence in primary care. BioMed research international. 2015; 137020.