

Research Article

Alcohol and Other Drug Use in a Sample of Admitted Adolescent Trauma Patients

Michael J. Mello^{1,2*}, Julie R. Bromberg^{1,2}, Hale Wills^{1,2}, Barbara A. Gaines³, Garry Lapidus⁴, Megan L. Ranney^{1,2}, Anthony Spirito², Christina Parnagian², and Janette Baird^{1,2}

¹The Warren Alpert Medical School of Brown University, USA

²Rhode Island Hospital, USA

³Children's Hospital of Pittsburgh of UPMC, USA

⁴Connecticut Children's Medical Center, USA

***Corresponding author**

Michael J. Mello, The Warren Alpert Medical School of Brown University, Rhode Island Hospital, 55 Claverick Street, 2nd Floor, Providence, RI 02903, USA, Tel: 401-444-6684; Email: mjmello@lifespan.org

Submitted: 15 May 2018

Accepted: 30 May 2018

Published: 31 May 2018

ISSN: 2373-9363

Copyright

© 2018 Mello et al.

OPEN ACCESS**Keywords**

• Alcohol screening; SBIRT; Pediatric trauma center

Abstract

Introduction: Alcohol screening, brief intervention and referral to treatment is mandated within the level 1 pediatric trauma center. However, data on the prevalence of alcohol and drug use among admitted pediatric trauma patients is limited. Our study objective was to describe substance use and related negative consequences in admitted adolescent trauma patients across three pediatric level 1 trauma centers.

Methods: This surveillance study was nested within a study on electronically delivered parenting skills education to parents of admitted adolescents (12-17 years) screening positive for alcohol or drug use. Enrolled adolescents completed baseline assessments to examine demographics, substance use and related negative consequences. Thirty-seven parent-adolescent dyads enrolled in the intervention study.

Results: Participants were eligible if they received a positive CRAFFT score or a positive biological screen for alcohol or drug use at time of the hospital admission. Of those enrolled into the study, 9 (24%) reported no substance use in the prior 12 months in our assessment battery. Of the remaining 28 patients, 6 (16%) reported using only alcohol, 10 (27%) only marijuana, 9 (24%) both alcohol and marijuana, and 3 (8%) alcohol and marijuana with other drugs in the past 12 months. Negative consequences reported varied between those who reported alcohol use only and those who reported marijuana use only with physical consequences of use most often being reported by those using alcohol (hangover, vomiting), and psychosocial consequences (getting into trouble with parents, doing something later regret) by those who used only marijuana.

Conclusion: These findings support the use of laboratory screening and screening questionnaires for all adolescent trauma admissions to capture a complete picture of alcohol and drug use.

ABBREVIATIONS

SBIRT: Screening, Brief Intervention Referral to Treatment; ACS: American College of Surgeons; CRAFFT: Car, Relax, Alone, Forget, Friends, Trouble; HER: Electronic Health Record

INTRODUCTION

Approximately 33% of US adolescents report current alcohol use [1], and its use is associated with serious injuries in adolescent populations [2]. For this reason, screening, brief interventions and referral to treatment (SBIRT) is supported by several national organizations [3-5], to be part of care for the injured patient. The American College of Surgeons Committee on Trauma (ACS) mandates that all trauma centers have the capacity to identify patients who are problem drinkers and requires level 1 trauma centers to have a mechanism to provide these patients with an intervention [6]. Although SBIRT is mandated for all trauma patients, policy has outpaced research evidence [7]. Limited research has evaluated SBIRT programs within the pediatric trauma center [8,9].

There is a link between alcohol use and injury [2], and research conducted across 25 European countries and North America has shown that early engagement in substance use (being intoxicated and marijuana use) is associated with increased rates of injury [10]. However, data on the prevalence of alcohol and drug use among admitted pediatric trauma patients is limited. One study found a prevalence of alcohol misuse of 30% in 107 hospitalized adolescent trauma patients [11]. No data on other drug use or negative consequences of alcohol and drug use was reported. A second single-site study investigated alcohol and drug rates among trauma patients in a wider age range of 12-21 years and reported an average alcohol rate of 29.2% [12], with alcohol and drug use increasing with age. A third single site retrospective chart review, reported 18% of level 1 or level 2 pediatric trauma activations screened positive for risky alcohol use (CRAFFT screening) or positive blood alcohol level/urine drug screen [13].

Our study objective was to describe the prevalence of drug use in admitted adolescent trauma patients who screened positive for alcohol use and describe negative consequence of alcohol and

drug use across three pediatric trauma centers. This information may provide guidance to pediatric trauma centers on the need to incorporate discussion of drug use in brief interventions delivered for alcohol to meet the ACS requirement.

METHODS

Study participants

Adolescents (age 12-17) admitted to three pediatric trauma centers were assessed for eligibility. This surveillance study that we report on was nested within a study on electronically delivering parenting skills education to parents of admitted adolescents. Adolescent patients were identified from a review of the site's electronic health record (EHR). Those adolescents whose EHR indicated a positive CRAFFT screen or positive laboratory toxicology screen for alcohol or drug use were approached for study enrollment. Other eligibility requirements included being medically stable and having a parent available for consent. Exclusion criteria included being admitted for a psychiatric diagnosis, incarcerated, in state protective custody, non-English speaking, or currently in drug treatment. Study procedures were explained to both parent and adolescent; one parent provided consent and the adolescent provided child assent for study enrollment.

The research assistant provided the adolescent with a tablet computer to complete baseline assessments utilizing the web based RED Cap platform [14]. Demographic data were collected as well as data assessing adolescent alcohol use, drug use and negative consequences included CRAFFT [15], Add Health [16], and Drug Use Questionnaire [17]. Follow up assessments of the adolescent were completed at 3 and 6 months after enrollment. Participants received a \$25 gift card as compensation for their time completing study assessments. The protocol was approved by the institutional review boards at all recruitment sites. The parent study was registered at clinicaltrials.gov (NCT02718508).

Data analysis

Data were analyzed using SAS version 9.4 (Carey, NC). Descriptors of the sample and reported counts of substance use and negative consequences of use are reported. All substance use questions asked from the CRAFFT, and negative consequences of use from the Add Health questionnaire, modified slightly for this study, concerning risk behaviors that occurred because of alcohol and/or marijuana or other drugs, were reported as binary outcome (use/no use or consequence experienced/not experienced). We also examined differences in report of negative consequences by participant gender.

RESULTS

From a total patient pool of 1,098 aged 12-17 year who were admitted to the trauma services at the study sites, 962 patients were screened for alcohol or other substance use (Figure 1). Of those screened, 91 patients (9.5%) had either a positive CRAFFT score, a positive alcohol or other substance use laboratory toxicology screen or both.

Thirty-seven participants enrolled in the intervention study and completed the baseline survey for the study. Most were males ($n = 29$, 78%), 21 were age 16-17 years (57%), most self-

reported as white ($n = 23$, 62%) and three (8%) were African American, 12 self-reported ethnicity as Hispanic/Latino (32%), and 25 (68%) reported their school grades as passing (grade in school mostly C or above).

Although study participants were eligible if they had a positive CRAFFT score or screened positive for alcohol or drug use via biologics at time of the hospital admission, when the research assistant re-administered the CRAFFT later in the hospitalization, 9 (24%) reported no substance use in the prior 12 months. Of the remaining 28 patients, 6 (16%) reported using only alcohol, 10 (27%) only marijuana, 9 (24%) both alcohol and marijuana, and 3 (8%) alcohol and marijuana with other drugs in the past 12 months. The other drugs reported were cocaine ($n = 2$), LSD ($n = 1$), prescription drugs not prescribed to participant ($n = 2$), and hallucinogenic mushrooms ($n = 1$). Add Health responses are reported for these 28 adolescents in Table 1. Participants who reported using marijuana only most often reported trouble with their parents or doing something they later regretted as the most often experienced negative consequences. With alcohol use, being sick/throwing up after drinking or having a hangover were the two most frequently reported negative consequences.

There were no gender differences in the number of negative consequences (male total = 49, mean = 1.5; females total = 11; mean = 1.4). Gender differences in the types of negative consequences were observed: only males reported physical consequences of alcohol use or having a sexual encounter they later regretted because of alcohol or drug use, more males than females (5 versus 2) reported being hungover or vomiting (5 versus 1) because of alcohol. Additionally, 86% adolescents who reported getting in trouble with parents because of drug use were male.

DISCUSSION

This manuscript describes patterns of drug and alcohol use among a multi-center sample of adolescents hospitalized due to trauma, with positive screens for alcohol or substance use. Although the 9.5% prevalence rate of drug and alcohol use is lower than others' reports of 18-30% in this patient population¹¹⁻¹³, our rate may be under-representative, given that 12% of the admitted patient received no substance use screen.

On self report, marijuana use was the most often reported used substance, alone or in combination with alcohol or other drugs, and the frequency of reported negative consequence was overall greater for marijuana use than alcohol use. The range of negative consequences associated with alcohol and/or marijuana use suggests that interventions to address substance use would be useful to reduce the burden of social and health consequences associated with substance use.

There are some important limitations to consider. First, this study and others [13,18], likely underestimate actual alcohol and drug use or risk as complete screening rates (using biologic tests for alcohol and drug metabolites and CRAFFT or similar screen for alcohol or drug use at other times) are often low within the pediatric trauma center. Twelve percent of the admitted patients in this study received no substance use screen despite the center taking part in a study involving screening. The rates could likely even be much higher in other pediatric

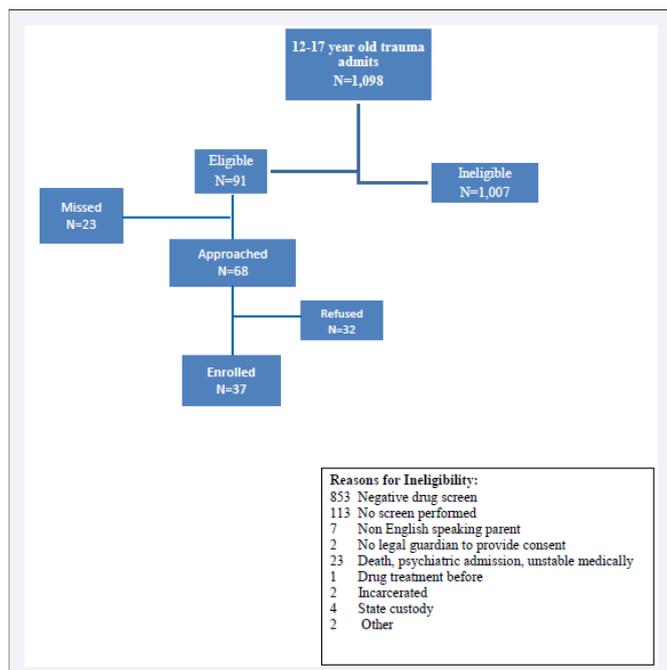


Figure 1 Recruitment of study sample.

Table 1: Reported Negative Consequences from Alcohol, Marijuana and other Drug Use*.

How often has the following happened to you in the past three months	Reported alcohol use (n = 18) n (%)	Reported marijuana use only (n = 10) n (%)
Got in to trouble with your parents'	3 (17)	7 (32)
You had problems with your friends	2 (11)	2 (9)
You did something you later regretted	3 (17)	6 (27)
Were you hung over	7 (39)	2 (9)
Sick to your stomach or threw up	6 (34)	4 (18)
Get into a sexual situation that you later regretted	1 (6)	3 (14)
Get into a physical fight that you later regretted	2 (12)	2 (9)

* Participants could report > 1 negative consequence

trauma centers not participating in research project related to adolescent substance use. Another limitation is that this and previous studies utilized different methodology to describe substance use among pediatric trauma patients; some only use medical chart reviews, others have only investigated alcohol use, and others have assessed risky alcohol and/or drug use. A third limitation is that for those that screen negative, we did not collect the method of screening and were unable to discern if they had screen negative by CRAFFT screen and/or toxicology screens. Also, some adolescents initially screen positive for alcohol or marijuana use but then later deny use. This may have occurred due to fear this information would be discoverable by parents or others, despite our assurance of confidentiality. Even given these limitations, these results support that both laboratory screening

for substance use at the time of admission and use of a screening instrument (like the CRAFFT) may be necessary for all adolescent admissions to capture a complete picture of alcohol and drug use.

CONCLUSION

It is challenging to consistently complete optimal screening for alcohol and drug use among admitted adolescent trauma patients. Yet it is important for practitioners to capture alcohol and drug use at time of admission (laboratory toxicology screen) and current/past use (substance use questionnaires) to best understand the needs of the trauma patient. Implementation studies are needed to identify best practices for institutional adherence to the S (screening) portion of mandated SBIRT policy in pediatric trauma centers.

ACKNOWLEDGEMENTS

This study was supported through funding by NIAAA 1R21AA024185 to Michael J. Mello.37

REFERENCES

1. CDC. Trends in the Prevalence of Alcohol Use National YRBS: 1991-2015 CDC. 2015.
2. Watt K, Purdie DM, Roche AM, McClure R. Injury severity: role of alcohol, substance use and risk-taking. Emerg Med Australas. 2006; 18: 108-117.
3. U.S. Preventative Services Task Force. Screening and behavioral counseling interventions in primary care to reduce alcohol misuse: recommendation statement. 2004.
4. CDC. Alcohol and other drug problems among hospitalized trauma patients: controlling complications, mortality, and trauma recidivism – conference proceedings. 2007.
5. NHTSA. Toward a comprehensive strategy to stop impaired driving: alcohol screening and brief intervention overview. Washington. DC. 2005.
6. American College of Surgeons Committee on Trauma. Resources for Optimal Care of the Injured Patient. Chicago, IL2014. Yuma-Guerrero PJ, Lawson KA, Velasquez MM, von Sternberg K, Maxson T, Garcia N. Screening, brief intervention, and referral for alcohol use in adolescents: a systematic review. Pediatrics. 2012; 130: 115-122.
7. Mello MJ, Becker SJ, Bromberg J, Baird J, Zonfrillo MR, Spirito A. Implementing Alcohol Misuse SBIRT in a National Cohort of Pediatric Trauma Centers-a type III hybrid effectiveness-implementation trial. Implementation Science. 2018; 13: 35.
8. Mello MJ, Bromberg J, Baird J, Nirenberg T, Chun T, Lee C, et al. Translation of alcohol screening and brief intervention guidelines to pediatric trauma centers. J Trauma Acute Care Surg. 2013; 75: S301-307.
9. de Looze M, Pickett W, Raaijmakers Q. Early Risk Behaviors and Adolescent Injury in 25 European and North American Countries: a Cross-National Consistent Relationship. J Early Adol. 2011; 31: 104-125.
10. Ehrlich PF, Maio R, Drongowski R, Wagaman M, Cunningham R, Walton MA. Alcohol interventions for trauma patients are not just for adults: justification for brief interventions for the injured adolescent at a pediatric trauma center. J Trauma. 2010; 69: 202-210.
11. Maung AA, Becher RD, Schuster KM, Davis KA. When should screening of pediatric trauma patients for adult behaviors start? J Trauma Surg Acute Open. 2018; 3: e000181.

12. Johnson KN, Raetz A, Harte M, et al. Pediatric trauma patient alcohol screening: a 3 year review of screening at a Level I pediatric trauma center using the CRAFFT tool. *J Pediatr Surg.* 2014; 49: 330-332.
13. Knight JR, Sherritt L, Shrier LA, Harris SK, Chang G. Validity of the CRAFFT substance abuse screening test among adolescent clinic patients. *Arch Pediatr Adolesc Med.* 2002; 156: 607-614.
14. Harris P, Taylor R, Thielke R, Payne J, Gonzalez N, Conde J. Research electronic data capture (REDCap) – A metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform.* 2009; 42: 377-381.
15. Harris KM, Udry J. Richard. National Longitudinal Study of Adolescent to Adult Health (Add Health), 1994-2008 [Public Use]. 2017.
16. Spirito A. Reliability data on the Drug Use Questionnaire Providence, RI: Brown University. 2001.
17. Nicolson NG, Lank PM, Crandall ML. Emergency department alcohol and drug screening for Illinois pediatric trauma patients, 1999 to 2009. *Am J Surg.* 2014; 208: 531-535.

Cite this article

Mello MJ, Bromberg JR, Wills H, Gaines BA, Lapidus G, et al. (2018) Alcohol and Other Drug Use in a Sample of Admitted Adolescent Trauma Patients. *J Subst Abuse Alcohol* 6(2): 1077.