



## Short communication

## An intensive assessment of alcohol use and emergency department utilization in homeless alcohol-dependent adults



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## ABSTRACT

**Background:** Excessive alcohol use among the homeless may contribute to their high rates of emergency department use. Survey-based studies have provided some information on the relation between alcohol and emergency department use among the homeless.

**Methods:** This study used an intensive schedule of random breath collections and self-report assessments to examine the relation between emergency department utilization and alcohol use in homeless alcohol-dependent adults. Data were from homeless alcohol-dependent adults (N = 116) who were participating in a therapeutic workplace that provided job-skills training every weekday for 26 weeks. Breath-sample collections and assessments of self-reported alcohol use were scheduled each week, an average of twice per week per participant, at random times between 9:00 A.M. and 5:00 P.M. Participants received \$35 for each breath sample collected. Self-reports of emergency department use were assessed throughout the study.

**Results:** Thirty-four percent of participants reported attending an emergency department and reported an average of 2.2 emergency department visits (range 1–10 visits). Alcohol intoxication was the most common reason for emergency department use. Participants who used the emergency department had significantly more alcohol-positive breath samples and more self-reported heavy alcohol use than participants who did not use the emergency department.

**Conclusions:** This study provided a rare intensive assessment of alcohol and emergency department use in homeless alcohol-dependent adults over an extended period. Emergency department use was high and was significantly related to indices of alcohol use.

### 1. Introduction

People who are homeless face numerous barriers to accessing health care and use acute care services, such as emergency departments, at high rates (Kushel et al., 2001, 2002; Martinez and Burt, 2006; Larimer et al., 2009). Compared to the general population, people who are homeless are three to four times more likely to have at least one emergency department visit annually (Kushel et al., 2001, 2002), and are more likely to be repeat emergency department users (Doran et al., 2013; Ku et al., 2010; Mandelberg et al., 2000). Heavy use of the emergency department in general can be problematic because it contributes to high health care costs and inefficiency (Adams, 2013). Identification of the reasons for the high rates of emergency department use among the homeless could be used to guide interventions to reduce costs, improve quality of care, and address unmet health care needs.

One factor that may be particularly relevant to the high rates of emergency department use among the homeless is excessive alcohol use. Problematic alcohol use is common among the homeless; some estimates show that as many as half of homeless adults are dependent on alcohol (Fazel et al., 2008). Studies of emergency department use among the homeless have provided some information on the relation between alcohol and emergency department use. In a survey-based study with 2578 homeless adults, repeated (4 or more visits in the previous year) emergency department use was associated with self-reported alcohol or drug problems (Kushel et al., 2002). In another study that examined Medicaid administrative data from 6494 homeless adults, alcohol-related disorders were the most common reason for an emergency department visit (Lin et al., 2015). In contrast to these studies, a secondary analysis of survey data from 2974 homeless adults did not find an association between alcohol abuse and emergency

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department use (Kushel et al., 2001). To further explore the relation between alcohol and emergency department use among the homeless, the present study focused on a sample of homeless adults with known alcohol use problems. The present study used an intensive longitudinal schedule of random breath-alcohol collections and self-report assessments to examine the relation between emergency department utilization and measures of alcohol use in homeless alcohol-dependent adults.

## 2. Material and methods

### 2.1. Design and description of the main trial

Data for this analysis were collected during a randomized clinical trial that evaluated whether a therapeutic workplace could promote alcohol abstinence in homeless and unemployed alcohol-dependent adults. The therapeutic workplace is an employment-based intervention designed to promote drug and alcohol abstinence and education and job skills in individuals with chronic unemployment and drug and alcohol addiction. Participants were invited to work in the therapeutic workplace for 26 weeks and were randomized to one of three conditions: a control condition that offered job-skills training in the therapeutic workplace and two experimental conditions – one assessing the impact of payment for participation in training and one assessing the impact of requiring alcohol abstinence to access paid training. The primary outcome measures and detailed methods have been reported previously (Koffarnus et al., 2011). Methods relevant to the present analysis are provided below.

### 2.2. Participants

Participants were recruited from an inpatient detoxification unit and community agencies that provided services to the homeless in Baltimore, MD. Participants were at least 18 years old, were unemployed, met DSM-IV criteria for alcohol dependence, and reported that they were currently homeless (i.e., stayed in a shelter, on the street, or in an abandoned house at least one night over the past 30 days; lost public housing assistance recently or were at risk of losing residence; or slept in more than two places over the past 30 days).

### 2.3. Breath sample collection and testing

Randomly-scheduled breath samples were collected and tested to provide a biological measure of alcohol use. On average, two breath samples were randomly scheduled per week for each participant during the hours of 9:00 A.M to 5:00 P.M. At scheduled times, research staff would call or page participants on cell phones or pagers that were assigned to them at the start of the study. If research staff were able to collect a breath sample from the participants within 60 min of phone or page contact, the participant received a \$35 voucher that was exchangeable for goods and services. Community/field visits were used for some of the breath-sample collections if the participant was not attending the therapeutic workplace at the time the collection was scheduled. Breath samples were tested for alcohol using an Alco-Sensor III device.

### 2.4. Self-reports of alcohol and emergency department use

Self-reported alcohol use was assessed at each randomly-scheduled breath sample collection. Participants were asked whether they consumed any alcohol during the 24 h prior to the collection and if so, whether they engaged in heavy drinking ( $\geq 4$  drinks for women and  $\geq 5$  drinks for men). Self-report of a visit to the emergency department was collected and documented for adverse event reports. Adverse events were collected as a part of routine study assessments conducted each month and throughout the study, whenever therapeutic workplace staff had contact with participants. Because participants could attend

the therapeutic workplace every weekday, workplace staff had frequent opportunities to monitor emergency department use.

### 2.5. Data analyses

Breath samples with a blood alcohol level (BAL) greater than or equal to 0.004 g/dl were considered positive for alcohol. Heavy drinking was defined as 4 or more drinks for women and 5 or more drinks for men in a 24-h period. Two methods of handling missing data were used, in which breath collections and self-report assessments that were scheduled but not collected were considered missing (missing) or were coded as the adverse outcome (missing positive). Unpaired *t*-tests were conducted to compare alcohol use among participants who did and did not use the emergency department. Mixed-effects longitudinal logistic regression was used to determine the odds of an emergency department visit as a function of alcohol use in the preceding week. Alcohol use across a week was used as the predictor in the longitudinal logistic regression because it allowed for the inclusion of both of the weekly randomly scheduled breath-sample collections. Statistically significant differences were assessed at a significance level of 0.05.

## 3. Results

### 3.1. Participant demographics

The sample was predominantly male (80%) and white (51%), with an average age of 43.0 (SD = 8.7) years. At intake, all participants met DSM-IV criteria for alcohol dependence and reported an average of 23.7 (SD = 8.1) drinking days out of the past 30 days and an average of 24.7 (SD = 16.7) drinks per drinking day in the past 30 days. All participants were currently homeless and reported that they stayed or slept in a recovery house or homeless shelter on an average of 5.3 (SD = 9.3) days out of the past 30 days and stayed or slept on the street an average of 13.6 (SD = 12.1) days out of the past 30 days.

### 3.2. Frequency of and reasons for emergency department visits

A total of 39 out of the 116 participants (34%) reported receiving care in an emergency department. Of these 39 participants, 59% reported having had one emergency department visit, 21% reported 2 or 3 visits, and 21% reported 4 or more visits. On average, these participants made 2.2 emergency department visits (range 1–10 visits) during the study period. A total of 86 emergency department visits were made. Alcohol intoxication was the most common reason for an emergency department visit (number of visits = 25; 29.1%), followed by medical problems ( $n = 16$ ; 18.6%), seizure ( $n = 15$ ; 17.4%), rape or assault ( $n = 14$ ; 16.3%), psychological problems ( $n = 10$ ; 11.6%), alcohol withdrawal ( $n = 4$ ; 4.7%), and drug or medication overdose ( $n = 2$ ; 2.3%).

### 3.3. Emergency department visits and alcohol use

Fig. 1 shows the relation between emergency department visits and measures of alcohol use for the missing-missing (A) and missing-positive (B) analyses. The percentage of alcohol-positive breath samples was significantly higher for participants who used the emergency department compared to participants who did not [missing missing:  $t(114) = 3.711$ ,  $p < 0.001$ ; missing positive:  $t(114) = 2.822$ ,  $p = 0.006$ ]. The percentage of randomly-scheduled assessments at which participants reported heavy drinking in the prior 24 h was significantly higher for participants who used the emergency department compared to participants who did not [missing:  $t(114) = 2.762$ ,  $p = 0.007$ ; missing positive:  $t(114) = 2.482$ ,  $p = 0.015$ ]. Sixty-five percent of the scheduled breath samples were collected and 31% were positive for alcohol. The percentage of samples collected did not significantly differ between participants who did and did not use the

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