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Characterizing Alcohol Use Behaviors among Homeless Men and Women

Julie Neisler, MS [Graduate Student and joint first author],

University of Houston, Department of Psychological, Health, & Learning Sciences, Houston, TX.

Sonakshee Shree, MPH [Research Assistant and joint first author],

University of Houston, Department of Psychological, Health, & Learning Sciences, Houston, TX.

Lorraine R. Reitzel, PhD [Associate Professor],

University of Houston, Department of Psychological, Health, & Learning Sciences, Houston, TX.

Tzu-An Chen, PhD [Assistant Professor],

University of Houston HEALTH Research Institute, Houston, TX.

Darla E. Kendzor, PhD [Associate Professor],

University of Oklahoma Health Sciences Center, Oklahoma Tobacco Research Center, Oklahoma City, OK.

Ezemenari M. Obasi, PhD [Professor],

University of Houston, Department of Psychological, Health, & Learning Sciences, Houston, TX.

Quentaxia Wrighting, BS [Research Data Coordinator], and

MD Anderson Cancer Center, Department of Behavioral Sciences, Houston, TX.

Michael S. Businelle, PhD [Associate Professor]

University of Oklahoma Health Sciences Center, Oklahoma Tobacco Research Center, Oklahoma City, OK.

Abstract

Objectives: This study characterized alcohol use behaviors by sex among sheltered homeless adults and explored associations with health and readiness to change drinking behaviors.

Methods: Participants (N=581; 63.7% men; $M_{age}=43.6$, 29.4% White) self-reported alcohol use and readiness to change drinking behaviors. Sex differences were analyzed via Wilcoxon rank-sum, Chi-Square tests, logistic regression, and ANCOVAs.

Results: Overall, 38.5% of the sample met criteria for current at-risk drinking, 39.7% self-reported a history of alcohol problems, and 22.9% reported having a formal alcohol use disorder (AUD) diagnosis. Among current alcohol users, 83.8% reported at-risk drinking. Men had more

Correspondence: Dr Reitzel; lreitzel@uh.edu.

Human Subjects Statement

The Institutional Review Boards at the University of Oklahoma Health Sciences Center and the University of Houston approved this study. Informed consent for all study procedures was obtained before data collection.

Conflicts of Interest Statement

Authors have no competing interests pertaining to this research.

drinks per drinking day, more drinks per week, and more drinking days per week when compared to women. No sex differences were found on at-risk drinking, self-reported alcohol problems, probable alcohol abuse/dependence, AUD diagnosis, readiness to change drinking, or recent alcohol/substance abuse counseling.

Conclusions: High rates of at-risk drinking were found among alcohol users. Homeless men and women did not exhibit differences in several manifestations of problematic alcohol use. Alcohol use interventions might be equally appealing to both sexes given equivalent readiness to change drinking; however, rates of recent treatment receipt were low.

Keywords

alcohol use; homelessness; drinking behaviors; self-reported health; alcohol dependence; sex

INTRODUCTION

Approximately 2.3–3.5 million individuals in the United States experience homelessness annually.¹ According to the Department of Housing and Urban Development (HUD), in 2016 over half a million individuals (39.5% of whom are women) experienced homelessness in the United States in a single night.² Alcohol use problems are prevalent among individuals who are homeless,^{3,4} at rates up to 8 times greater than that found among domiciled adults,^{5–9} and are linked to increased rates of premature mortality and morbidity in this disadvantaged population.^{10–13} For example, a large-scale study of nearly 30,000 individuals comparing Boston Health Care for the Homeless Program (BHCHP) and the Massachusetts adult population from 2003–2008 showed that alcohol attributable mortality rates in the BHCHP population were 6–8 times higher among homeless men and 6–10 times higher among homeless women than those among domiciled adults.¹⁰

Alcohol use problems include both risky alcohol use and alcohol dependence. Risky or hazardous alcohol use is defined as a quantity or pattern of alcohol consumption that places individuals at risk for adverse health events.¹⁴ As defined by the Centers for Disease Control and Prevention, at-risk drinking is defined as consuming >14 drinks per week for men and >7 drinks per week for women or 5 drinks in a drinking episode in the past 30 days for men and 4 drinks for women.¹⁵ While at-risk drinking includes binge drinking,¹⁶ it also includes high frequency drinking in lower quantities, both of which can progress to alcohol use disorders, which include alcohol abuse and dependence.^{5,17} Several recent studies indicated that 20%–31% of homeless adults endorse such alcohol related problems.^{3,4,7}

Few studies have contrasted alcohol use problems among homeless men and women in the United States. For example, while research has explored drinking patterns solely among homeless men^{8,18,19} and homeless women,^{20–22} the statistical comparison between the 2 sexes, particularly from the same sample, has undergone little exploration. Improving the understanding of differences and similarities for alcohol use and misuse among homeless men and women is important, however, as it informs improvements in service planning and service utilization.

In the United States, less than one fourth of individuals who need substance abuse treatment receive it; this deficit is worse for homeless adults due to the realities of structural and interpersonal barriers related to homelessness.²³ Notably, more than half of homeless adults who use alcohol have no intention to quit or take steps toward quitting within the next 6 months.^{7,24,25} In a recent study of 394 homeless adults who were receiving services at a large Dallas (TX) based shelter, homeless adults were least inclined to address risky alcohol use compared with other risky health behaviors (eg, cigarette smoking, insufficient fruit and vegetable consumption, insufficient physical activity), with only 32.8% indicating a desire to change alcohol use versus 51.7%–67.2% indicating a desire to change other health risk behaviors.⁷ However, little research has examined potential sex differences in the receipt of intervention for substance abuse among homeless samples.

The purpose of the current study was to characterize alcohol use problems by sex among a large sample of homeless adults and to explore associations of sex with readiness to change drinking behaviors and recent receipt of substance abuse counseling. We hypothesized that various manifestations of alcohol use problems would be prevalent among this sample and within each sex, as demonstrated in prior literature,^{3,4} with the potential for differences between the sexes, as is commonly the case with domiciled samples.^{17,26} Findings have the potential to provide insight into differences in drinking behaviors and readiness to change among homeless men and women, as well as to provide information about unaddressed needs and offer guidance for targeting limited intervention services within this vulnerable group.

METHODS

Participants

Participants were adults recruited from 6 homeless serving agencies in Oklahoma City, OK. Flyers posted at these agencies advertised the need for volunteers for a study focused on the identification of “common health problems and unhealthy behaviors among adults who receive services at Oklahoma City homeless shelters.” Eligibility criteria included: aged 18 years or older, a > 6th grade English literacy level on the Rapid Estimate of Adult Literacy in Medicine-Short Form (REALM-SF),²⁷ and the receipt of services (eg, food, shelter, counseling) at the targeted agencies.

In total, 648 individuals were screened for the study, but 38 individuals were deemed ineligible for participation due to inadequate literacy scores. Thus, 610 individuals were enrolled in the study. Of the enrolled participants, 29 were excluded from the analyses because they were considered housed based on responses to questions “Where did you sleep last night” (ie, selecting “My personal apartment or house”), “Are you currently homeless” (ie, selecting “No”), current months homeless, and/or endorsing “I am not currently homeless” to the question “What are the reasons for your current homelessness.” The remaining 581 homeless participants comprised the analytic sample.

Procedures

Data collection occurred at each of the 6 agencies. The names of interested individuals were collected and cross-checked against a list of participants to ensure that the same individual did not participate more than once across recruitment sites. Potential participants were screened for eligibility at each location. Participants were enrolled following the provision of verbal informed consent (approval for a waiver of documentation of informed consent was granted). Study staff interacted with participants through the enrollment process, including the verbal component of the REALM-SF and the interactive informed consent; individuals who were not competent to provide informed consent for the study participation, which would include those who were intoxicated, were excluded from the study. Enrolled participants completed a computerized survey that was administered via tablet. The survey software read each study question aloud and participants selected a response by using the tablet touch screen. Participants were recruited and data were collected between July and August of 2016. There were no direct identifiers associated with survey responses, and the list of participants' names were destroyed after 610 unique adults were enrolled in the study. As remuneration for participation, individuals received a \$20 department store gift card.

Measures

Demographics and self-rated health.—Participants reported their age, sex, ethnicity/race, educational attainment, and number of months spent homeless during their lifetime (“What is the total amount of time you have been homeless in your lifetime?”).

Participants rated their health in general using a 5-point scale which ranged from excellent, very good, good, fair, or poor, with lower scores indicating fair or poor health.^{28,29} Poor self-rated health is linked to mortality, morbidity, disability status, and race/ethnic disparities in the general population,^{28,30,31} and has been used within homeless samples to assess health status.^{7,32–34}

Alcohol use problems.—Alcohol use frequencies and quantities were assessed using the Alcohol Quantity and Frequency Questionnaire,³⁵ a self-report measure of average alcohol consumption on each day of the week over the last 30 days. Inquiries were accompanied by visual images of what constituted 1 standard drink (ie, 4–5-ounce glass of wine, shot of liquor, 12-ounce beer). Variables yielded from this measure included: average number of drinks consumed per drinking day; total number of drinks consumed per week; and number of drinking days per week. At-risk drinking, also partially calculated from this measure, was defined as consuming >14 drinks per week for men or >7 drinks per week for women¹⁵ or meeting criteria for binge drinking, which was having endorsed consuming 4 or more standard drinks if female or 5 or more standard drinks if male over the last 30 days.¹⁶

“Alcohol Problems” were defined by answering “yes” to the following question: “Have you ever had an alcohol problem?” and was designed to tap into insight about potential alcohol misuse. “Probable Alcohol Dependence/Abuse” over the preceding 6 months was assessed using the Patient Health Questionnaire (PHQ), a 5-item self-administered screening instrument that uses diagnostic criteria from the DSM-IV and was meant to capture true diagnostic cases in the sample.³⁶ A previous history of “Alcohol Use Disorder Diagnosis”

was defined as selecting “Alcohol Use Disorder” in response to the question: “Which Substance Use Disorder(s) have you been diagnosed with?” and was meant to potentially assess access to care for alcohol use at some point over the lifetime.

Readiness to change.—Readiness to change alcohol use was assessed among alcohol users using an 8-point Contemplation Ladder where 1 = “I enjoy drinking and have decided not to reduce my drinking for my lifetime. I have no interest in cutting down;” 2 = “I never think about reducing my drinking, and I have no plans to cut down;” 3 = “I rarely think about reducing my drinking, and I have no plans to cut down;” 4 = “I sometimes think about reducing my drinking, and I have no plans to cut down;” 5 = “I often think about reducing my drinking, but I have no plans to cut down;” 6 = “I definitely plan to reduce my drinking within the next 6 months;” 7 = “I definitely plan to reduce my drinking within the next 30 days;” and 8 = “I drink alcohol, but I have begun to change, like cutting back on how many drinks I have each day.” This item was only administered to alcohol users in the sample.

Receipt of alcohol/substance abuse counseling.—Participants were asked if they received counseling for alcohol or other substance abuse over the preceding 3 months. This item was only administered to alcohol users in the sample.

Analyses

Descriptive statistics were calculated for participant characteristics and other variables of interest. Comparisons by sex for the whole sample and for alcohol users only were performed using Wilcoxon rank-sum tests or Chi-square tests for continuous and categorical variables, respectively. Participants were identified as alcohol users if they reported consuming any alcohol (including beer and wine) on an average day within the last 30 days or endorsed a binge drinking episode (> 4 drinks for women and > 5 drinks for men) within the last 30 days. To assess differences by sex, logistic regressions and Analysis of Covariance (ANCOVA) adjusting for length of time homeless, self-rated health, and race were performed as appropriate. Logistic regression analyses were conducted to examine differences by sex in at-risk drinking, self-reported alcohol problems, probable alcohol abuse/dependence and alcohol use disorder diagnosis for both entire sample and alcohol users only. In logistic regression analysis, estimates were expressed as odds ratios (OR) with 95% confidence intervals (CIs). ANCOVAs were carried out on number of drinks per week, number of drinking days per week, number of drinks per drinking day, and readiness to change alcohol use for alcohol users. Separate models were used for each criterion variable of interest, and significance level was set at 0.05. All analyses were conducted using SAS 9.4.³⁷

RESULTS

Descriptives and Associations of Interest in the Full Sample

Table 1 provides the Descriptive statistics for the 581 participants in the study. Men comprised 63.7% (N = 370) of the sample. The average age was 43.6 ($\pm$ 12.2) years old, 56.4% were White, participants reported 11.9 ($\pm$ 2.0) years of education, and 42.4 ($\pm$ 51.3) months of homelessness over the lifetime. A further demographic breakdown is as follows:

White (56.4%), African American (19.97%), American Indian/Alaska Native (11.8%), multi-racial (9.2%), other (1.6%), native Hawaiian/Other Pacific Islander (0.7%), and Asian (0.4%). Most of the participants were born in Oklahoma (52.6%), grew up in greater Oklahoma City (52.4%), and planned to live in Oklahoma for next 12 months (95.3%). More than one-third of participants rated their health as fair or poor (36.4%, $N = 211$). Sex comparisons for the overall sample ($N = 581$) indicated that women were significantly younger ($p < 0.01$), were homeless for a shorter length of time ($p < 0.01$) and were more likely to report fair or poor health than men (42.9% vs. 32.7%, $p < 0.05$).

Overall, 38.5% of the full sample ($N = 222$) met the criteria for at-risk drinking. Additionally, 39.7% ($N = 230$) endorsed ever having an alcohol problem, 27.3% ($N = 158$) had probable alcohol abuse/dependence within the past 6 months based upon their responses to PHQ items,³⁶ and 22.9% ($N = 133$) reported that they had been previously diagnosed with an alcohol use disorder. Women were significantly less likely to have at-risk drinking (27.6% vs. 44.7%, $p < 0.001$), report having a history of problems with alcohol (28.6% vs. 46.1%, $p < 0.001$), past 6-month probable alcohol abuse/dependence (19.1% vs. 32.1%, $p < 0.001$) or a previous alcohol use disorder diagnosis (17.1% vs. 26.2%, $p < 0.05$) relative to men. The adjusted odds ratios in logistic regression analyses are shown in Table 2. Compared with men, women were significantly less likely to have at-risk drinking (OR: 0.497, 95% CI: 0.341 – 0.724, $p < 0.001$), self-reported alcohol problem (OR: 0.465, 95% CI: 0.319 – 0.676, $p < 0.001$), probable alcohol abuse/dependence (OR: 0.497, 95% CI: 0.328 – 0.754, $p < 0.01$), and alcohol use disorder diagnosis (OR: 0.610, 95% CI: 0.395 – 0.942, $p < 0.05$).

Descriptives and Associations of Interest in the Alcohol Users

Descriptive statistics for alcohol users ($N = 265$, 45.6% of the sample, 71.7% men) are provided in Table 3. Among this subset, the average age was 43.97 (± 11.6) years old, 49.4% were White, participants reported 11.8 (± 1.9) years of education, and 45.5 (± 52.6) months of homelessness over the lifetime. The proportion of alcohol users who reported fair or poor health was 35.5% ($N = 94$), which was similar to the overall sample (36.4%). Alcohol users reported a total of 22.6 (± 23.1) drinks per week, 4.3 (± 2.5) drinking days per week over the past 30 days, and an average of 4.4 (± 3.3) drinks per drinking day.

Over three fourths (83.8%) of alcohol users met the criteria for at-risk drinking. About half (50.8%) self-reported ever having had an alcohol problem and a similar proportion (49.8%) responded to PHQ items suggesting probable alcohol use/dependence over the past 6 months. However, only 29.8% had a history of an alcohol use disorder diagnosis. Alternatively, 16.2% ($N = 43$) of alcohol users did not meet criteria for at-risk drinking. Among those participants ($N = 43$), 11.9% ($N = 5$) had a self-reported alcohol problem and 23.63% ($N = 10$) had probable alcohol abuse/dependence. The average score on the Readiness to Change alcohol use scale was 5.4 (± 2.5), which falls between “I often think about reducing my drinking, but I have no plans to cut down” and “I definitely plan to reduce my drinking within the next 6 months.” The majority (82.6%) of alcohol users, however, reported they received no alcohol/substance abuse counseling in the last 3 months.

Of the alcohol users, 49.4% reported being White, 23.4% African American, 15.3% American Indian/Alaska Native, 9.96% mixed ethnic heritage, 0.8% Native Hawaiian/Other Pacific Islander, 0.8% other, and 0.4% Asian. Most of the alcohol drinkers were born in Oklahoma (55.2%), grew up in greater Oklahoma City (55.94%), and planned to live in Oklahoma for next 12 months (94.2%). There were no significant differences between male and female alcohol users on age, ethnicity, and educational attainment. As was the case in the sample overall, women were homeless for a significantly shorter length of time (32.3 vs. 50.7 months, $p < 0.05$) and were more likely to report fair or poor health (48.0% vs. 30.5%, $p < 0.01$) relative to men. Female alcohol users reported consuming significantly fewer drinks per week (16.5 vs. 24.99, $p < 0.01$), having fewer drinking days per week (3.7 vs. 4.6, $p < 0.05$), and fewer average drinks per drinking day (3.6 vs. 4.7, $p < 0.05$). However, there were no significant differences between women and men on meeting criteria for at-risk drinking (77.3% vs. 86.3%), having a self-reported history of alcohol problems (42.7% vs. 53.97%), past 6 months probable alcohol abuse/dependence (45.3% vs. 51.6%), history of an alcohol use disorder diagnosis (26.7% vs. 31.1%), recent participation in alcohol/substance abuse counseling (12.0% vs. 19.5%) or readiness to change alcohol use (5.97 vs. 5.3).

ANCOVA adjusted means showed that after adjusting for lifetime months homeless, self-rated health and race, significant differences between men and women seen in unadjusted analyses were maintained in the number of drinks per week (25.1 vs. 17.6, $p < 0.05$), number of drinking days per week (4.6 vs. 3.8, $p < .05$), and number of drinks per drinking day (4.7 vs. 3.7, $p < .05$). See Table 4.

The adjusted odds ratios in logistic regression analyses and are shown in Table 5. The results of these covariate adjusted logistic regression analyses were similar to the unadjusted results, in that there were no sex differences in rates of at-risk drinking, self-reported alcohol problems, probable alcohol abuse/dependence, alcohol use disorder diagnosis, and receipt of alcohol/substance abuse counseling. See Table 5.

DISCUSSION

A major purpose of this work was to examine the prevalence of various manifestations of alcohol use problems, both present day and by history, among a sample of homeless adults. Expansion of the current knowledge base in this area is vital to the understanding of alcohol use and misuse patterns among a marginalized group, which can provide valuable insight to be used in service planning and implementation. Consistent with prior literature,^{3,4} this research demonstrated that alcohol use problems were common. Specifically, over one third (38.5%) of the sample endorsed at-risk drinking¹⁵ in the previous 30 days, while almost 40% of the sample endorsed having had a history of alcohol problems. Rates of past 6 month probable alcohol abuse/dependence (via PHQ³⁶) among this sample of homeless adults was nearly 6 times the rate of abuse/dependence among domiciled individuals aged 15+ in the United States (27.3% vs. 4.7%).³⁸ Likewise, this sample reported a nearly 4 times greater rate of having been diagnosed with an alcohol use disorder (AUD; 22.9%) than domiciled adults in the United States (6.2%).⁹ Results confirm that homeless adults are vulnerable to high rates of alcohol misuse, and suggest a high need for intervention service provision within settings accessible to this group.

It is interesting to note that a greater proportion of individuals self-reported prior problems with alcohol (39.7%) than individuals who met criteria for past 6-month PHQ probable alcohol abuse/dependence (27.3%);³⁶ further still, an even smaller proportion of individuals responded to having a prior AUD diagnosis (22.9%). This suggests that participants may perceive themselves as having a problem with alcohol that does not yet meet the DSM-IV criteria for probable alcohol abuse/dependence or may be evaluating “problem” beyond the 6-month criteria of the PHQ. As expected, formal rates of AUD were lower than probable alcohol abuse/dependence, suggesting that many individuals with alcohol use problems are not diagnosed or are unaware of their diagnoses.

Additionally, there was a small subset of the sample (N = 15) who indicated engaging in binge drinking¹⁶ but who endorsed an average alcohol consumption of 0 drinks on each day of the week over the last 30 days. This suggests that while participants may drink no alcohol beverages on an *average* day, they may still binge drink on occasion. As noted, binge drinking is a type of at-risk drinking,¹⁵ and even if drinking in these quantities is atypical, it is associated with several negative adverse health events.¹⁴ Therefore, it is crucial that clinicians and patient providers inquire into both frequency of average/typical alcohol consumption as well as specific alcohol misuse behaviors, such as binge drinking.

Among alcohol users, over 80% met the criteria for at-risk drinking, and about half reported prior problems with alcohol and PHQ probable alcohol abuse/dependence.³⁶ Similar to the comparison with the entire sample, rates of formal AUD diagnosis (29.8%) were lower than past 6-month PHQ probable alcohol abuse/dependence (49.8%) among alcohol users. Moreover, the overlap rates between problematic alcohol use was high: 53 participants (20.0%) who endorsed alcohol use in the prior 30 days endorsed all 3 historical alcohol use problem items: a prior AUD diagnosis, past 6-month PHQ probable alcohol abuse/dependence, and having a prior problem with alcohol. Over half of the participants who met criteria for at-risk drinking (N = 222) also responded to PHQ items suggesting probable alcohol use/dependence over the past 6 months (N = 122). Again, results point to a very high prevalence of misuse among users that may warrant intervention, and suggest that diagnoses are not being communicated by treatment professionals or that at-risk individuals are not being seen in formal treatment settings where diagnoses are common.

It is important to consider that self-reported alcohol problems, probable alcohol abuse/dependence, and AUD diagnosis could be based on historical data. Thus, some individuals endorsing these constructs may not have been categorized as current alcohol users, which was based on past 30 day use. This may suggest that individuals with historical problems with alcohol have been recently abstaining from recent alcohol use. For those who endorsed having a historical problem with alcohol, there were 94 individuals who indicated prior problems with alcohol use but did not endorse any alcohol use in the last 30 days, 17 individuals met criteria for probable alcohol abuse/dependence in the prior 6 months but did not endorse any alcohol use in the last 30 days, and 45 individuals who have received a prior AUD diagnosis but did not endorse any alcohol use in the last 30 days. As expected, a majority of participants overlapped for all 3 historical questions.

The average readiness to change alcohol use reflected a value between “I often think about reducing my drinking, but I have no plans to cut down” and “I definitely plan to reduce my drinking within the next 6 months.” These results are consistent with other studies that have indicated that a majority of homeless alcohol users have no immediate intention to quit or reduce their drinking.^{7,24,25} This may explain why only about one-sixth of participants who reported drinking in the past 30 days, a majority of whom consumed quantities of alcohol placing them at risk for adverse health events,¹⁴ reported that they attended alcohol/substance abuse counseling within the past 3 months. It is unclear why many individuals in this sample were not interested in changing alcohol use in the immediate future, although ambivalence about behavior change is not uncommon among individuals with addictions and motivation to alter behavior may fluctuate from day to day or even from moment to moment depending on contextual and internal cues.^{39,40} Therapeutic approaches to enhancing intrinsic motivation for change may be helpful to move individuals with alcohol use problems closer to behavioral change enactment.^{39,40} It is also important to note that low rates of recent treatment receipt in the face of high at-risk alcohol use may also reflect a dearth of interventions available or accessible to this group.

Another primary purpose of this study was to examine sex differences in alcohol use problems, readiness to quit, and receipt of recent intervention among this sample. This work is of particular interest given the resurging practice of considering sex bound factors in alcohol abuse prevention and treatment strategies. Findings highlight interesting differences and similarities in drinking patterns among homeless men and women. Men drank more drinks per drinking day and more drinks per week on more drinking days per week when compared to women, which might be expected based on their greater body mass, etc. However, alcohol users showed no sex differences on prior history of alcohol problems, at-risk drinking, probable current alcohol abuse/dependence, and previous AUD diagnosis. This is a departure from prior studies of domiciled individuals, which shows among that men are more likely than women to have alcohol use problems and disorders among 12-month alcohol users.^{17,26} Moreover, it highlights that sex differences in problematic alcohol use among a homeless sample overall disappear when only alcohol users are examined.

While much research has explored drinking patterns solely among homeless men^{8,18,19} or among homeless women^{20–22} in the United States, the statistical comparison of homeless men and women alcohol users from the same sample (rather than comparing descriptives from separate research studies / samples) adds to the health behavior literature in this area. Moreover, this study provides additional evidence that homelessness may correlate with poor substance abuse treatment uptake²³ and elucidates a potential need for adequate substance abuse programs for alcohol use in homeless shelters. This was the case for both male and female alcohol users in this study, who endorsed very low recent treatment receipt with no differences by sex (19.5% for men and 12.0% for women) relative to the 83.8% at-risk drinking rates in the sample. Given that homeless women may prefer to receive intervention separately from men,^{22,41} these findings suggest that service planning should take into account the adequate availability of intervention groups by sex (ie, potentially more offerings than overall rates of readiness to quit might suggest). Aside from therapeutic interventions, other promising interventions (eg, case management, housing first) should be considered to address high alcohol misuse rates among homeless individuals.^{42–44} Of

course, the extent to which this lack of sex difference in multiple manifestations of alcohol misuse generalizes to other homeless samples warrants further study. However, null results on sex differences among this homeless sample may reflect high use as a coping mechanism among both sexes,⁴⁵ misconceptions about what constitutes an alcohol problem and/or a probable alcohol abuse/dependence, or lack of formal diagnosis due to inadequate access to regular healthcare services.⁴⁶ Each of these potential mechanisms, as applicable, can be addressed within the context of clinical intervention services (eg, activation of alternative coping mechanisms, provision of normative feedback, diagnostic evaluation conduct).

Finally, it is also interesting that despite significantly higher overall drinking rates for men, they were more likely to self-rate their health as excellent, very good, or good (vs. fair or poor) as compared to women. This was in spite of being homeless for longer than women, which is associated with lower objective evaluations of health.^{12,47} Prior research supports that women report worse health statuses but exhibit lower mortality;⁴⁷ it is theorized this is due to women's judgments being based on a wider range of health-related factors (including both life-threatening and non-life threatening disease) and women's differing perceptions of victimization experiences when compared to men.^{48,49} Results suggest that education about the connection between alcohol misuse and premature morbidity and mortality among homeless groups¹² may enhance understanding of the associated health effects.

Study limitations include the use of an adult homeless convenience sample from a single city in Oklahoma, which may limit the generalizability of results to homeless adults more broadly or to those in other cities.⁵⁰ Additionally, a smaller proportion of women in the study were alcohol users relative to men (35.6% vs. 51.4% respectively); though a power analysis concluded sufficient power (> 80%) for resulting conclusions for both the entire sample and alcohol users-only sample based on the statistical analyses being conducted. According to an Oklahoma City Planning report, there were approximately 1,511 homeless adults in Oklahoma City at a point-in-time in January 2016,⁵¹ suggesting that our sample comprised roughly 40% of that city's homeless population. The report also stated that 64% of the homeless population at the point-in-time were men, which is a nearly identical proportion to that in the current study (63.7%). Moreover, the use of 6 separate recruitment sites was a strength of this study as far as enhancing geographic diversity of the sample across the city. Nevertheless, participants in this study were limited to those who received services at one or more of the included shelters, were literate, and were English speaking; consequently, this sample did not represent those failing to meet any of these criteria. Other limitations include reliance upon self-reports of alcohol problems, which may be subject to recall bias or intentional inaccuracies. The use of objective data for confirmation of self-report (eg, collection of medical records) was a limitation of this data collection that could be addressed in future work. However, the inclusion of multiple measures of alcohol use, including the Alcohol Quantity and Frequency Questionnaire³⁵ and the Patient Health Questionnaire,³⁶ was implemented to at least partially mitigate this limitation. A final limitation was the inability for participant follow-up due to the cross-sectional nature of the study. This research inspires future inquiry regarding participants who reported binge drinking behaviors but reported 0 drinks in an average week, participants whose responses indicated abstinence despite a prior problem with alcohol or diagnosis of dependence or

abuse, and participants who reported high quantities of alcohol use with no readiness to change behavior.

In summary, the current study adds to the extant literature by characterizing sex differences in alcohol use problems among homeless adults, who represent an underserved and vulnerable population. In the overall sample, men were more likely to report a prior problem with alcohol, current probable alcohol abuse/dependence, and previous diagnosis of an AUD. Among alcohol users, risky drinking behaviors, problems with alcohol, and probable alcohol abuse/dependence were prevalent in this sample. Although men reported consuming more drinks per week overall, men and women alcohol users did not differ in readiness to change their drinking or in several manifestations of alcohol use problems. This, coupled with the low likelihood of receiving treatment, highlights the potential importance of creating specialized alcohol use disorder treatment for this population and expanding (or advertising the availability of existing) services in this area.

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Table 1.

Sample Descriptives by Sex among Homeless Men and Women (N = 581).

<i>Variables of Interest</i>	Total (N = 581)		Men (N = 370)		Women (N = 211)		p value
	M (SD) / % [N]		M (SD) / % [N]		M (SD) / % [N]		
Age	43.64 (12.16)		44.62 (12.26)		41.93 (11.82)		0.0062
White							0.7948
No	43.58 [251]		43.17 [158]		44.29 [93]		
Yes	56.42 [325]		56.83 [208]		55.71 [117]		
Educational attainment	11.94 (2.04)		11.87 (2.04)		12.05 (2.04)		0.1725
Lifetime months homeless	42.36 (51.25)		46.83 (55.58)		34.51 (41.55)		0.0088
Self-rated health							0.0146
Excellent, very good, or good	63.62 [369]		67.30 [249]		57.14 [120]		
Fair or poor	36.38 [211]		32.70 [121]		42.86 [90]		
At-risk drinking							<.0001
No	61.53 [355]		55.31 [203]		72.38 [152]		
Yes	38.47 [222]		44.69 [164]		27.62 [58]		
Self-reported alcohol problem							<.0001
No	60.28 [349]		53.93 [199]		71.43 [150]		
Yes	39.72 [230]		46.07 [170]		28.57 [60]		
Probable alcohol abuse/dependence							0.0007
No alcohol abuse/dependence	72.66 [420]		67.93 [250]		80.95 [170]		
Probable alcohol abuse/dependence	27.34 [158]		32.07 [118]		19.05 [40]		
Alcohol use disorder diagnosis							0.0115
No	77.11 [448]		73.78 [273]		82.94 [175]		
Yes	22.89 [133]		26.22 [97]		17.06 [36]		

Notes: Sex differences were assessed Wilcoxon rank-sum tests or Chi-square tests for continuous and categorical variables, respectively.

Table 2.

Logistic Regression for Alcohol Variables by Sex among Homeless Men and Women adjusted for Lifetime Months Homeless, Self-rated Health, and Race (N = 581).

Variables of Interest		Odds Ratio (95% CI)	p value
At-risk drinking (Ref: No)	Months Homeless	1.003 (1, 1.007)	0.0503
	Self-rated health (Ref: Excellent, very good, or good)	1.047 (0.725, 1.512)	0.8065
	Race (Ref: All others)	0.641 (0.442, 0.93)	0.0017
	Sex (Ref: Male)	0.497 (0.341, 0.724)	0.0003
Self-reported alcohol problem (Ref: No)	Months Homeless	1.005 (1.001, 1.008)	0.0066
	Self-rated health (Ref: Excellent, very good, or good)	1.573 (1.095, 2.261)	0.0143
	Race (Ref: All others)	1.45 (1.018, 2.065)	0.0395
	Sex (Ref: Male)	0.465 (0.319, 0.676)	0.0001
Probable alcohol abuse/dependence (Ref: No)	Months Homeless	1.002 (0.999, 1.006)	0.1670
	Self-rated health (Ref: Excellent, very good, or good)	1.387 (0.939, 2.048)	0.1001
	Race (Ref: All others)	0.903 (0.618, 1.319)	0.5962
	Sex (Ref: Male)	0.497 (0.328, 0.754)	0.001
Alcohol use disorder diagnosis (Ref: No)	Months Homeless	1.003 (0.999, 1.006)	0.1221
	Self-rated health (Ref: Excellent, very good, or good)	0.924 (0.61, 1.402)	0.7115
	Race (Ref: All others)	1.393 (0.929, 2.089)	0.1086
	Sex (Ref: Male)	0.61 (0.395, 0.942)	0.0257

Notes: At-risk drinking is defined as consuming >14 drinks per week for men and >7 drinks per week for women OR 5 drinks in a drinking episode in the past 30 days for men and 4 drinks for women.

Table 3.

Sample Descriptives, Drinking Frequencies, Alcohol Use Problems, and Readiness to Change Alcohol Use by Sex among Homeless Men and Women Alcohol Users (N = 265).

<i>Variables of Interest</i>	Total (N = 265)		Men (N = 190)		Women (N = 75)		p value
	M (SD)	% [N]	M (SD)	% [N]	M (SD)	% [N]	
Age	43.97	(11.67)	44.35	(11.63)	43.00	(11.80)	0.2459
White							0.7699
No	50.57	[132]	50.00	[93]	39.00	[52.00]	
Yes	49.43	[129]	50.00	[93]	36.00	[48.00]	
Educational attainment	11.84	(1.90)	11.68	(1.95)	12.25	(1.72)	0.0556
Lifetime months homeless	45.48	(52.58)	50.69	(56.55)	32.32	(38.18)	0.0101
Self-rated health							0.0074
Excellent, very good, or good	64.53	[171]	69.47	[132]	52.00	[39]	
Fair or poor	35.47	[94]	30.53	[58]	48.00	[36]	
No. of drinks per week	22.59	(23.09)	24.99	(23.65)	16.51	(20.51)	0.0017
No. of drinking days per week	4.32	(2.46)	4.56	(2.38)	3.69	(2.57)	0.0141
No. of drinks per drinking day	4.35	(3.31)	4.66	(3.36)	3.57	(3.07)	0.0137
At-risk drinking							0.074
No	16.23	[43]	13.68	[26]	22.67	[17]	
Yes	83.77	[222]	86.32	[164]	77.33	[58]	
Self-reported alcohol problem							0.0976
No	49.24	[130]	46.03	[87]	57.33	[43]	
Yes	50.76	[134]	53.97	[102]	42.67	[32]	
Probable alcohol abuse/dependence							0.3597
No alcohol abuse/dependence	50.19	[133]	48.42	[92]	54.67	[41]	
Probable alcohol abuse/dependence	49.81	[132]	51.58	[98]	45.33	[34]	
Alcohol use disorder diagnosis							0.482
No	70.19	[186]	68.95	[131]	73.33	[55]	
Yes	29.81	[79]	31.05	[59]	26.67	[20]	
Readiness to change alcohol use	5.44	(2.52)	5.29	(2.66)	5.97	(1.87)	0.3672
Receipt of alcohol/substance abuse counseling							0.1479

<i>Variables of Interest</i>	Total (N = 265)		Men (N = 190)		Women (N = 75)		<i>p value</i>
	M (SD)	% [N]	M (SD)	% [N]	M (SD)	% [N]	
	82.64	[219]	80.53	[153]	88.00	[66]	
	17.36	[46]	19.47	[37]	12.00	[9]	

Notes: Sex differences were assessed Wilcoxon rank-sum tests or Chi-square tests for continuous and categorical variables, respectively.

Table 4.

ANCOVA of Drinking Behaviors and Readiness to Change Alcohol Use by Sex among Homeless Alcohol Users Adjusted for Lifetime Months Homeless, Self-rated Health, and Race (N = 265).

Variables of Interest	Men	Women	p value
No. of drinks per week	25.053	17.627	0.0204
No. of drinking days per week	4.59	3.807	0.0216
No. of drinks per drinking day	4.656	3.681	0.0369
Readiness to change alcohol use	5.372	5.958	0.2819

Table 5.

Logistic Regression Alcohol Use Problems and Receipt of Treatment for Alcohol Users by Sex among Homeless Alcohol Users adjusted for Lifetime Months Homeless, Self-rated Health, and Race (N = 265).

		Odds Ratio (95% CI)	p value
At-risk drinking (Ref: No)	Months Homeless	1.014 (1.003, 1.026)	0.0156
	Self-rated health (Ref: Excellent, very good, or good)	0.985 (0.478, 2.028)	0.9673
	Race (Ref: All others)	0.814 (0.414, 1.603)	0.5522
	Sex (Ref: Male)	0.657 (0.322, 1.34)	0.2479
Self-reported alcohol problem (Ref: No)	Months Homeless	1.007 (1.001, 1.012)	0.0196
	Self-rated health (Ref: Excellent, very good, or good)	1.444 (0.839, 2.485)	0.1848
	Race (Ref: All others)	1.55 (0.935, 2.572)	0.0895
	Sex (Ref: Male)	0.65 (0.368, 1.15)	0.1388
Probable alcohol abuse/dependence (Ref: No)	Months Homeless	1.003 (0.998, 1.008)	0.3045
	Self-rated health (Ref: Excellent, very good, or good)	1.698 (0.995, 2.898)	0.0521
	Race (Ref: All others)	1.124 (0.685, 1.845)	0.6443
	Sex (Ref: Male)	0.728 (0.414, 1.28)	0.2707
Alcohol use disorder diagnosis (Ref: No)	Months Homeless	1.003 (0.998, 1.008)	0.2764
	Self-rated health (Ref: Excellent, very good, or good)	1.012 (0.568, 1.804)	0.9671
	Race (Ref: All others)	1.793 (1.042, 3.087)	0.035
	Sex (Ref: Male)	0.846 (0.453, 1.579)	0.5992
Receipt of alcohol/substance abuse counseling (Ref: No)	Months Homeless	1.002 (0.996, 1.008)	0.463
	Self-rated health (Ref: Excellent, very good, or good)	0.693 (0.333, 1.442)	0.3262
	Race (Ref: All others)	2.485 (1.254, 4.923)	0.0091
	Sex (Ref: Male)	0.629 (0.278, 1.425)	0.2666

Notes: At-risk drinking is defined as consuming >14 drinks per week for men and >7 drinks per week for women OR >5 drinks in a drinking episode in the past 30 days for men and >4 drinks for women.