Hazardous drinking and its association with homelessness among veterans in care

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ABSTRACT

Background: While scholarship on alcohol use and homelessness has focused on the impact of alcohol abuse and dependence, little is known about the effects of lower levels of misuse such as

hazardous use. Veterans receiving care in the Department of Veterans Affairs Health Care System (VA) constitute a population that is vulnerable to alcohol misuse and homelessness. This research examines the effects of hazardous drinking on homelessness in the Veterans Aging Cohort Study, a sample of 2,898 older veterans (mean age=50.2), receiving care in 8 VAs across the country.

Methods: Logistic regression models examined the associations between (1) hazardous drinking at baseline and homelessness at 1-year follow-up, (2) transitions into and out of hazardous drinking from baseline to follow-up and homelessness at follow-up, and (3) transitioning to hazardous drinking and transitioning to homelessness from baseline to follow-up during that same time-period.

Results: After controlling for other correlates including alcohol dependence, hazardous drinking at baseline increased the risk of homelessness at follow-up (adjusted odds ratio [AOR]=1.39, 95% confidence interval [CI]=1.02, 1.88). Transitioning to hazardous drinking more than doubled the risk of homelessness at follow-up (AOR=2.42, 95% CI=1.41, 4.15), while more than doubling the risk of transitioning from being housed at baseline to being homeless at follow-up (AOR=2.49, 95% CI=1.30, 4.79).

Conclusions: Early intervention that seeks to prevent transitioning into hazardous drinking could increase housing stability among veterans. Brief interventions which have been shown to be effective at lower levels of alcohol use should be implemented with veterans in VA care.

Keywords

hazardous drinking; homelessness; veteran care; alcohol use; longitudinal analysis; Veterans Aging Cohort Study

1. INTRODUCTION

Veterans are a population at increased risk for alcohol misuse and homelessness (Goldstein et al., 2008; Department of Housing and Urban Development [HUD], 2008). In a recent study, the Department of Veterans Affairs (VA) identified 800,000 veterans with substance use and alcohol use disorders (McKellar and Dalton, 2006). In a national study conducted on the non-institutionalized general population in the U.S., almost 57% of veterans reported alcohol use in the last month, significantly higher than those who reported use among the non-veteran population. Moreover, 23% of veterans reported episodes of heavy episodic drinking (Wagner et al., 2007). The same proportion of veterans reported drinking almost daily in the past year, which was significantly higher than the prevalence of daily consumption in the general population (Tessler et al., 2005). Scholars have also documented a high prevalence of homelessness among veterans. The VA estimates that on any given day, approximately 75,000 veterans are in emergency shelters or transitional housing and comprise 15% of the shelter population of the U.S (HUD, 2008).

Alcohol use has been referred to as a pandemic among homeless veterans (Goldstein et al., 2008) significantly increasing their homeless tenure (O'Connell et al., 2008) and preventing their exit from current homelessness (Gregoire, 1996). Common risk factors for both alcohol use and homelessness include age (Bray et al., 2002; Cannon et al., 1990; Ferrier-Auerbach et al., 2009; Rosenheck 1994b), race (HUD 2008; Jacobsen et al., 2008; Rosenheck 1994b),

gender (Bradley et al., 2003; Gamache et al., 2003; Ross et al., 1998), poverty (HUD, 2008; Khan et al., 2002; Sosin and Bruni, 1997), illicit substance use (O'Connell et al., 2008; Rounsaville et al., 2003; Rosenheck and Fontana, 1994a;) and mental illnesses such as depression (Desai et al., 2003; Ghose et al., 2011; Jakupcak et al., 2010; Kuno et al., 2000; Prigerson et al., 2003), schizophrenia (Drake et al., 1989; Etter and Etter, 2004) and posttraumatic stress disorder (PTSD; O'Connell et al., 2008; Shipherd, et al., 2005; Steindl et al., 2003).

However, research has not examined the direct link between alcohol use and transitioning into homelessness among veterans. Moreover, while research on alcohol use among veterans has tended to focus on more severe alcohol use disorders such as alcohol abuse and dependence, little is known about the outcomes of lower levels of misuse such as hazardous use. The World Health Organization defines hazardous use as a subthreshold (i.e., below the threshold of abuse or dependence) form of heavy drinking, which consists of a repeated pattern of drinking that confers the risk of harm (Conigliaro et al., 2003; Rinaldi et al., 1988; Sanchez-Craig et al., 1995; Saunders and Lee, 2000). This definition of hazardous drinking has been accepted by the ICD-10 and usually corresponds to 16 or more drinks a week for men and 12 or more for women. The move from an emphasis on alcohol dependence to lower thresholds of consumption mirrors a similar shift in mental health, where subthreshold levels of symptoms have been found to be more prevalent and cause significant functional impairments (Saunders and Lee, 2000).

Examining the link between transitioning into and out of hazardous drinking on homelessness might inform the use of early interventions with alcohol users in order to increase the likelihood that they remain housed. Moreover, scholars note that studies examining the link between addictive disorders and homelessness have generally not differentiated between disorders that preceded homelessness and those that followed it (Winkelby et al., 1992). Thus the longitudinal link between alcohol use and homelessness has been largely unexamined. This research seeks to address these issues by examining the effects over time, of hazardous drinking on homelessness in the Veterans Aging Cohort Study (VACS), a sample of 2,898 older veterans attending the general medical clinic of 8 VAs across the country. We hypothesize that after controlling for other correlates: (a) hazardous drinking at baseline is positively associated with homelessness at follow-up, (b) transitioning to hazardous drinking from baseline to follow-up is positively associated with homelessness at follow-up, (c) reducing hazardous drinking to non-hazardous levels from baseline to follow-up is negatively associated with homelessness at follow-up, and (d) transitioning to hazardous drinking is positively associated with transitioning to homelessness from baseline to follow-up.

2. METHODS

2.1. Sample

The VACS is a longitudinal study of HIV-infected and uninfected patients seen in VA infectious disease and general medical clinics. The study examines the role of alcohol and comorbid medical and psychiatric disease on clinical outcomes in HIV infection. Initiated in 2002, the eight-site study includes veterans being treated in VAs in Atlanta, Baltimore, New

York, Houston, Los Angeles, Pittsburgh, and Washington, D.C. Subjects were randomly selected from the VA Immunology Case Registry of all HIV infected veterans in care at the sites. Age, race and site-matched HIV-negative control subjects from the general medicine clinic were simultaneously recruited into the study. The study was approved by the internal review boards at each site. Consented subjects completed a survey questionnaire and were followed up with annually. Overall, 9% of those recruited declined to participate, while 59% of HIV-infected veterans were recruited into the study. Participants were more likely than non-participants to be older and African American. Further details of the methodology are described elsewhere (Justice et al., 2006) and are available online (www.vacohort.org). We used data from the baseline and the one-year follow-up (n=2,898) and information from VA medical records for this study.

A majority of veterans were African Americans (55.8%, n=1,583), while Hispanic veterans comprised 11.6% (329) and women 5.1% (145) of the sample (Table 1). The mean age of veterans in this sample was 50.2 (range=21-86) years. There was a high prevalence of mental illness and substance use in this sample: 14% (396) of veterans were using illicit substances weekly, 9.5% (269) suffered from major depression, 7.7% (219) from post-traumatic stress disorder, and 3.5% (98) from schizophrenia. Almost half the sample (42.6%, n=1,208) lived in poverty.

2.2 Measures

2.2.1 Dependent variable—Homelessness was measured at baseline and at one-year follow-up and operationalized as being homeless for at least one night in the four weeks prior to the survey. Focusing on the month immediately preceding the survey ensures a measure of recent homelessness and is comparable to similar measures of recent veteran homelessness (HUD, 2008).

2.2.2 Primary predictor variable—Our independent measure of interest was hazardous alcohol use which was measured using the Alcohol Use Disorders Identification Test- Consumption (AUDIT-C) scale (Reinert and Allen, 2002) which has a demonstrated sensitivity ranging from 0.85 to 0.98 and a specificity ranging from 0.66 to 0.80 for hazardous drinking (score of 4 and above on a 3-item scale) among primary care patients in the U.S. (Gordon et al., 2001; Seale et al., 2006). Gordon and colleagues (2001) found that the AUDIT-C, an abbreviated version of the AUDIT, identified hazardous drinkers as well as the full AUDIT. Increase in use from non-hazardous to hazardous use was operationalized as an increase in the AUDIT-C score from below 4 in the first year, to a score of 4 and above in the second year, while decrease in use was operationalized as a decrease in score from 4 and above at baseline, to below 4 at follow-up.

2.2.3 Control variables—Control variables included the factors highlighted in the literature reviewed above, that have been found to be associated with alcohol use and homelessness. They included demographic variables such as race and gender, HIV status, substance use, alcohol dependence, poverty and mental illnesses such as schizophrenia, depression and post-traumatic stress disorder (PTSD). High substance use was operationalized as use of an illicit substance at least once a week. Poverty was

operationalized as having a family income below the federal poverty line specified for the number of members in the participant's household. Hospital administrative data were used to extract demographic measures (race and gender), HIV status and diagnoses for alcohol dependence, depression, schizophrenia and PTSD. The mental health and alcohol dependence diagnoses were based on the World Health Organization's International Classification of Diseases, 9th Revision (ICD-9), whose validity and reliability has been established in previous research (Fischer et al., 2001; Grant, 1996; Hiller et al., 1993).

2.3 Analyses

We conducted bivariate analyses and entered significant correlates into logistic regression models.

Model 1 (n=2,838) examined the influence of the correlates (specifically that of hazardous alcohol use) at baseline on future homelessness, measured at one-year follow-up.

Model 2 (n=2,838) examined the association between homelessness at one-year follow-up and the transition in alcohol consumption from baseline to follow-up. In particular, our variables of interest were transition to hazardous use from non-hazardous use and reduction of use from hazardous to non-hazardous from baseline to one-year follow-up. The transition to hazardous drinking from non-hazardous to hazardous levels was compared to maintenance of non-hazardous drinking from baseline to follow-up as the reference category by controlling for the two other possible trajectories of alcohol use over that time period: decreasing consumption from hazardous to non-hazardous levels and maintenance of hazardous consumption. To examine the effects of reducing alcohol use, we ran a separate regression comparing reduction of alcohol consumption from hazardous use at baseline to non-hazardous use at follow-up to the reference category of maintenance of hazardous drinking over that time period by controlling for increase to hazardous use and maintenance of non-hazardous levels of consumption. The results of the association of reduction in use with homelessness are also reported in Model 2. Finally, by controlling for homelessness at baseline in Model 2, we assessed the influence of changes in levels of alcohol consumption on those who were newly homeless at follow-up.

Model 3 (n=2,838) presents results of regressing on correlates, the transition from being housed at baseline to being homeless at follow-up. Compared to Model 2 where the dependent variable was homelessness at follow-up, Model 3 had less power given the lower proportion of veterans who transitioned to homelessness (4.6%), even though the size of the sample remained the same. However, more accurate inferences about the nature of the association between independent and dependent variables can be drawn from Model 3 since it examined the way change in alcohol consumption was linked to transition into homelessness during the same time period.

In order to examine the relative salience of correlates and identify parsimonious models, stepwise logistic regressions were conducted for Models 2 and 3 where correlates were entered in successive blocks. The first set of variables included demographic variables, the second added substance use (weekly use and alcohol dependence) and mental health factors (schizophrenia, PTSD and depression) to the previous set, the next added economic

vulnerability factors such as poverty and homelessness at baseline and finally, alcohol consumption variables were added to the model. Models 2 and 3 present the significant associations in the final step, although all correlates entered were controlled for in this step.

Two of the correlates (poverty and change in alcohol consumption) had missing values for 5% of the cases, while missing data for the rest was negligible. However, this resulted in a loss of almost 10% of cases in analyses that only included fully complete cases. The resulting increases in standard errors for estimates in the regression models reduced the significance of associations. After examining the patterns of missing data to confirm that data were missing at random, multiple imputations (m=10 iterations or draws), were conducted to obtain estimates of parameters. All the correlates included in the regression analyses were included in the imputation model. SAS 9.2 was used to analyze the data.

3. RESULTS

The rates of hazardous drinking were high: 35.9% (1,018) were engaging in it at baseline, 23.2% (658) were drinking at that level at the one-year follow-up, 10.2% (289) increased their drinking to hazardous levels through the year, and 17.9% (506) decreased consumption from hazardous to non-hazardous levels during that same time (Table 1). Of the veterans in this sample, 5.6% (159) were homeless at baseline, 7.3% (206) were homeless at one-year follow-up and 4.6% (131) were housed at baseline, but were homeless at follow-up.

Table 2 presents results of models examining the manner homelessness at one-year follow-up was associated with alcohol use and other correlates. The first regression model examined the influence of hazardous drinking at baseline on homelessness at follow-up, controlling for other correlates (Model 1). After controlling for alcohol dependence and other correlates, hazardous alcohol use at baseline increased the risk of being homeless a year later by 39% (AOR=1.39). Moreover, homelessness at follow-up was also associated positively with being men, younger and with poverty, depression and weekly illicit substance use.

The second regression model in Table 2 examined the influence on homelessness at follow-up, of transitioning into and out of hazardous drinking from baseline to follow-up, after controlling for other correlates (Model 2). Compared to those who remained at non-hazardous levels of consumption from baseline to one-year follow-up, veterans who increased their consumption to hazardous levels increased their risk of being homeless at follow-up by almost two and a half times, (AOR=2.42). The negative association between homelessness at follow-up and those who decreased their use from hazardous levels at baseline to non-hazardous levels at follow-up was not significant.

However, several factors lost their association with homelessness in this model. The step-wise method utilized to enter blocks of variables in this model indicated that when economic vulnerability indicators such as living in poverty and being homeless at baseline were added to the model using illicit substances weekly (which had been significantly associated with homelessness in previous steps and in Model 1), its association with homelessness was lost at follow-up. These results did not change when marijuana use was excluded from weekly

substance use in order to assess the effects of the use of cocaine, opioids and stimulants (not shown). Thus, transition to hazardous drinking, which was added in the final step, was significantly associated with homelessness, while other illicit drug use was not.

The third regression model examined the influence of transitioning into hazardous drinking on transitioning into homelessness, after controlling for other correlates (Model 3). Compared to veterans who maintained their use at non-hazardous levels through the year, veterans who were housed at baseline and who increased their use from non hazardous to hazardous use over the course of the year were more than twice as likely to become homeless at follow-up (AOR=2.49).

4. DISCUSSION

The results highlight a unique set of associations between alcohol consumption and homelessness, which have important clinical and policy implications for care. Hazardous drinking at baseline, after controlling for levels of drinking that indicated alcohol dependence, was associated with homelessness at follow-up. Moreover, transition to hazardous drinking over the course of the year was one of the factors most significantly associated with being homeless at follow-up. Economic vulnerability accounted for the significant association of illicit substance use (Model 2) which has been found to be significantly associated with veteran homelessness in previous studies (HUD, 2008; O'Connell et al., 2008). However, increasing alcohol consumption to hazardous levels persisted as a risk factor after all other factors were controlled for. Moreover, since homelessness at baseline was controlled for, these results indicate that transitioning to hazardous alcohol use was associated with becoming homeless at follow-up, even for veterans who were housed at baseline. This conclusion is supported by the results of the final model which assessed the association between transitioning into homelessness (i.e., housed at baseline, and homelessness at follow-up) and transitioning into hazardous drinking. Despite the lower proportion of veterans in this category resulting in a lower powered model, transition to hazardous drinking emerged as a significant predictor, more than doubling the risk of becoming homeless at follow-up (AOR=2.35).

The prevalence of homelessness among veterans in this sample (7%) was significantly higher than the 0.3% point-in-time prevalence and the 0.6% annual prevalence of all forms of homelessness among veterans documented in the third annual homeless assessment report to Congress (HUD, 2008). The high rates in this sample may be attributable to the high prevalence of risk factors such as mental illness, substance use and poverty among veterans, all correlates of homelessness in this study. Specifically, there was a high prevalence of hazardous alcohol use among veterans in care: more than 1 in 4 veterans in care were hazardous users. In fact, the prevalence of hazardous drinking at baseline (36%) is considerably higher than the highest rates documented in primary care settings (29%) by a previous review of the literature (Reid et al., 1999).

The results highlight the importance of prevention and early treatment of alcohol use in order to reduce the risk of homelessness. Moreover, the results provide support for prioritizing the transition to hazardous drinking as a target of intervention, given its

relatively greater association with future homelessness when compared to other risk factors. Whereas poverty accounted for the association between other forms of illicit substance use and homelessness, hazardous-drinking posed a risk for veterans of all socioeconomic strata. This provides further support for targeting lower thresholds of alcohol use before other forms of drug use in order to reduce homelessness risk for veterans.

Scholars have found that the early detection of alcohol misuse, when users are still at a sub-threshold level, allows for the use of effective brief interventions that can prevent escalation of use, and related problems later. In a 10-country study, Saunders and colleagues (1998) found that an ultra-brief five minute intervention that consisted of providing information and advice reduced drinking among those at the hazardous drinking sub-threshold level by 28%. In a meta analysis of brief interventions (BI) with hazardous drinkers in primary care settings, Ballesteros and colleagues (2004) found that BI comprising a specific alcohol intervention lasting 10 to 15 minutes in one session, with 3 to 5 minute follow-up sessions significantly reduced hazardous drinking, and outperformed minimal interventions comprising 3 to 5 minutes of advice about alcohol dispensed in a single session. Moreover, BI were effective even when applied to those who had not been seeking treatment for alcohol use in general screening programs in the primary care setting.

VA patients constitute a particularly vulnerable section of the veteran population, are accessible and already in care, and have a high prevalence of hazardous drinking as well as homelessness. The VA thus, constitutes an ideal setting to effectively address hazardous drinking among patients. Given the association of hazardous drinking with homelessness, and the proven effectiveness of BI integrated into screenings in primary care, targeting hazardous drinking at the VA would be an effective step towards achieving the government's goal of reducing veteran homelessness. Testing for hazardous drinking is now routine at the VA. However, even when VA protocols advise specialty treatment for veterans with an AUDIT-C in the hazardous range, only 4% of such veterans actually get treated (Glass et al., 2010). The results indicate brief interventions should be routinely implemented as prevention in order to stop people from increasing their consumption to hazardous levels.

There are several limitations to the study. Since homelessness was assessed only at the time of the baseline and follow-ups surveys, it is possible that participants were (or became) homeless at multiple points during the year, which would complicate conclusions about the association between alcohol use and homelessness. The AUDIT-C cut-off score for hazardous drinking is slightly less for women than for men. We however, chose to use the cut-off for men (AUDIT-C score of 4 and higher), given the low proportion of women in this sample (5%). When the AUDIT-C cut-off score of 3 and above was used, the gender association stayed the same: women were significantly less likely to become homeless in all three models. However, conclusions about the significance of the association between gender and homelessness should be drawn with caution. Since this study was not based on a random sampling of all VAs in the country, the results cannot be generalized to the universe of VA patients nationally. However, the large sample of participants drawn from VAs in cities across the country ensure that the results indicate patterns for patients receiving care in VAs in urban settings.

This research highlights the risk posed by hazardous drinking for veterans in care in the VA. Moreover, the results address a gap in the literature on alcohol and homelessness by focusing on the longitudinal link between the two variables. Hazardous consumption as well as transitioning into it from non-hazardous levels was associated with VA veterans becoming homeless. Future research needs to examine the association between the time of transition to hazardous alcohol use and to homelessness in order to build on this research and explore the causal association between hazardous alcohol use and homelessness.

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Table 1:

Proportions for dependent and independent variables (n=2,898)

Factors	Proportions (n)
Alcohol use	
Hazardous use at baseline	35.9 (1018)
Hazardous use at year two	23.2 (658)
Increase to hazardous use (baseline to follow-up)	10.2 (289)
Decrease from hazardous use (baseline to follow-up)	17.9 (506)
Homelessness	
Homeless at baseline	5.6 (159)
Homeless at follow-up	7.3 (206)
Homeless at follow-up, housed at baseline	4.6 (131)
Demographics	
Women	5.1 (145)
Hispanic	11.6 (329)
African American	55.8 (1583)
Mental illness and substance use	
Post-traumatic stress disorder	7.7 (219)
Schizophrenia	3.5 (98)
Depression	9.5 (269)
Weekly illicit substance use	14.0 (396)
Economic Vulnerability	
Living in poverty	42.6 (1208)

Table 2:

Homelessness at one-year follow-up regressed on correlates (n=2,838)

	Model 1	Model 2[b]	Model 3[b]
Alcohol Use			
Hazardous use at baseline[a]	1.39 (1.02, 1.88)		
Alcohol dependence	1.72 (1.06, 2.81)		
Increase to hazardous use (baseline to follow-up)[c]		2.42 (1.41, 4.15)	2.49 (1.30, 4.79)
Decrease from hazardous use (baseline to follow-up)[d]		0.78 (0.50, 1.23)	
Demographics			
African American	1.28 (0.94, 1.74)		
Female	0.18 (0.04, 0.77)	0.19 (0.05, 0.79)	
Age	0.97 (0.95, 0.99)	0.97 (0.95, 0.99)	0.97 (0.95, 0.99)
Serostatus, mental illness & drug use			
HIV	0.97 (0.72, 1.32)		
PTSD	1.03 (0.59, 1.72)		
Schizophrenia	1.27 (0.60, 1.75)		
Depression	1.55 (1.01, 2.36)	1.58 (1.03, 2.44)	
Weekly illicit substance use	1.54 (1.08, 2.19)		
Economic vulnerability			
Poverty	1.98 (1.36, 2.89)	2.16 (1.55, 3.01)	1.86 (1.26, 2.74)
Homelessness baseline		5.64 (3.81, 8.35)	

[a] reference category=non-hazardous alcohol consumption

[b] Only significant associations reported, but controlling for all other correlates from Model 1

[c] reference category= maintenance of non-hazardous drinking, baseline to follow-up

[d] reference category=maintenance of hazardous drinking, baseline to follow-up