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Differences in Alcohol Use and Alcohol-Related Problems between Transgender- and Nontransgender-identified Young Adults

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Abstract

Background—Little is known about differences in alcohol use and alcohol-related problems between transgender- and nontransgender-identified populations. Using data from a large-scale health survey, we compare the drinking patterns and prevalence of alcohol-related problems of transgender-identified individuals to nontransgender-identified males and females. For transgender-identified people, we examine how various forms of victimization relate to heavy episodic drinking (HED).

Methods—Cross-sectional surveys were completed by 75,192 students aged 18–29 years attending 120 post-secondary educational institutions in the United States from 2011–2013. Self-reported measures included alcohol use, alcohol-related problems, victimization, and sociodemographics, including 3 gender-identity groups: transgender-identified individuals; nontransgender-identified males; and nontransgender-identified females.

Results—Compared to transgender-identified individuals, nontransgender-identified males were more likely to report HED in the past 2 weeks (relative risk=1.42; $p=0.006$); however, nontransgender-identified males and females reported HED on fewer days than transgender-

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Conflicts of Interest

None

Contributors

Robert W.S. Coulter led the conceptualization, data analysis, and writing of this manuscript. John R. Blosnich, Leigh A. Bukowski, A. L. Herrick, Daniel E. Siconolfi, and Ron D. Stall contributed substantially to the conceptualization, data interpretation, and writing of this manuscript. All authors have read and approved the submission of this manuscript to *Drug and Alcohol Dependence*.

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identified people (incidence-rate ratios [IRRs] ranged from 0.28–0.43; p -values <0.001). Compared to transgender-identified people, nontransgender-identified males and females had lower odds of past-year alcohol-related sexual assault and suicidal ideation (odds ratios ranged from 0.24–0.45; p -values <0.05). Among transgender-identified people, individuals who were sexually assaulted (IRR=3.21, $p=0.011$) or verbally threatened (IRR=2.42, $p=0.021$) in the past year had greater HED days than those who did not experience those forms of victimization.

Conclusions—Compared to transgender-identified people, nontransgender-identified males and females: have fewer HED occasions (despite nontransgender-identified males having greater prevalence of HED); and are at lower risk for alcohol-related sexual assaults and suicidal ideation. Experiences of sexual assault and verbal threats are associated with greater HED occasions for transgender-identified people.

Keywords

Transgender; alcohol use; heavy episodic drinking; alcohol-related problems; violence

1. INTRODUCTION

After systematically documenting the dearth of research on transgender populations, the landmark Institute of Medicine report on the health of lesbian, gay, bisexual, and transgender populations recommended expanding research on the health of transgender populations (Institute of Medicine, 2011). The term transgender is commonly used as an umbrella term for people whose gender identity or expression does not conform with the sex they were assigned at birth (Institute of Medicine, 2011; The GenIUSS Group, 2014). Transgender populations often face multiple forms of discrimination and victimization, including physical, verbal, and sexual assault (Institute of Medicine, 2011; Stotzer, 2009), which can negatively impact their wellbeing and may result in maladaptive coping, such as heavy alcohol use (Keyes et al., 2011; Meyer, 2003).

Few epidemiologic surveillance systems collect information about transgender status (Institute of Medicine, 2011; The GenIUSS Group, 2014), limiting information that compares the drinking behaviors of transgender people to their cisgender counterparts (i.e., people whose gender identity and expression match their assigned sex at birth). One study of United States youth (aged 13–18 years) found that transgender youth had higher odds of lifetime alcohol use than cisgender youth, but were no different in their prevalence of regular alcohol use (i.e., alcohol use at least monthly in the past year) (Reisner et al., 2014a). Another study of Massachusetts adults (aged 18–64 years) found no differences in the prevalence of past-month heavy episodic use between transgender and cisgender populations (Conron et al., 2012). The remaining few studies about transgender individuals' alcohol use utilized convenience-based samples or lacked direct cisgender comparison groups (Bradford et al., 2013; Gilbert et al., 2014; Hotton et al., 2013; Reisner et al., 2013; Rowe et al., 2015). Therefore, we have incomplete knowledge about drinking differences between transgender and cisgender populations, especially among young adults, the age group most at risk for heavy alcohol use in the United States (Centers for Disease Control and Prevention, 2010b; Fryar et al., 2006; Substance Abuse and Mental Health Services Administration, 2011; United States Department of Health and Human Services, 2009).

Alcohol use, especially heavy episodic drinking, can lead to acute problems—like blackouts, suicides, and sexual assaults (Darvishi et al., 2015; Perkins, 2002; White, 2003)—which contribute to multiple leading causes of death among young adults (Centers for Disease Control and Prevention, 2010a). In young adulthood, the prevalence of alcohol-related problems sometimes vary by gender (American College Health Association, 2012; Perkins, 2002). According to studies where transgender status was not assessed, males were more likely get into trouble with police, while females were more likely to experience sexual assault (Perkins, 2002). Meanwhile, blackouts and alcohol-related suicidality are equally common among males and females (American College Health Association, 2012; Perkins, 2002). Yet, little to no information exists about differences in alcohol-related problems for transgender people compared to their cisgender counterparts.

A burgeoning body of literature shows that, compared to cisgender people, transgender individuals have a higher risk of experiencing victimization (Grant et al., 2011; Institute of Medicine, 2011; Kosciw et al., 2012; Reisner et al., 2014a), which can induce psychological distress and lead to alcohol use as a way of coping (Keyes et al., 2011; Meyer, 2003). While this phenomenon has been shown in multiple empirical studies of alcohol use among transgender populations (Bradford et al., 2013; Gilbert et al., 2014; Hotton et al., 2013; Reisner et al., 2013; Rowe et al., 2015), there is a paucity of research about how certain forms of assault (i.e., physical, verbal, and sexual) are associated with heavy episodic drinking for transgender people. In studies where transgender status was not measured, different types of victimization have diverse effects on alcohol use (Begle et al., 2011; Tyler et al., 2012). For example, in a longitudinal study of adolescents, experiences of sexual and physical abuse predicted subsequent high-risk behavior (including alcohol use) for boys, and sexual abuse was the primary driver of subsequent high-risk behavior for girls (Begle et al., 2011). These results demonstrate how associations between victimization and alcohol use vary by gender, substantiating the need for a within-group analysis among transgender populations.

The purpose of this study was to examine alcohol use and alcohol-related problems for transgender young adult populations using data from a large epidemiologic surveillance system of college and university students in the United States. We examined differences in drinking behaviors and the prevalence of alcohol-related problems by gender identity, comparing transgender-identified people to their nontransgender-identified counterparts. We also examined how various forms of victimization were related to heavy episodic drinking among transgender-identified people.

2. MATERIAL AND METHODS

2.1. Study Design

The American College Health Association (ACHA) administered the National College Health Assessment Survey (NCHA) at postsecondary educational institutions. Data were compiled into a national dataset if schools: elected to administer the NCHA and pay a fee to ACHA for the self-administered questionnaire; and surveyed randomly selected students, surveyed students in randomly selected classrooms, or surveyed all students at their school (American College Health Association, 2012, 2013, 2014). The current investigation used

cross-sectional survey data from schools participating in the Fall 2011 (44 schools), Fall 2012 (51 schools), or Fall 2013 (57 schools) surveys. In total, the sample included data from 120 unique higher education institutions. According to the Carnegie Classification of Institutions of Higher Education (Center for Postsecondary Research, 2011), 30.8% of the participating schools were Doctorate-granting Universities, 30.8% were Master's Colleges and Universities, 26.7% were Baccalaureate Colleges, 10.0% were Associate's Colleges, and 1.7% were Special Focus Institutions. Half were public schools, and half were private schools. Regarding location in the United States, 37.5% of participating schools were in the Northeast, 29.2% were in the South, 17.5% were in the Midwest, and 15.8% were in the West.

Students completed either paper or web surveys, depending on the format offered at their institution. Response rates were high for paper surveys (mean response proportions ranged from 71% to 100% from 2011–2013) but lower for web surveys (mean response proportions ranged from 16% to 21% from 2011–2013). Respondents anonymously completed surveys during a specific time period selected by each school's administration. Institutions obtained approval of study procedures from their own Institutional Review Board (IRB).

2.2. Measures

2.2.1. Sociodemographics—Gender identity was measured with the following item: “What is your gender?” The 3 response options were: (1) “female;” (2) “male;” and (3) “transgender.” To emphasize each participants' self-reported gender identity based on to this measure, we refer to each group as nontransgender-identified females, nontransgender-identified males, and transgender-identified people. Other sociodemographic measures were age (dichotomized as 21+ vs. under 21 to reflect the legal drinking age in the United States), race/ethnicity (White vs. non-White), sexual orientation (heterosexual, gay/lesbian, bisexual, unsure), education level (undergraduate vs. graduate student), employment (none vs. employed for at least 1 hour per week), current living situation (on-campus or off-campus), and membership in a fraternity or sorority (yes/no).

2.2.2. Victimization—Four forms of violence were measured dichotomously (yes/no) in the past 12 months. Physical fights, physical assaults, and verbal threats were measured individually with single items. Sexual assault was measured with 3 items after the initial stem “Within the last 12 months...”: (1) “were you sexually touched without your consent”; (2) “was sexual penetration attempted (vaginal, anal, oral) without your consent”; and (3) “were you sexually penetrated (vaginal, anal, oral) without your consent.” If participants responded yes to any of these questions, we coded them as having been sexually assaulted.

2.2.3. Alcohol Use—Participants were asked about their past-month drinking behaviors with the following item: “Within the last 30 days, on how many days did you use alcohol (beer, wine, liquor)?” Response options included: never used; have used, but not in the last 30 days; 1–2 days; 3–5 days; 6–9 days; 10–19 days; 20–29 days; used daily. From this item, we created three different variables: lifetime alcohol use (dichotomous yes/no, where “no” was represented by “never used”); past-month alcohol use (dichotomous yes/no, where “no” was represented by “never used” and “have used, but not the last 30 days”); and number of

past-month drinking days (range: 0–30 days). For the latter variable, we created a continuous count variable by assigning midpoint values to categories with ranges (e.g., 1–2 days was coded as 1.5), as has been done previously (Corliss et al., 2008).

Participants were also asked about heavy episodic drinking, which was measured with the following item: “Over the last two weeks, how many times have you had five or more drinks of alcohol at a sitting?” Response options included “don’t drink,” “none,” “1 time,” “2 times,” through “10 or more times.” From this item, we created two different variables: any heavy episodic drinking; and number of heavy episodic drinking days in past 2 weeks, because responses generally followed a Poisson distribution (range: 0–10 days).

2.2.4. Alcohol-related Problems—We examined 7 alcohol-related problems. The question stem was: “Within the last 12 months, have you experienced any of the following when drinking alcohol?” Specific items included the following: did something you later regretted; forgot where you were or what you did; had unprotected sex; physically injured yourself; got in trouble with the police; someone had sex with me without my consent (i.e., sexual assault); and seriously considered suicide (i.e., suicidal ideation). We coded responses dichotomously yes/no: “no” if participants selected the options “N/A, don’t drink” or “no;” and “yes” if participants selected “yes.”

2.3. Data Analyses

Since young adults (age 18–29) have a higher prevalence of heavy episodic drinking than any other age group in the United States (Centers for Disease Control and Prevention, 2010b; Fryar et al., 2006; Naimi et al., 2003; Substance Abuse and Mental Health Services Administration, 2011), we restricted our current study to include only respondents in this age group. This removed 9,419 participants (including 33 transgender-identified students). After excluding the few participants who indicated they were neither undergraduate nor graduate students (113 participants indicated they were “not seeking a degree” and 389 indicated being some “other” kind of student), the sample included 79,054 participants.

In any particular analysis, we excluded participants if they were missing data on independent or dependent variables. Overall, missing data were minimal, with the largest proportion of missingness being 1.5% for membership in a fraternity or sorority. We removed 50 participants who were missing data for every alcohol use and alcohol-related problem variable. Of the remaining participants, we removed 4.8% of participants who were missing data on any independent variables, creating an analytic sample of 75,192 participants. To maintain the largest sample size possible, we allowed our sample sizes to vary using listwise deletion for each alcohol use and alcohol-related problem variable.

We conducted data analyses in Stata version 13 (College Station, TX). Data were collected from students nested within schools; to account for non-independence of observations, we used Rao-Scott corrected chi-square tests for bivariate analyses with categorical variables, and cluster-robust standard errors for multivariable regression models (StataCorp, 2013). Also, we controlled for sociodemographics in all multivariable models.

First, we examined the differences in drinking patterns by gender identity in the whole sample. To examine gender-identity differences in dichotomous alcohol use variables (i.e., lifetime alcohol use, past-month alcohol use, and heavy episodic drinking in the past 2 weeks), we used the modified Poisson regression approach to estimate risk ratios for transgender-identified people compared to nontransgender-identified female and male students, separately (Zou, 2004). To examine gender-identity differences in continuous alcohol use variables (i.e., number of past-month drinking days, number of heavy episodic drinking days), we used zero-inflated negative binomial models due to statistically significant likelihood-ratio tests of $\alpha=0$ (p-values<0.05 for all models; indicating overdispersed data) and Vuong's tests (p-values<0.05 for all models) (Vuong, 1989). Second, we examined the differences in alcohol-related problems by gender. For this, we restricted to participants who reported drinking in their lifetime. We fit models using logistic regression for each alcohol-related problem.

Within transgender-identified populations, we examined how victimization correlated with the number of heavy episodic drinking days. We used negative binomial regression because the data were overdispersed according to the likelihood-ratio test of $\alpha=0$ (p-values<0.001), but Vuong's test was not significant (p-value=0.248).

3. RESULTS

In total, there were 175 transgender-identified individuals, 50,465 nontransgender-identified females, and 24,552 nontransgender-identified males. Table 1 shows the sociodemographic characteristics by gender. Compared to transgender-identified people, nontransgender-identified females were more likely to be White, heterosexual, and fraternity/sorority members. Nontransgender-identified males were more likely than transgender-identified people to be heterosexual, graduate students, employed, and fraternity/sorority members.

Table 1 also shows the prevalence of victimization by self-identified gender identity. Overall, transgender-identified people were significantly more likely to have been in physical fights, physically assaulted, verbally threatened, and sexually assaulted than both their nontransgender-identified counterparts. For example, 21.1% of transgender-identified people reported being victims of sexual assault in the past year, compared to 8.5% of nontransgender-identified females and 3.5% of nontransgender-identified males.

3.1. Drinking Patterns by Gender Identity

As shown in Table 2, lifetime alcohol use was reported by 79.9% of transgender-identified people, 75.8% of nontransgender-identified females, and 74.8% of nontransgender-identified males. Past-month drinking was reported by 60.3% of transgender-identified, 62.1% of nontransgender-identified females, and 63.1% of nontransgender-identified males. Adjusting for sociodemographics, transgender-identified individuals and nontransgender-identified males and females had similar risk of lifetime and past-month drinking (RRs range from 0.96–1.04; p-values>0.05). Yet nontransgender-identified females drank on significantly fewer days than transgender-identified people in the past month (incidence-rate ratio [IRR]=0.69; p=0.006).

Heavy episodic drinking in the past 2 weeks was reported by 27.4% of transgender-identified people, 28.1% of nontransgender-identified females, and 40.9% of nontransgender-identified males. In adjusted analyses, nontransgender-identified males were significantly more likely to report heavy episodic drinking than transgender-identified people, but there were no differences between transgender-identified people and nontransgender-identified females. However, nontransgender-identified males and females reported heavy episodic drinking on significantly fewer days than transgender-identified people (IRRs range from 0.28–0.43; p -values<0.001).

3.2. Alcohol-related Problems by Gender Identity

As shown in Table 3, nontransgender-identified drinkers had lower odds of reporting alcohol-related sexual assaults than transgender-identified drinkers (odds ratios [ORs] ranged from 0.24–0.45; p -values<0.05). Nontransgender-identified drinkers also had significantly lower odds of suicidal ideation while drinking compared to transgender-identified drinkers (ORs range from 0.37–0.42; p -values<0.01). On the other hand, nontransgender-identified males had higher odds than transgender-identified people of forgetting where they were or what they did while drinking (OR=1.68; p =0.014). Transgender-identified drinkers were no different from nontransgender-identified drinkers with regards to doing something they later regretted, getting in trouble with the police, having unprotected sex, or physically injuring themselves while drinking.

3.3. Correlates of Heavy Episodic Drinking Days Among Transgender-identified People

Table 4 shows how past-year victimization is correlated with the number of heavy episodic drinking days among transgender-identified people, controlling for sociodemographics. Transgender-identified individuals who were verbally threatened (IRR=2.42, p =0.021) or sexually assaulted (IRR=3.21, p =0.011) had more heavy episodic drinking days than their transgender-identified peers who did not experience those stressors.

4. DISCUSSION

Our study addresses gaps identified in the Institute of Medicine report (Institute of Medicine, 2011), including differences in alcohol use and alcohol-related problems between transgender-identified individuals and their nontransgender-identified counterparts. Transgender-identified people have a similar prevalence of heavy episodic drinking to nontransgender-identified females, but are less likely to use than nontransgender-identified males; however, transgender-identified people who engaged in heavy episodic drinking do so more frequently than their nontransgender-identified counterparts. This result is particularly striking because young adult males were previously found to be among the heaviest drinkers in the United States (Centers for Disease Control and Prevention (CDC), 2012; Substance Abuse and Mental Health Services Administration, 2013).

Sexual assaults in the past year were more common among transgender-identified people than nontransgender-identified people, which is notable because nontransgender-identified females in the general population disproportionately experience sexual assault victimization (Basile et al., 2007; Krebs et al., 2007; Tjaden and Thoennes, 1998, 2000). Being sexually

assaulted was strongly associated with a greater number of heavy episodic drinking days for transgender-identified people, which dovetails with previous research showing that sexual assault exacerbated drinking (Begle et al., 2011; Keyes et al., 2011; Tyler et al., 2012). Furthermore, alcohol-related sexual assaults were elevated among transgender-identified drinkers compared to their nontransgender-identified counterparts. Together these findings suggest a potential stress-response feedback loop, where the response (i.e., heavy episodic drinking) to a stressor (i.e., sexual assault) can increase exposure to subsequent stressors. Though we could not determine directionality of these findings, previous studies showed both that victimization can induce drinking (Begle et al., 2011; Keyes et al., 2011; Tyler et al., 2012) and that drinking environments can foster aggressive behaviors (Abbey, 2002; Cunradi et al., 2012; Mair et al., 2013; Studer et al., 2014), which may contribute to the sexual assault of transgender-identified people.

Suicidal ideation while drinking was also much more common among transgender-identified people than nontransgender-identified individuals. Previous studies suggest that transgender-identified people are at great risk for depression and suicidality (Bockting et al., 2005; Clements-Nolle et al., 2006; Reisner et al., 2013, 2014b), and many people who are suicidal use alcohol for its disinhibiting effects in order to harm themselves (Pompili et al., 2010). Moreover, alcohol is a depressant that can negatively change one's mood (Valenzuela, 1997), making the precise relationship between alcohol use and suicidal ideation in our cross-sectional study unclear. Nevertheless, alcohol may exacerbate underlying mental health problems for transgender-identified people, making them more vulnerable to self-inflicted premature mortality than their nontransgender-identified counterparts.

The differences in heavy episodic drinking frequency between transgender-identified nontransgender-identified people are a serious public health problem, and our findings can inform primary prevention efforts. For transgender-identified individuals, we found the number of heavy episodic drinking days was associated with verbal threats and sexual assaults, and therefore eliminating—or at least reducing—the victimization of transgender-identified people may mitigate their heavy episodic drinking. Because transgender-identified people comprise a small proportion of the entire population—0.2% of our sample, which is comparable to national estimates (Gates, 2011)—a cost-effective way to reduce their drinking disparities may be to explicitly incorporate transgender and gender nonconformity issues into existing drinking and violence intervention prevention programs.

Our findings can also inform secondary prevention efforts. Both alcohol programs (e.g., brief interventions and treatment) and assault survivor services should be competent about transgender issues. This includes training staff on transgender competency and being inclusive of transgender people in all practices. In general, there are scant transgender-tailored alcohol treatment programs (Cochran et al., 2007), therefore creating transgender-inclusive programs is necessary. For survivor services, providers ought to understand that experiences of violence may lead to hazardous drinking behaviors, and implementing Screening, Brief Intervention, and Referral to Treatment (SBIRT) programs within survivor services should be considered. Conversely, general SBIRT programs should also incorporate assessment of assault experiences.

Our study propels the field forward, but much about transgender alcohol use remains unexamined. For example, there is scant information about transgender alcohol use over time. Longitudinal studies that include transgender status are necessary to discern mediators of heavy episodic drinking disparities. Heavy episodic drinking and related problems may also be influenced by transgender-specific factors, such as interpersonal transgender discrimination, internalized transphobia, stage of transition, and hormone replacement therapy. Additionally, structural stigma—institutionalized policies and laws that restrict any minority population's opportunities, resources, or well-being (Link and Phelan, 2001)—may contribute to higher levels of heavy episodic drinking, as has been demonstrated among lesbian, gay, and bisexual populations (Hatzenbuehler et al., 2009, 2010, 2012). Although we examined gender differences in acute alcohol-related problems, long-term heavy alcohol use can lead to chronic morbidities, such as liver cirrhosis (Rehm et al., 2003; Rehm and Shield, 2014; Rehm et al., 2010), which we were unable to examine. Finally, there are likely intersections of gender identity with race/ethnicity, age, and sexual orientation; but we chose not to examine these effects because of the small number of transgender-identified respondents and the large number of covariates present in our models.

Though our findings are from a large epidemiologic study, they are not without limitations. One limitation concerns the measurement of gender identity in this survey. Based on the gender identity question asked in the NCHA, we were unable to discern whether transgender-identified people transitioned from male to female or female to male, conflating them into a monolithic group. Because of this, misclassification may have occurred: some cisgender people may have mistakenly selected the transgender option; and some transgender people may have selected the female or male options. As an example of the latter, some individuals who transitioned from male to female or female to male may not identify as transgender, but instead identify as female or male, respectively (Institute of Medicine, 2011; The GenIUSS Group, 2014). We were unable to identify these individuals because the NCHA did not include items measuring participants' sex assigned at birth. We recommend future surveillance efforts utilize questions from the recent recommendations for identifying transgender people from the Gender Identity in U.S. Surveillance group (The GenIUSS Group, 2014).

All measures in our study were self-reported, and therefore the data were not externally validated. Because of the way we recoded the number of drinking days and heavy episodic drinking occasions, there may be misclassification for the alcohol use variables. Furthermore, NCHA defined heavy episodic drinking as 5 or more drinks for all participants, regardless of gender. Some studies define heavy episodic drinking behaviors based on a respondent's gender (e.g., some studies consider 4 or more drinks for women to be heavy episodic drinking; National Institute on Alcohol Abuse and Alcoholism, 2015). Nevertheless, there is no recommended definition of heavy episodic drinking for transgender-identified people, therefore, the standard measure for all participants irrespective of gender was a strength of our study. Also, victimization items only captured experiences from the past year, and previous studies suggest that experiences of victimization earlier in the life-course may impact alcohol use later in life (Bontempo and d'Augelli, 2002; Rosario et al., 2009; Talley et al., 2014). Finally, we did not have data about institutional level factors that directly relate to transgender status (e.g., school climate

for transgender people) or alcohol use and related problems (e.g., alcohol outlets near campus), and our results may be confounded by these unmeasured variables.

The overall study design also limited our findings. Due to the cross-sectional nature of this study, we could not discern the directionality of the correlates of heavy episodic drinking for transgender-identified people. Data were also drawn from a sample of undergraduate and graduate students at non-randomly sampled universities; therefore, findings may not generalize to students at other institutions or individuals not attending post-secondary institutions. Furthermore, our study is not free from selection bias, particularly because our sample included a larger proportion of nontransgender-identified females than males; a previous study with students showed that females were more likely to respond to surveys than males (Sax et al., 2003), but we were unable to examine gender differences in response rates. Also, participation rates were less than optimal for web surveys, which is a common artifact of web survey administrations (Cook et al., 2000). Survey administration time periods were not standardized across schools, and our results may be affected by schools' selected time periods (e.g., before or after holiday breaks). Because the specific dates of survey completion were not publicly available, we could not assess the extent of this effect. Finally, 24 schools participated in more than one survey administration, and because surveys were anonymous, we could not be certain that individuals only participated in one survey period. In spite of our study's inherent limitations, the NCHA rigorously sampled individuals and collected multiple measures of alcohol use and related problems, allowing for close examinations of drinking patterns and consequences in a population at high-risk for hazardous alcohol use and alcohol-related problems.

Altogether, for people who engage in heavy episodic drinking, transgender-identified people imbibe much more frequently than their nontransgender-identified counterparts. Combined with the finding that transgender-identified people are at elevated risk for several alcohol-related problems, transgender-identified people may have a high risk of morbidity and mortality in young adulthood and possibly across the lifespan. Public health researchers and practitioners must develop effective interventions that reduce victimization and marginalization of transgender-identified people to help improve their overall health and wellbeing.

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Highlights

- Heavy episodic drinking (HED) differs among transgender and nontransgender people.
- Sexual assault after drinking is higher for transgender than nontransgender people.
- Suicidality after drinking is higher for transgender than nontransgender people.
- For transgender people, sexual assault is associated with greater HED days.
- For transgender people, verbal threats are associated with greater HED days.

Table 1
Sociodemographics and victimization by gender identity: National College Health Assessment Surveys, Fall 2011–2013, United States

	Transgender- identified people N=175		Nontransgender- identified females N=50,465		Nontransgender- identified males N=24,552	
	% (95% CI)	P	% (95% CI)	P	% (95% CI)	P
<u>SOCIODEMOGRAPHICS</u>						
Age						
Younger than 21 years	55.4 (47.9, 62.7)		58.9 (54.5, 63.3)	0.378	54.0 (48.8, 59.1)	0.717
21 years or older	44.6 (37.3, 52.1)		41.1 (36.7, 45.5)		46.0 (40.9, 51.2)	
Race/ethnicity						
White	57.7 (49.6, 65.4)		66.9 (62.8, 70.8)	0.034	65.6 (61.6, 69.5)	0.068
Non-White	42.3 (34.6, 50.4)		33.1 (29.2, 37.2)		34.4 (30.5, 38.4)	
Sexual orientation						
Heterosexual	20.6 (15.8, 26.3)		91.7 (90.9, 92.5)	<0.001	90.9 (90.2, 91.6)	<0.001
Gay/lesbian	21.1 (16.1, 27.2)		1.6 (1.4, 1.8)		4.6 (4.1, 5.1)	
Bisexual	36.6 (29.4, 44.4)		4.5 (4.0, 5.1)		2.5 (2.2, 2.7)	
Unsure	21.7 (16.3, 28.4)		2.2 (1.9, 2.4)		2.0 (1.8, 2.2)	
Education level						
Undergraduate student	93.7 (86.9, 97.1)		89.3 (85.0, 92.5)	0.129	86.8 (81.1, 90.9)	0.014
Graduate student	6.3 (2.9, 13.1)		10.7 (7.5, 15.0)		13.2 (9.1, 18.9)	
Employment						
Unemployed	57.1 (51.0, 63.1)		56.0 (52.3, 59.7)	0.746	50.1 (46.5, 53.6)	0.037
Employed	42.9 (36.9, 49.0)		44.0 (40.3, 47.7)		49.9 (46.4, 53.5)	
Residence						
On-campus housing	53.7 (43.4, 63.7)		47.3 (41.7, 53.0)	0.163	45.6 (39.7, 51.5)	0.077
Off-campus housing	46.3 (36.3, 56.6)		52.7 (47.0, 58.3)		54.4 (48.5, 60.3)	
Fraternity or sorority member						
No	92.6 (88.7, 95.2)		87.0 (83.9, 89.6)	0.008	88.6 (86.7, 90.2)	0.038
Yes	7.4 (4.8, 11.3)		13.0 (10.4, 16.1)		11.4 (9.8, 13.3)	
<u>VICTIMIZATION</u>						
Physical Fight						
No	84.0 (77.3, 89.0)		96.6 (96.2, 96.9)	<0.001	89.9 (88.9, 90.7)	0.020

	Transgender- identified people <i>N</i> =175	Nontransgender- identified females <i>N</i> =50,465	Nontransgender- identified males <i>N</i> =24,552
	% (95% CI)	% (95% CI)	% (95% CI)
Physical Assault			
Yes	16.0 (11.0, 22.7)	3.4 (3.1, 3.8)	10.1 (9.3, 11.1)
No	87.4 (80.4, 92.2)	96.8 (96.5, 97.0)	95.4 (94.9, 95.8)
Yes	12.6 (7.8, 19.6)	3.2 (3.0, 3.5)	4.6 (4.2, 5.1)
Verbal Threats			
No	61.1 (53.1, 68.6)	84.7 (83.9, 85.6)	75.8 (74.2, 77.2)
Yes	38.9 (31.4, 46.9)	15.3 (14.4, 16.1)	24.2 (22.8, 25.8)
Sexual Assault			
No	78.9 (71.7, 84.6)	91.5 (90.9, 92.1)	96.5 (96.2, 96.8)
Yes	21.1 (15.4, 28.3)	8.5 (7.9, 9.1)	3.5 (3.2, 3.8)

Note. CI = confidence interval. P-values use transgender-identified people as the referent, and are based on Rao-Scott chi-square values, which account for students clustered within schools.

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Table 2

Unadjusted estimates and adjusted comparisons of drinking patterns by gender identity: National College Health Assessment Surveys, Fall 2011–2013, United States

	Unadjusted estimates			Adjusted models			
	Transgender-identified people	Nontransgender-identified females	% (95% CI)	Transgender-identified people	Nontransgender-identified females	Nontransgender-identified males	P
	% (95% CI)	% (95% CI)	% (95% CI)	Estimate	Estimate	Estimate	P
Lifetime alcohol use prevalence ^a (n=74,628)	79.9 (74.1, 84.6)	75.8 (73.8, 77.7)	74.8 (73.0, 76.6)	RR = 1.00	0.98 (0.92, 1.05)	0.96 (0.90, 1.03)	0.276
Past-month alcohol use prevalence ^a (n=74,628)	60.3 (52.3, 67.8)	62.1 (59.5, 64.6)	63.1 (60.5, 65.5)	RR = 1.00	1.04 (0.92, 1.17)	1.04 (0.93, 1.17)	0.475
Past-month alcohol use frequency ^b (mean number of days and 95% CI; n=74,628)	5.2 (4.0, 6.4)	4.1 (3.8, 4.3)	5.2 (4.9, 5.5)	IRR = 1.00	0.69 (0.52, 0.90)	0.88 (0.67, 1.16)	0.372
Past-two-week heavy episodic drinking prevalence ^a (n=74,850)	27.4 (21.0, 35.0)	28.1 (26.3, 30.1)	40.9 (38.7, 43.2)	RR = 1.00	0.97 (0.75, 1.25)	1.42 (1.10, 1.81)	0.006
Past-two-week heavy episodic drinking frequency ^b (mean number of times and 95% CI; n=74,850)	1.1 (0.7, 1.5)	0.6 (0.5, 0.6)	1.1 (1.0, 1.2)	IRR = 1.00	0.28 (0.19, 0.40)	0.43 (0.29, 0.62)	<0.001

Unadjusted estimates are the prevalence or mean, as well as 95% confidence intervals (CIs), for each alcohol use outcome by gender. Adjusted models present the risk ratio (RR) estimates or incidence-rate ratio (IRR) estimates, as well as 95% CIs, for each alcohol use variable by gender identity, controlling for age, race/ethnicity, sexual orientation, education level, employment, residence, and fraternity/sorority membership. Both unadjusted and adjusted estimates account for the clustering of students within schools.

^a = Adjusted models were fit using the modified Poisson regression approach.

^b = Adjusted models were fit using zero-inflated negative binomial regression models

Table 3
Unadjusted estimates and adjusted comparisons of alcohol-related problems among lifetime drinkers by gender identity: National College Health Assessment Surveys, Fall 2011–2013, United States

	Unadjusted estimates			Adjusted models						
	Transgender-identified people % (95% CI)	Nontransgender-identified females % (95% CI)	Nontransgender-identified males % (95% CI)	Transgender-identified people AOR	Nontransgender-identified females		Nontransgender-identified males			
					AOR	P	AOR	P		
Alcohol-related problems in the past year										
Did something they later regretted (n=56,629)	30.2 (23.2, 38.3)	32.9 (31.4, 34.4)	33.6 (32.0, 35.3)	1.00	1.16	(0.81, 1.65)	0.415	1.22	(0.85, 1.74)	0.275
Forgot where they were or what they did (n=56,543)	20.9 (15.0, 28.3)	28.0 (26.6, 29.5)	31.5 (29.8, 33.2)	1.00	1.39	(0.92, 2.11)	0.119	1.68	(1.11, 2.54)	0.014
Had unprotected sex (n=56,592)	15.2 (10.2, 22.1)	17.0 (16.0, 18.0)	18.6 (17.2, 20.0)	1.00	1.08	(0.68, 1.72)	0.747	1.23	(0.78, 1.97)	0.375
Physically injured themselves (n=56,564)	18.0 (12.2, 25.7)	13.1 (12.3, 13.9)	15.6 (14.6, 16.6)	1.00	0.78	(0.49, 1.25)	0.311	1.00	(0.63, 1.59)	0.993
Got in trouble with the police (n=56,436)	3.7 (1.2, 11.1)	2.2 (2.0, 2.5)	4.2 (3.8, 4.8)	1.00	0.61	(0.19, 1.90)	0.391	1.25	(0.39, 3.96)	0.705
Someone had sex with them without their consent (sexually assaulted; n=56,591)	7.2 (3.6, 13.7)	2.1 (1.9, 2.3)	1.1 (0.9, 1.3)	1.00	0.45	(0.22, 0.93)	0.030	0.24	(0.12, 0.48)	<0.001
Seriously considered suicide (suicidal ideation; n=56,327)	12.2 (7.5, 19.4)	1.9 (1.7, 2.1)	2.1 (1.9, 2.4)	1.00	0.37	(0.21, 0.64)	<0.001	0.42	(0.24, 0.74)	0.003

Unadjusted estimates are the prevalence for each alcohol-related problem by gender. Adjusted models present the adjusted odds ratio (AOR) estimates, as well as 95% confidence intervals (CIs), for each alcohol-related problem by gender identity, controlling for age, race/ethnicity, sexual orientation, education level, employment, residence, and fraternity/sorority membership. All models account for the clustering of students within schools.

Table 4

Correlates of heavy episodic alcohol use for transgender-identified people: National College Health Assessment Surveys, Fall 2011–2013, United States

	<u>Number of heavy episodic drinking days in past 2 weeks (n=175)</u>		
	<i>IRR</i>	<i>(95% CI)</i>	<i>P</i>
Physical fight	2.10	(0.62, 7.10)	0.235
Physical assault	0.56	(0.14, 2.22)	0.406
Verbal threats	2.42	(1.14, 5.15)	0.021
Sexual assault	3.21	(1.30, 7.93)	0.011

This model presents the incidence-rate ratio (IRR) estimates and 95% confidence intervals (CIs) for heavy episodic drinking days, controlling for age, race/ethnicity, sexual orientation, education level, employment, residence, and fraternity/sorority membership—and accounts for the clustering of students within schools.