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Association of transphobic discrimination and alcohol misuse among transgender adults: Results from the U.S. Transgender Survey

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Abstract

Background: Alcohol misuse remains a leading preventable risk factor for morbidity and mortality in the United States. Evidence suggests that alcohol misuse is more prevalent among

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Author contributions

LK conceptualized and designed the study, conducted the analyses, and drafted the original manuscript. REP assisted with the conceptualization of the study, critically reviewed, and edited the manuscript. CJB critically reviewed and edited the manuscript. SEM assisted with the conceptualization of the study, interpretation of results, critically reviewed the manuscript, and provided supervision for the study. All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

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Declaration of Competing Interest

None.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.drugalcdep.2020.108223>.

transgender populations. This study examined the association between transphobic discrimination and alcohol use/misuse among a large sample of transgender people.

Methods: Using the 2015 U.S. Transgender Survey ($N = 27,715$), logistic regression models were conducted to estimate the adjusted odds ratios (AOR) and 95 % confidence intervals (CI) of current alcohol use, past-month binge drinking (≥ 1 occasion of consuming ≥ 5 alcoholic beverages within the past month), and past-month frequent binge drinking (≥ 5 occasions of binge drinking within the past month) among transgender people.

Results: Of the respondents, 60.4 % reported current alcohol use, 24.3 % reported past-month binge drinking, and 8.5 % reported past-month frequent binge drinking. The majority (70.1 %) had experienced some form of past-year transphobic discrimination. Experiencing 3+ forms of transphobic discrimination was significantly associated with past-month binge drinking (AOR = 1.49, 95 % CI = 1.37–1.62) and past-month frequent binge drinking (AOR = 1.57, 95 % CI = 1.37–1.79) than individuals who did not experience transphobic discrimination. Persons who cross-dress showed higher odds of current alcohol use (AOR = 1.52, 95 % CI = 1.32–1.74), past-month binge drinking (AOR = 2.51, 95 % CI = 2.21–2.85), and past-month frequent binge drinking (AOR = 4.13, 95 % CI = 3.45–4.94) than transgender women. Discrimination within public spaces and housing domains had the most robust associations with alcohol misuse.

Conclusions: Experiencing transphobic discrimination increased the odds of alcohol misuse among transgender people. Stakeholders and providers should be cognizant of the multifaceted nature of transphobic discrimination as unique social stressors that many transgender persons experience.

Keywords

Transgender; Binge drinking; Alcohol misuse; Discrimination; Epidemiology

1. Introduction

Alcohol misuse contributes to the global burden of disease, causes approximately 3.3 million deaths per year (or 5.9 % of all deaths) worldwide (Rehm et al., 2009; World Health Organization, 2018), and is associated with increased costs related to healthcare and social harm (Rehm et al., 2009). Binge drinking (defined as consuming ≥ 5 alcoholic beverages by men or ≥ 4 alcoholic beverages by women on the same occasion) is reported by 17 % of the American adult population (Azagba et al., 2020) and is more prevalent among U.S. transgender populations (Day et al., 2017; Grant et al., 2011; James et al., 2016; Tupler et al., 2017). For the present study, we will use the term alcohol misuse to refer to binge drinking and frequent binge drinking (defined as binge drinking on ≥ 5 occasions in the past month).

The term *transgender* broadly refers to individuals whose gender identity and/or gender expression differs from their assigned sex at birth (Institute of Medicine, 2011). It is an umbrella term used to encapsulate a spectrum of identities which transcend culturally defined categories of gender, including *transgender women* (individuals who were assigned male at birth, but identify as women), *transgender men* (individuals who were assigned female at birth, but identify as men), *non-binary/genderqueer* (individuals who do not

subscribe to a binary paradigm of gender), and *persons who cross-dress* (individuals who dress in clothing commonly associated with another gender) (Bockting, 2009; Institute of Medicine, 2011). Language used to describe gender identities/expression is dynamic, political, and cohort dependent, and individuals who fall under the transgender umbrella may not necessarily identify with that label (Witten, 2016). For example, some persons who cross-dress may view their cross-dressing as a form of gender expression, may not experience any dissonance between their gender identity and their assigned sex at birth, and may not regard themselves as transgender (James et al., 2016). The decision to adopt the transgender identity label is highly individual. An estimated 0.6 % of U.S. adults (approximately 1.4 million) identify as transgender and younger adults are more likely to identify as transgender than older adults (Flores et al., 2016), making it imperative for us to better understand alcohol risk in this growing population.

In its landmark report, the Institute of Medicine called attention to the paucity of research about transgender populations and the high prevalence of alcohol misuse among transgender people (Institute of Medicine, 2011). A systematic review revealed that alcohol misuse among transgender people varied considerably across studies, ranging from 7 % to 61 % (Gilbert et al., 2018). Variation in the prevalence of alcohol misuse among transgender people may be attributable to different sampling strategies (e.g., probability versus non-probability methods) (Henderson et al., 2019). Some studies which compared the prevalence of alcohol misuse between transgender and *cisgender* adults (individuals whose gender identity aligns with their assigned sex at birth) have found no statistically significant difference between the two groups (Blosnich et al., 2017; Meyer et al., 2017). In contrast, studies of college students have found that transgender students reported more days of binge drinking (Coulter et al., 2015), more total drinks, and a greater number of maximum drinks per day in the past two weeks compared to cisgender students (Tupler et al., 2017). Researchers have also considered the heterogeneity in transgender populations by examining the drinking behavior among transgender subgroups. Prior work has found that there were no significant differences between transgender women and transgender men in their rates of alcohol misuse (Gonzalez et al., 2017). Past studies have not examined additional heterogeneity among transgender populations, such as other forms of gender identity/expression, transgender-specific factors, or experiences of transphobic discrimination, which may influence alcohol misuse.

The *Minority Stress Model* provides insight regarding substance misuse as a stress-related behavior among sexual minority populations to cope with their experience of stigma and discrimination (Meyer, 2003, 1995). Building upon this model, Hendricks and Testa (2012) proposed the *Gender Minority Stress Model* to explain how discrimination based on gender identity/expression (referred to in this study as transphobic discrimination) creates psychological distress. The excess tension in the social environment can impact transgender people's physical and psychological well-being through stress responses and health behaviors resulting in health-related disparities (Hendricks and Testa, 2012; Meyer, 2003, 1995; White Hughto et al., 2015). Transphobic discrimination occurs across multiple social domains, such as public, education, employment/workplace, housing, and healthcare settings, (Casey et al., 2019; Grant et al., 2011; Kcomt, 2019; Pyne, 2011; Reisner et al., 2015; Seelman, 2014). Discrimination can produce inequities by limiting transgender

people's opportunities and resources, and by amplifying their health disparities (Hatzenbuehler et al., 2013; White Hughto et al., 2015). Previous work has demonstrated the presence of transphobic discrimination and its relationship with alcohol misuse among transgender young adults (Coulter et al., 2015; Tupler et al., 2017). Our study extends the current literature by examining transphobic discrimination across multiple domains to determine if discrimination experienced within certain settings may be associated with alcohol use/misuse. We believe this inquiry is important because it will allow for the identification of potential targets for interventions.

Informed by the *Gender Minority Stress Model* (Hendricks and Testa, 2012), the purpose of this study was to: 1) examine the association between transphobic discrimination and alcohol use/misuse among a large national sample of U.S. transgender adults; 2) assess transphobic discrimination across multiple social domains as potential correlates to alcohol use/misuse among transgender people; 3) examine differences among transgender subgroups in their odds for alcohol use/misuse.

2. Methods

2.1. Data source

This study used the 2015 U.S. Transgender Survey (USTS) as its data source for secondary analysis. Conducted by the National Center for Transgender Equality, the non-probability sampling methods resulted in the largest, cross-sectional sample of U.S. adults (aged 18 years) who self-identified as transgender, genderqueer, non-binary, or another identity on the transgender spectrum to date ($N = 27,715$). Further details about the primary study's methodology have been published previously (James et al., 2016). Approval for the present study has been received from the University of Windsor Research Ethics Board.

2.2. Measures

2.2.1. Alcohol use and misuse—Current alcohol use was defined as having drank an alcoholic beverage within the past 30 days. Those who reported current alcohol use were asked a subsequent question to assess binge drinking: *"During the past 30 days, on how many days did you have 5 or more drinks on the same occasion? By 'occasion,' we mean at the same time or within a couple of hours of each other."* From this item, two alcohol misuse variables were created: binge drinking (defined as 1 occasion of consuming 5 alcoholic beverages within the past 30 days) and frequent binge drinking (defined as binge drinking on 5 occasions in the past 30 days). Within the literature, the standards used to define binge drinking are based on assigned sex at birth (Centers for Disease Control and Prevention, 2018; Dafna et al., 2012). However, some transgender individuals change their physiology through gender-affirming hormone treatments and/or surgeries. In the absence of established guidelines to assess binge drinking and frequent binge drinking among transgender populations, the same 5 alcoholic beverages threshold was applied to all individuals (Coulter et al., 2015; Gilbert et al., 2018; Turban et al., 2020).

2.2.2. Transphobic discrimination—The Transphobic Discrimination Experiences Index was constructed out of 50 items that assessed experiences of discrimination resulting

from the respondents' transgender status or gender expression across five domains: public spaces, employment/workplace, housing, educational settings, and healthcare settings (Table S1). The educational settings domain assessed transphobic discrimination during K-12 and post-secondary education; the other four domains assessed past-year experiences. Each item had a dichotomous response set (yes/no). The affirmative responses were summed and subsequently recoded into a categorical variable (none, 1–2, and 3+). Domain-specific discrimination indexes were created by summing the affirmative responses within each domain and recoding them into categorical variables (none, 1–2, and 3+).

2.2.3. Sociodemographic correlates—These consisted of gender identity/expression (transgender women, transgender men, non-binary/genderqueer assigned female at birth [AFAB], non-binary/genderqueer assigned male at birth [AMAB], and persons who cross-dress); age (18–24, 25–44, 45–64, and 65+); race/ethnicity (non-Hispanic White, Hispanic/Latinx, Black/African American, biracial/multiracial, and others); educational attainment (less than high school, high school grad, some college, and bachelor's degree or higher); lives in poverty (yes/no); and sexual orientation (heterosexual, gay/lesbian/same gender loving, bisexual, pansexual, queer, asexual, and sexual orientation not listed). Based on the U.S. Census Bureau's official poverty measure in 2015, poverty was coded using age of householders, household size, and self-reported income.

2.2.4. Health and transgender-specific correlates—Health measures included psychological distress (yes/no) and general health status (excellent, very good, good, fair/poor). Serious psychological distress during the past month was assessed using the Kessler Psychological Distress Scale; respondents met the threshold for serious psychological distress if they scored ≥ 13 ($\kappa = 0.64$) (Substance Abuse and Mental Health Services Administration, 2010). Transgender-specific factors included disclosure of transgender identity and visual conformity. Disclosure was a summary measure reflecting categorical degrees of outness about the respondents' transgender identity to eight categories of people in their social network (immediate family; extended family; lesbian, gay, bisexual, or transgender friends; straight, non-transgender friends; current boss/manager/supervisor; current coworkers; current classmates; current healthcare providers). The disclosure measure had good internal consistency in this study ($\alpha = 0.81$). Visual conformity was a recoded variable based on the survey item, “People can tell I am transgender even if I don't tell them.” Responses were recoded to tertiles (rarely, never = visual conformers; sometimes = somewhat visual conforming; and always, most of the time = visual non-conformers).

2.3. Statistical analysis

The original sample included a disproportionate number of young, non-Hispanic White respondents and thus, survey weights were applied, adjusting the USTS sample to reflect the age, race/ethnicity, and educational attainment of the U.S. population. Univariate frequency distributions with weighted percentages were used to describe the study sample. Pearson's chi-square (χ^2) tests were used to examine the associations between the correlates with the outcomes. Multivariable logistic regression analyses estimated the relationships of transphobic discrimination experiences (overall and domain-specific, respectively) with current alcohol use, binge drinking, and frequent binge drinking, adjusting for

sociodemographic, health, and transgender-specific correlates. Only correlates that were significantly associated with the outcome variable during bivariate analyses were included in the model for that outcome. Missing data were at random (Little, 1988) and ranged from 0.1 % for general health status to 9.8 % for the transphobic discrimination experiences index. Missing data were deleted listwise in each logistic regression model. Consequently, there were minor differences in sample size among the models due to differences in missing data within the variables used to construct each model. Moreover, we conducted supplemental analyses by replicating the models using overall and domain-specific discrimination as continuous variables and stratified the sample by gender identity/expression to examine the association between overall transphobic discrimination and alcohol use outcomes among each subgroup. All analyses were conducted using SPSS, version 26.

3. Results

The analytic sample consisted of 27,715 respondents (See Table 1). Overall, 52.2 % ($n = 9,238$) identified as transgender women, 21.8 % ($n = 7,950$) as transgender men, 13.1 % ($n = 7,844$) as non-binary/genderqueer AFAB, 6.1 % ($n = 1,925$) as non-binary/genderqueer AMAB, and 6.9 % ($n = 758$) as persons who cross-dress. The majority (70.1 %, $n = 19,711$) had experienced some form of transphobic discrimination within the past year. The highest prevalence of transphobic discrimination had occurred within healthcare settings, wherein 38.2 % ($n = 12,741$) of the sample experienced at least one form of discrimination. Over half (60.4 %, $n = 17,156$) had consumed alcohol within the past 30 days. Almost one-quarter (24.3 %, $n = 6,871$) reported binge drinking and 8.5 % ($n = 1,894$) reported frequent binge drinking within the past month.

Gender identity/expression, age, race/ethnicity, educational attainment, sexual orientation, and general health status were included as controls in all models, whereas visual conformity was omitted from all models (See Table 2). Other control variables selectively included in the models based on their significant bivariate associations with the outcome of interest were: living in poverty, serious psychological distress, and disclosure of transgender identity. Table 3 displays the results of the logistic regression models with transphobic discrimination experiences predicting current alcohol use (Model 1), binge drinking (Model 2), and frequent binge drinking (Model 3). Experiencing 1–2 forms of transphobic discrimination was associated with increased odds of binge drinking (adjusted odds ratio [AOR] = 1.12, 95 % confidence interval [CI] = 1.03–1.21) as was experiencing 3+ forms of discrimination (AOR = 1.49, 95 % CI = 1.37–1.62) compared to those who did not experience any transphobic discrimination. Transgender individuals who experienced 3+ forms of discrimination had increased odds of frequent binge drinking (AOR = 1.57, 95 % CI = 1.37–1.79). Supplemental analyses using overall transphobic discrimination experiences as a continuous variable found discrimination was associated with risk for all three outcomes (current alcohol use: AOR = 1.02, 95 % CI = 1.01–1.03; binge drinking: AOR = 1.05, 95 % CI = 1.04–1.06; frequent binge drinking: AOR = 1.07, 95 % CI = 1.05–1.08) (Table S2).

Table 4 displays the results of the adjusted logistic regression models assessing the associations between domain-specific discrimination indexes and current alcohol use (Model 1), binge drinking (Model 2), and frequent binge drinking (Model 3). Across several

domains, individuals who experienced 3+ forms of discrimination showed increased adjusted odds of binge drinking, with AORs ranging from 1.17 ($p < .01$) in educational settings to 1.70 ($p < .001$) in public spaces compared to those who did not experience any discrimination within those domains. Discrimination within public spaces and housing domains had the most robust associations with frequent binge drinking (AOR=2.46 and 1.77 respectively, $p < .001$). Lastly, there was an unexpected finding that individuals who experienced 3+ forms of discrimination within healthcare settings had decreased odds of binge drinking (AOR=0.74, 95 % CI=0.62–0.87). Results of supplemental analyses using domain-specific transphobic discrimination experiences as continuous variables can be found in Table S3.

The risk of current alcohol use/misuse differed by gender identity/expression. Persons who cross-dress showed higher odds of current alcohol use (AOR = 1.52, 95 % CI = 1.32–1.74), binge drinking (AOR = 2.51, 95 % CI = 2.21–2.85), and frequent binge drinking (AOR = 4.13, 95 % CI = 3.45–4.94) compared to transgender women (Table 3). Supplemental analyses using the stratified sample by gender identity/expression showed that experiencing 3+ forms of discrimination was significantly associated with binge drinking among all subgroups except persons who cross-dress, compared to individuals in those subgroups who did not experience discrimination (Table S4). Similarly, experiencing 3+ forms of discrimination was significantly associated with frequent binge drinking for transgender women, transgender men, and non-binary/genderqueer AFAB compared to individuals who did not experience any discrimination in their subgroups.

4. Discussion

We found that seven in every ten transgender individuals had experienced some form of discrimination based on their gender identity/expression within the past year. This high prevalence demonstrates the pervasive nature of such discrimination in our social institutions (Grant et al., 2011). This study provides empirical support for the *Gender Minority Stress Model*, in that the experience of transphobic discrimination was significantly associated with alcohol misuse among transgender populations. Transgender individuals who experienced multiple types of transphobic discrimination were more likely to misuse alcohol compared to those who did not experience discrimination. Discrimination in public, employment/workplace, housing, and educational settings had significantly increased odds of binge drinking, whereas discrimination in healthcare settings unexpectedly resulted in decreased odds of binge drinking.

Transphobic discrimination disadvantages transgender people by limiting their opportunities and access to resources, which can have deleterious effects on their well-being and financial security (Institute of Medicine, 2011). For example, experiencing bullying in school settings can negatively impact transgender students' academic achievement and educational aspirations (Greytak et al., 2009), which may affect their future income earning potential (Grant et al., 2011). Employment/workplace discrimination can lead to income disparities as well as compromised access to adequate health insurance (dickey et al., 2016). Discrimination in public settings forces transgender people out of public life, making it more difficult for them to access key services, such as public transportation (Reisner et al., 2015).

For transgender people, this excess stress in their social environments can produce profound physiological, psychological, and behavioral effects (Hendricks and Testa, 2012; Meyer, 2003, 1995). Our study demonstrated associations between domain-specific discrimination and alcohol misuse and supports the call for targeted intervention strategies for transgender individuals. The need to recognize and eliminate transphobic discrimination is especially important as more individuals, particularly younger adults, identify as transgender and disclose their identity. Interventions such as implementing non-discrimination policies protecting gender minorities and cultural competency training for staff may be effective ways to mitigate transphobic discrimination.

This study found significant differences among gender identity/expression subgroups in their alcohol misuse and in the association of discrimination with alcohol misuse. Specifically, persons who cross-dress had increased adjusted odds of alcohol use/misuse compared to transgender women, whereas non-binary/genderqueer AFAB individuals had decreased adjusted odds for alcohol misuse compared to transgender women. These findings show that transgender subgroups can have distinct health risk profiles, which underscores the importance of understanding gender diversity. Difference in health risk profiles may have assessment implications for alcohol interventions among transgender persons. Additional research may elucidate alcohol misuse variations based on the lived experience of transgender individuals. Furthermore, our analyses with the stratified sample showed that transphobic discrimination was significantly associated with alcohol misuse for all transgender subgroups except persons who cross-dress. This stress-related health behavior among transgender people is associated with higher risk of developing an alcohol use disorder and related health concerns (Hendricks and Testa, 2012; Meyer, 2003, 1995). Providers need to consider the discrimination their transgender patients may have experienced as part of their assessment and treatment process. Future research might examine the role of stress as a mediator between discrimination and alcohol use/misuse.

Historically, lack of understanding about gender diversity resulted in the conflation of transgender people with persons who cross-dress and the pathologization of transgender individuals as transvestites—a term now considered pejorative. Research should be sensitive to the changing nature of identity labels and the distinctions drawn between identity subgroups based on their experiences (Beemyn and Rankin, 2011). The inclusion of persons who cross-dress in this study highlights the heterogeneity of gender minorities and thus, extends knowledge about alcohol use/misuse among transgender populations. The greater risk of alcohol misuse found among persons who cross-dress may be related to their decreased identity disclosure, potentially increasing their social isolation. *Post hoc* analysis revealed that persons who cross-dress were less likely to be out to most or all of their social networks (11.2 %) relative to transgender women (72.2 %), transgender men (74.4 %), non-binary/genderqueer AFAB (32.4 %), and non-binary/genderqueer AMAB (34.8 %) (results not shown). Though persons who cross-dress are included under the transgender umbrella, they are frequently excluded in research studies because cross-dressing is considered a form of gender expression rather than indicative of gender identity (Grant et al., 2011; Kattari et al., 2020), or persons who cross-dress are subsumed under other transgender subgroups due to small sample sizes (Horvath et al., 2014). Like persons who cross-dress, non-binary/genderqueer individuals are also underrepresented in transgender research (Reisner and

Hughto, 2019). Our findings suggest that future research should aim to bring these transgender subgroups into focus for a more nuanced understanding of their experiences.

The prevalence of binge drinking among transgender individuals in the current study (24.3 %) is higher than previous estimates found in regional samples of transgender adults using probability-based sampling methods (e.g., 16.74 % (Meyer et al., 2017) and 11.5 % (Blosnich et al., 2017)). It should be noted that these probability-based transgender samples were from selected states (19 states and 8 states, respectively), producing much smaller sample sizes. Studies using probability-based transgender samples are limited to states that opt to assess gender identity/expression. The lower rates of binge drinking found in these samples may be a selection effect, wherein these states may be more affirming of gender diversity relative to other states that forego assessing gender identity/expression, thus underestimating the true prevalence of discrimination and binge drinking among transgender people nationally. Notably, the estimated prevalence of binge drinking and frequent binge drinking among transgender people in this study were also higher than the estimates found among U.S. adults in the general population in other studies utilizing the same measures (Azagba et al., 2020; Dafna et al., 2012). Importantly, binge drinking is associated with suicidality, poor mental health, and other adverse health-related behaviors (Cranford et al., 2009; Glasheen et al., 2015; Paul et al., 2011). The high prevalence of binge drinking among transgender adults in this study should alert practitioners to screen for alcohol use to identify individuals in need of further interventions.

This study found that the highest prevalence of transphobic discrimination occurred within healthcare settings. Yet, there was an unexpected finding that transgender individuals who experienced multiple forms of discrimination in healthcare settings had decreased odds of binge drinking. It may be that individuals with fair/poor health were more likely to visit a healthcare provider, and hence, were more likely to experience transphobic discrimination. Additional bivariate analysis revealed that 50.4 % of transgender individuals who experienced 3+ forms of discrimination in healthcare settings had fair/poor health compared to only 17.3 % of transgender individuals who experienced no discrimination in healthcare settings (results not shown). Alcohol misuse may have been contraindicated for these individuals because of their health conditions that led to more healthcare visits, potentially explaining their decreased odds of binge drinking.

Our study showed a high prevalence of alcohol misuse among transgender populations and demonstrated that transphobic discrimination is significantly associated with alcohol misuse. This provides a strong rationale for lessening transphobic discrimination as a potential pathway for decreasing alcohol misuse among transgender individuals. Multiple studies, including ours, have shown the prevalence and impact of transphobic discrimination in many settings (Casey et al., 2019; Grant et al., 2011; Greytak et al., 2009; Kcomt, 2019; Pyne, 2011; Reisner et al., 2015; Seelman, 2014). Stakeholders and providers should develop awareness of the multifaceted and pervasive nature of transphobic discrimination as unique social stressors (Ebersole et al., 2012; Hendricks and Testa, 2012), which the majority of transgender individuals experience. Offering a safe, welcoming space that embraces gender diversity can reduce the social isolation often experienced by transgender populations (Gower et al., 2018). In light of our findings, governments, organizations, and institutions

should review their practices to eliminate barriers to access and strive to create gender-affirming environments for transgender individuals (Glynn and van den Berg, 2017; Gower et al., 2018; U.S. Department of Health and Human Services, 2001). In embracing gender diversity, stakeholders and providers may be challenged to confront their own biases rooted in a restrictive gender normative paradigm (Hendricks and Testa, 2012).

4.1. Strengths and limitations of the study

This study used the largest national dataset of U.S. transgender adults to date, allowing for comparisons of gender identity/expression subgroups while controlling for socio-demographic and transgender-specific factors in alcohol use/misuse. Several limitations, however, should also be noted. The 2015 USTS was cross-sectional and used non-probability sampling methods; thus, generalizability of our results is limited and the timing of discrimination experiences and alcohol use/misuse could not be determined. Additionally, the primary study used an online-only platform for data collection. The biases inherent in online surveys of transgender populations have been well documented (Hash and Spencer, 2007; Miner et al., 2012). Lastly, the Transphobic Discrimination Experiences Index as well as the domain-specific discrimination indexes reflect multiple facets of transphobic discrimination but do not capture the frequency nor severity of discriminatory experiences, which can impact transgender individuals.

4.2. Areas for future research

Future studies should explore different methods for utilizing non-probability-based transgender samples to make inferences to a larger population. Prospective research should also consider the intersections of transgender identity/expression with race/ethnicity, age, sexual orientation, and disability to explore the associations among multiplicative discrimination and alcohol misuse. Not all transgender individuals who engage in alcohol misuse will develop alcohol use disorder. However, for those who require intervention, there is scant research on theoretically informed, culturally sensitive screening and substance use treatment programs specific to transgender consumers (Cochran et al., 2007; Glynn and van den Berg, 2017). Future research should examine early exposure to gender-affirming environments to understand how these environments might reduce alcohol misuse. In addition, future studies should aim to understand how alcohol is metabolized in transgender adults and determine appropriate cut points for binge drinking, particularly among those who have received gender-affirming hormone therapy or surgeries. Addressing these research needs may enhance understanding of transgender people's experiences with alcohol misuse, particularly those who hold multiple marginalized identities, and improve the efficacy of substance use prevention and treatment for transgender populations.

5. Conclusion

Higher levels of exposure to transphobic discrimination is associated with increased odds of alcohol misuse among transgender people. This can have detrimental long-term effects on their morbidity and mortality. Stakeholders and service providers should be aware of transphobic discrimination as a potential social stressor for transgender people. Creating an

environment that embraces gender diversity and cultural sensitivity may attenuate the risk of alcohol misuse among transgender populations.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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References

- Azagba S, Shan L, Latham K, Manzione L, 2020 Trends in binge and heavy drinking among adults in the United States, 2011–2017. *Subst. Use Misuse* 1–8. 10.1080/10826084.2020.1717538.
- Beemyn G, Rankin S, 2011 *The Lives of Transgender People*. Columbia University Press, New York, NY.
- Blosnich JR, Lehavot K, Glass JE, Williams EC, 2017 Differences in alcohol use and alcohol-related health care among transgender and nontransgender adults: findings from the 2014 Behavioral Risk Factor Surveillance System. *J. Stud. Alcohol Drugs* 78, 861–866. 10.15288/jsad.2017.78.861. [PubMed: 29087820]
- Bockting WO, 2009 Transforming the paradigm of transgender health: a field in transition. *Sex. Relatsh. Ther* 24, 103–107. 10.1080/14681990903037660.
- Casey LS, Reisner SL, Findling MG, Blendon RJ, Benson JM, Sayde JM, Miller C, 2019 Discrimination in the United States: experiences of lesbian, gay, bisexual, transgender, and queer Americans. *Health Serv. Res* 54, 1454–1466. 10.1111/1475-6773.13229. [PubMed: 31659745]
- Centers for Disease Control and Prevention, 2018 Alcohol and Public Health - Frequently Asked Questions. URL <https://www.cdc.gov/alcohol/faqs.htm> (Accessed 2.7.20).
- Cochran BN, Peavy KM, Robohm JS, 2007 Do specialized services exist for LGBT individuals seeking treatment for substance misuse? A study of available treatment programs. *Subst. Use Misuse* 42, 161–176. 10.1080/10826080601094207. [PubMed: 17366131]
- Coulter RWS, Blosnich JR, Bukowski LA, Herrick AL, Siconolfi DE, Stall RD, 2015 Differences in alcohol use and alcohol-related problems between transgender- and nontransgender-identified young adults. *Drug Alcohol Depend.* 154, 251–259. 10.1016/j.drugalcdep.2015.07.006. [PubMed: 26210734]
- Cranford JA, Eisenberg D, Serras AM, 2009 Substance use behaviors, mental health problems, and use of mental health services in a probability sample of college students. *Addict. Behav* 34, 134–145. 10.1016/j.addbeh.2008.09.004. [PubMed: 18851897]
- Dafna K, Liu Y, Brewer RD, Garvin WS, Balluz L, 2012 Vital signs: binge drinking prevalence, frequency, and intensity among adults - United States, 2010. *Morb. Mortal. Wkly. Rep* 61.
- Day JK, Fish JN, Perez-Brumer A, Hatzenbuehler ML, Russell ST, 2017 Transgender youth substance use disparities: results from a population-based sample. *J. Adolesc. Health* 61, 729–735. 10.1016/j.jadohealth.2017.06.024. [PubMed: 28942238]
- dickey Im., Budge SL, Katz-Wise SL, Garza MV, 2016 Health disparities in the transgender community: exploring differences in insurance coverage. *Psychol. Sex. Orientat. Gend. Divers* 3, 275–282. 10.1037/sgd0000169.

- Ebersole RC, Noble JJ, Madson MB, 2012 Drinking motives, negative consequences, and protective behavioral strategies in lesbian, gay, bisexual, and transgender college students. *J. LGBT Issues Couns* 6, 337–352. 10.1080/15538605.2012.725650.
- Flores AR, Herman JL, Gates GJ, Brown TNT, 2016 How Many Adults Identify As Transgender in the United States? The Williams Institute, Los Angeles, CA.
- Gilbert PA, Pass LE, Keuroghlian AS, Greenfield TK, Reisner SL, 2018 Alcohol research with transgender populations: a systematic review and recommendations to strengthen future studies. *Drug Alcohol Depend.* 186, 138–146. 10.1016/j.drugalcdep.2018.01.016. [PubMed: 29571076]
- Glasheen C, Pemberton MR, Lipari R, Copello EA, Mattson ME, 2015 Binge drinking and the risk of suicidal thoughts, plans, and attempts. *Addict. Behav* 43, 42–49. 10.1016/j.addbeh.2014.12.005. [PubMed: 25553510]
- Glynn TR, van den Berg JJ, 2017 A systematic review of interventions to reduce problematic substance use among transgender individuals: a call to action. *Transgend. Health* 2, 45–59. 10.1089/trgh.2016.0037. [PubMed: 28861547]
- Gonzalez CA, Gallego JD, Bockting WO, 2017 Demographic characteristics, components of sexuality and gender, and minority stress and their associations to excessive alcohol, cannabis, and illicit (noncannabis) drug use among a large sample of transgender people in the United States. *J. Prim. Prev* 38, 419–445. 10.1007/s10935-017-0469-4. [PubMed: 28405831]
- Gower AL, Rider GN, Brown C, McMorris BJ, Coleman E, Taliaferro LA, Eisenberg ME, 2018 Supporting transgender and gender diverse youth: protection against emotional distress and substance use. *Am. J. Prev. Med* 55, 787–794. 10.1016/j.amepre.2018.06.030. [PubMed: 30344037]
- Grant JM, Mottet LA, Tanis J, Harrison J, Herman JL, Keisling M, 2011 Injustice at Every Turn: a Report of the National Transgender Discrimination Survey. National Center for Transgender Equality and National Gay and Lesbian Task Force, Washington, D.C.
- Greytak EA, Kosciw JG, Diaz EM, 2009 Harsh Realities: The Experiences of Transgender Youth in Our Nation's Schools. Gay, Lesbian and Straight Education Network, New York.
- Hash KM, Spencer SM, 2007 "You've got subjects": the promise of the internet in research with lesbian, gay, bisexual, and transgender populations In: Meezan W, Martin JI (Eds.), *Handbook of Research with Lesbian, Gay, Bisexual, and Transgender Populations*. Taylor & Frances Ltd., Oxfordshire, United Kingdom, pp. 238–257.
- Hatzenbuehler ML, Phelan JC, Link BG, 2013 Stigma as a fundamental cause of population health inequalities. *Am. J. Public Health* 103, 813–821. 10.2105/AJPH.2012.301069. [PubMed: 23488505]
- Henderson ER, Blosnich JR, Herman JL, Meyer IH, 2019 Considerations on sampling in transgender health disparities research. *LGBT Health* 6, 267–270. 10.1089/lgbt.2019.0069. [PubMed: 31295043]
- Hendricks ML, Testa RJ, 2012 A conceptual framework for clinical work with transgender and gender nonconforming clients: an adaptation of the Minority Stress Model. *Prof. Psychol. Res. Pract* 43, 460–467. 10.1037/a0029597.
- Horvath KJ, Iantaffi A, Swinburne-Romine R, Bockting W, 2014 A comparison of mental health, substance use, and sexual risk behaviors between rural and non-rural transgender persons. *J. Homosex* 61, 1117–1130. 10.1080/00918369.2014.872502. [PubMed: 24380580]
- Institute of Medicine, 2011 The Health of Lesbian, Gay, Bisexual, and Transgender People: Building a Foundation for Better Understanding. The National Academies Press, Washington, D.C.
- James SE, Herman JL, Rankin S, Keisling M, Mottet LA, Anafi M, 2016 The Report of the 2015 U.S. Transgender Survey. National Center for Transgender Equality, Washington, D.C.
- Kattari SK, Bakko M, Hecht HK, Kattari L, 2020 Correlations between healthcare provider interactions and mental health among transgender and nonbinary adults. *SSM -Popul. Health* 10, 100525. 10.1016/j.ssmph.2019.100525. [PubMed: 31872041]
- Kcomt L, 2019 Profound health-care discrimination experienced by transgender people: rapid systematic review. *Soc. Work Health Care* 58, 201–219. 10.1080/00981389.2018.1532941. [PubMed: 30321122]

- Little RJA, 1988 A test of missing completely at random for multivariate data with missing values. *J. Am. Stat. Assoc* 83, 1198–1202.
- Meyer IH, 1995 Minority stress and mental health in gay men. *J. Health Soc. Behav* 36, 38–56. 10.2307/2137286. [PubMed: 7738327]
- Meyer IH, 2003 Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: conceptual issues and research evidence. *Psychol. Bull* 129, 674–697. 10.1037/0033-2909.129.5.674. [PubMed: 12956539]
- Meyer IH, Brown TNT, Herman JL, Reisner SL, Bockting WO, 2017 Demographic characteristics and health status of transgender adults in select US regions: behavioral Risk Factor Surveillance System, 2014. *Am. J. Public Health* 107, 582–589. 10.2105/AJPH.2016.303648. [PubMed: 28207334]
- Miner MH, Bockting WO, Romine RS, Raman S, 2012 Conducting internet research with the transgender population: reaching broad samples and collecting valid data. *Soc. Sci. Comput. Rev* 30, 202–211. 10.1177/0894439311404795. [PubMed: 24031157]
- Paul LA, Grubaugh AL, Frueh BC, Ellis C, Egede LE, 2011 Associations between binge and heavy drinking and health behaviors in a nationally representative sample. *Addict. Behav* 36, 1240–1245. 10.1016/j.addbeh.2011.07.034. [PubMed: 21868171]
- Pyne J, 2011 Unsuitable bodies: trans people and cisnormativity in shelter services. *Can. Soc. Work Rev* 28, 129–137.
- Rehm J, Mathers C, Popova S, Thavorncharoensap M, Teerawattananon Y, Patra J, 2009 Global burden of disease and injury and economic cost attributable to alcohol use and alcohol-use disorders. *Lancet* 373, 2223–2233. 10.1016/S0140-6736(09)60746-7. [PubMed: 19560604]
- Reisner SL, Hughto JMW, 2019 Comparing the health of non-binary and binary transgender adults in a statewide non-probability sample. *PLoS One* 14, e0221583 10.1371/journal.pone.0221583. [PubMed: 31454395]
- Reisner SL, Hughto JMW, Dunham EE, Heflin KJ, Begenyi JBG, Coffey-Esquivel J, Cahill S, 2015 Legal protections in public accommodations settings: a critical public health issue for transgender and gender-nonconforming people. *Milbank Q.* 93, 484–515. 10.1111/1468-0009.12127. [PubMed: 26219197]
- Seelman KL, 2014 Transgender individuals' access to college housing and bathrooms: findings from the National Transgender Discrimination Survey. *J. Gay Lesbian Soc. Serv* 26, 186–206. 10.1080/10538720.2014.891091.
- Substance Abuse and Mental Health Services Administration, 2010 Reliability of Key Measures in the National Survey on Drug Use and Health. U. S. Department of Health and Human Services, Rockville, MD.
- Tupler LA, Zapp D, DeJong W, Ali M, O'Rourke S, Looney J, Swartzwelder HS, 2017 Alcohol-related blackouts, negative alcohol-related consequences, and motivations for drinking reported by newly matriculating transgender college students. *Alcohol. Clin. Exp. Res* 41, 1012–1023. 10.1111/acer.13358. [PubMed: 28324915]
- Turban JL, Beckwith N, Reisner SL, Keuroghlian AS, 2020 Association between recalled exposure to gender identity conversion efforts and psychological distress and suicide attempts among transgender adults. *JAMA Psychiatry* 77, 68–76. 10.1001/jamapsychiatry.2019.2285.
- U.S. Department of Health and Human Services, 2001 A Provider's Introduction to Substance Abuse Treatment for Lesbian, Gay, Bisexual, and Transgender Individuals. 10.1037/e435552005-001.
- White Hughto JM, Reisner SL, Pachankis JE, 2015 Transgender stigma and health: a critical review of stigma determinants, mechanisms, and interventions. *Soc. Sci. Med* 147, 222–231. 10.1016/j.socscimed.2015.11.010. [PubMed: 26599625]
- Witten TM, 2016 The intersectional challenges of aging and of being a gender nonconforming adult. *Generations* 9.
- World Health Organization, 2018 Global Status Report on Alcohol and Health 2018. World Health Organization, Geneva.

Table 1Characteristics of Transgender Respondents ($N = 27,715$).

Variables Categories	Sample Size ^a	% ^b
Gender Identity/Expression		
Transgender women	9,238	52.2
Transgender men	7,950	21.8
Non-binary/genderqueer AFAB	7,844	13.1
Non-binary/genderqueer AMAB	1,925	6.1
Persons who cross-dress	758	6.9
Age		
18 to 24	11,840	11.9
25 to 44	10,987	38.7
45 to 64	4,085	34.4
65+	803	14.9
Race/Ethnicity		
Non-Hispanic White	22,873	65.9
Hispanic/Latinx	1,473	14.9
Black/African American	796	13.1
Biracial/Multiracial	1,468	2.0
Others	1,105	4.2
Educational Attainment		
Less than high school	906	13.9
High school grad	3,467	27.8
Some college	12,819	30.8
Bachelor's degree or higher	10,523	27.4
Lives in Poverty ^c	8,625	29.8
Sexual Orientation		
Heterosexual	3,363	23.9
Gay/Lesbian/SGL	4,617	19.6
Bisexual	4,129	17.9
Pansexual	5,056	13.4
Queer	5,706	11.4
Asexual	2,984	7.6
Sexual orientation not listed	1,860	6.2
Serious Psychological Distress	10,604	29.8
General Health Status		
Excellent	3,339	13.7
Very Good	9,261	31.7
Good	9,351	32.7
Fair/Poor	5,740	21.9
Visual Conformity		
Conformers	15,332	52.7

Variables Categories	Sample Size ^a	% ^b
Somewhat conforming	9,139	34.0
Non-conformers	3,178	13.3
Disclosure of Identity		
None	427	1.9
Some	11,558	37.3
Most	12,908	46.9
All	1,956	14.0
Transphobic Discrimination Experiences Index		
None	5,974	29.9
1 to 2	10,336	36.5
3+	9,375	33.6
Discrimination within Public Spaces Index		
None	21,930	82.0
1 to 2	4,445	15.0
3+	944	3.0
Discrimination within Employment and Workplace Index		
None	20,271	79.1
1 to 2	5,323	16.0
3+	1,656	5.0
Discrimination within Housing Index		
None	21,371	78.3
1 to 2	3,993	13.5
3+	1,819	8.3
Discrimination within Educational Settings Index		
None	18,365	72.9
1 to 2	5,027	11.8
3+	4,070	15.3
Discrimination within Healthcare Settings Index		
None	14,321	61.8
1 to 2	11,748	34.2
3+	993	4.0
Current Alcohol Use ^d	17,156	60.4
Binge Drinking ^e	6,871	24.3
Frequent Binge Drinking ^f	1,894	8.5

Notes. AFAB, Assigned Female at Birth; AMAB, Assigned Male at Birth; SGL, Same Gender Loving. Missing data were completely at random and ranged from 0.1 % (general health status) to 9.8 % (transphobic discrimination experiences index) on individual items in weighted sample.

^aBased on unweighted data.

^bBased on weighted data.

^cPoverty was coded based on the U.S. Census Bureau's guidelines in 2015 and included age of householders, size, and income.

^dCurrent Alcohol Use defined as drinking an alcoholic beverage within the past 30 days.

^e Binge Drinking defined as drinking ≥ 5 alcoholic beverages on the same occasion (i.e. at the same time or within a couple of hours of each other) during the past 30 days.

^f Frequent Binge Drinking defined as binge drinking ≥ 5 days during the past 30 days.

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Bivariate Analyses of Correlates with Current Alcohol Use, Binge Drinking, and Frequent Binge Drinking among Transgender

Table 2

Variables Categories	Current Alcohol Use <i>n</i> = 17,156 ^a		Binge Drinking <i>n</i> = 6,871 ^a		Frequent Binge Drinking <i>n</i> = 1,894 ^a	
	% ^b	χ^2 (df), <i>p</i> value	% ^b	χ^2 (df), <i>p</i> value	% ^b	χ^2 (df), <i>p</i> value
Gender Identity/Expression		127.68 (4), <i>p</i> < .001		161.67 (4), <i>p</i> < .001		395.26 (4), <i>p</i> < .001
Transgender women	57.6		21.5		7.2	
Transgender men	63.0		26.8		8.1	
Non-binary/genderqueer AFAB	60.7		24.0		5.8	
Non-binary/genderqueer AMAB	66.6		30.4		14.9	
Persons who cross-dress	67.7		31.7		18.9	
Age		216.92 (3), <i>p</i> < .001		363.02 (3), <i>p</i> < .001		46.04 (3), <i>p</i> < .001
18 to 24	52.9		24.4		5.8	
25 to 44	65.6		29.9		9.4	
45 to 64	58.6		21.6		8.0	
65+	57.2		15.6		9.4	
Race/Ethnicity		15.65 (4), <i>p</i> < .01		231.94 (4), <i>p</i> < .001		53.92 (4), <i>p</i> < .001
Non-Hispanic White	61.1		22.2		8.0	
Hispanic/Latinx	60.7		32.6		9.3	
Black/African American	58.0		27.8		11.1	
Biracial/Multiracial	59.1		22.3		8.3	
Others	57.3		17.5		4.9	
Educational Attainment		484.67 (3), <i>p</i> < .001		20.02 (3), <i>p</i> < .001		74.84 (3), <i>p</i> < .001
Less than high school	53.3		24.5		9.9	
High school grad	54.0		25.7		10.4	
Some college	60.7		24.4		7.4	
Bachelor's degree or higher	70.1		22.5		7.0	
Lives in Poverty	53.2	250.84 (1), <i>p</i> < .001	24.8	1.61 (1), <i>p</i> = .20	8.4	0.35 (1), <i>p</i> = .55
Sexual Orientation		453.65 (6), <i>p</i> < .001		358.79 (6), <i>p</i> < .001		110.80 (6), <i>p</i> < .001
Heterosexual	58.9		23.5		7.3	
Gay/Lesbian/SGL	59.8		20.0		7.0	

Variables Categories	Current Alcohol Use <i>n</i> = 17,156 ^a		Binge Drinking <i>n</i> = 6,871 ^a		Frequent Binge Drinking <i>n</i> = 1,894 ^a	
	% ^b	χ^2 (df), <i>p</i> value	% ^b	χ^2 (df), <i>p</i> value	% ^b	χ^2 (df), <i>p</i> value
Bisexual	60,7		25,5		10,5	
Pansexual	63,0		30,5		9,7	
Queer	74,0		31,9		9,8	
Asexual	45,3		13,2		4,9	
Sexual orientation not listed	55,2		23,0		11,3	
Serious Psychological Distress	57,5	53,23 (1), <i>p</i> < .001	28,1	78,25 (1), <i>p</i> < .001	9,0	2,80 (1), <i>p</i> = .09
General Health Status		382,57 (3), <i>p</i> < .001		32,76 (3), <i>p</i> < .001		81,21 (3), <i>p</i> < .001
Excellent	64,9		20,8		6,8	
Very Good	66,5		23,9		6,9	
Good	58,9		25,3		9,2	
Fair/Poor	50,9		25,4		10,7	
Visual Conformity		0,43 (2), <i>p</i> = .81		4,43 (2), <i>p</i> = .11		2,34 (2), <i>p</i> = .31
Conformers	60,6		24,0		8,4	
Somewhat conforming	60,2		24,3		8,4	
Non-conformers	60,2		25,7		9,2	
Disclosure of Trans Identity		16,03 (2), <i>p</i> < .001		2,58 (2), <i>p</i> = .28		32,62 (2), <i>p</i> < .001
None to some	60,3		25,1		9,7	
Most	62,7		24,3		7,8	
All	59,9		24,0		7,0	
Transphobic Discrimination Experiences Index		1,44 (2), <i>p</i> = .49		223,87 (2), <i>p</i> < .001		58,46 (2), <i>p</i> < .001
None	61,0		19,3		6,9	
1 to 2	61,5		23,4		7,5	
3+	60,6		29,7		10,0	

Notes. AFAB, Assigned Female at Birth; AMAB, Assigned Male at Birth; SGL, Same Gender Loving.

^aBased on unweighted data.

^bBased on weighted data.

Table 3

Multivariable Logistic Regression Models of Transphobic Discrimination Experiences Index and Current Alcohol Use, Binge Drinking, and Frequent Binge Drinking among Transgender People.

Variables Categories	Model 1: Current Alcohol Use		Model 2: Binge Drinking		Model 3: Frequent Binge Drinking	
	AOR ^a	95% CI	AOR ^a	95% CI	AOR ^a	95% CI
Gender Identity/Expression						
Transgender women ^b	1.00	Ref	1.00	Ref	1.00	Ref
Transgender men	1.01	0.93, 1.09	0.96	0.89, 1.05	0.95	0.82, 1.09
Non-binary/genderqueer AFAB	0.99	0.89, 1.10	0.82***	0.73, 0.92	0.62***	0.50, 0.76
Non-binary/genderqueer AMAB	1.14	1.00, 1.31	1.05	0.91, 1.21	1.07	0.85, 1.35
Persons who cross-dress	1.52***	1.32, 1.74	2.51***	2.21, 2.85	4.13***	3.45, 4.94
Age						
18 to 24	1.00	Ref	1.00	Ref	1.00	Ref
25 to 44	1.54***	1.39, 1.70	1.25***	1.13, 1.39	1.44***	1.20, 1.73
45 to 64	1.17**	1.05, 1.31	0.89	0.79, 1.01	1.19	0.97, 1.45
65+	0.95	0.83, 1.09	0.51***	0.44, 0.60	0.89	0.69, 1.15
Race/Ethnicity						
Non-Hispanic White	1.00	Ref	1.00	Ref	1.00	Ref
Hispanic/Latinx	1.23***	1.12, 1.35	1.63***	1.49, 1.77	1.26**	1.10, 1.45
Black/African American	0.77***	0.70, 0.84	1.07	0.97, 1.18	0.82*	0.69, 0.97
Biracial/Multiracial	0.90	0.74, 1.11	0.94	0.75, 1.18	1.07	0.76, 1.51
Others	0.85*	0.74, 0.99	0.65***	0.54, 0.77	0.58**	0.42, 0.80
Educational Attainment						
Less than high school	1.00	Ref	1.00	Ref	1.00	Ref
High school grad	0.76***	0.69, 0.84	1.04	0.94, 1.15	0.88	0.75, 1.03
Some college	1.03	0.93, 1.13	1.01	0.91, 1.12	0.77**	0.66, 0.90
Bachelor's degree or higher	1.37***	1.23, 1.52	1.01	0.90, 1.12	0.75**	0.63, 0.89
Lives in Poverty	0.81***	0.75, 0.86	-	-	-	-
Sexual Orientation						
Heterosexual	1.00	Ref	1.00	Ref	1.00	Ref

Variables Categories	Model 1: Current Alcohol Use		Model 2: Binge Drinking		Model 3: Frequent Binge Drinking	
	AOR ^a	95% CI	AOR ^a	95% CI	AOR ^a	95% CI
Gay/Lesbian/SGL	0.99	0.90, 1.08	0.87**	0.79, 0.97	1.25*	1.06, 1.48
Bisexual	1.13*	1.03, 1.24	1.15**	1.04, 1.26	1.75***	1.50, 2.05
Pansexual	1.21***	1.09, 1.34	1.26***	1.13, 1.40	1.68***	1.41, 2.01
Queer	1.71***	1.52, 1.93	1.36***	1.21, 1.53	1.92***	1.58, 2.34
Asexual	0.60***	0.53, 0.68	0.51***	0.43, 0.59	0.86	0.66, 1.12
Sexual orientation not listed	0.79**	0.69, 0.91	0.69***	0.59, 0.82	0.86	0.64, 1.14
Serious Psychological Distress	0.97	0.91, 1.04	1.16***	1.08, 1.25	-	-
General Health Status						
Excellent	1.00	Ref	1.00	Ref	1.00	Ref
Very Good	1.06	0.96, 1.16	1.12*	1.01, 1.24	1.08	0.91, 1.29
Good	0.79***	0.72, 0.87	1.05	0.95, 1.17	1.21*	1.02, 1.44
Fair/Poor	0.64***	0.58, 0.71	1.04	0.93, 1.17	1.34**	1.11, 1.62
Visual Conformity						
Conformers	-	-	-	-	-	-
Somewhat conforming	-	-	-	-	-	-
Non-conformers	-	-	-	-	-	-
Disclosure of Trans Identity						
None to some	1.00	Ref	-	-	1.00	Ref
Most	1.00	0.94, 1.07	-	-	0.95	0.84, 1.07
All	1.08	0.98, 1.19	-	-	0.88	0.74, 1.05
Transphobic Discrimination Experiences Index						
None	1.00	Ref	1.00	Ref	1.00	Ref
1 to 2	0.99	0.92, 1.07	1.12**	1.03, 1.21	0.99	0.86, 1.14
3+	1.05	0.97, 1.13	1.49***	1.37, 1.62	1.57***	1.37, 1.79
Nagelkerke R ²	7.5 %		7.5 %		7.0 %	

Notes. AFAB, Assigned Female at Birth; AMAB, Assigned Male at Birth; AOR, adjusted odds ratio; CI, confidence interval; Ref, reference group. An adjusted odds ratio of 1.00 is the baseline. Asterisk(s) denotes significant results (* $p < .05$; ** $p < .01$; *** $p < .001$). Data obtained from a weighted sample. Sample sizes ranged from 20,860 (Model 1) to 22,954 (Model 2).

^aOdds ratios are adjusted for control variables which had a significant bivariate association with each drinking outcome (see Table 2).

^bTransgender women were the reference category because they were the largest gender identity/expression subgroup and also because this was consistent with prior work (Tupler et al., 2017).

Table 4

Multivariable Logistic Regression Models of Domain-Specific Transphobic Discrimination and Current Alcohol Use, Binge Drinking, and Frequent Binge Drinking among Transgender People.

Variables Categories	Model 1: Current Alcohol Use		Model 2: Binge Drinking		Model 3: Frequent Binge Drinking	
	AOR ^a	95 % CI	AOR ^a	95 % CI	AOR ^a	95 % CI
Gender Identity/Expression						
Transgender women ^b	1.00	Ref	1.00	Ref	1.00	Ref
Transgender men	1.02	0.94, 1.10	0.99	0.91, 1.08	1.00	0.87, 1.15
Non-binary/genderqueer AFAB	1.01	0.90, 1.12	0.85**	0.76, 0.95	0.65***	0.53, 0.79
Non-binary/genderqueer AMAB	1.15*	1.01, 1.32	1.07	0.93, 1.24	1.08	0.85, 1.35
Persons who cross-dress	1.54***	1.35, 1.77	2.57***	2.26, 2.92	4.22***	3.52, 5.07
Age						
18 to 24	1.00	Ref	1.00	Ref	1.00	Ref
25 to 44	1.51***	1.36, 1.66	1.25***	1.12, 1.39	1.42***	1.18, 1.71
45 to 64	1.18**	1.06, 1.32	0.90	0.80, 1.02	1.23*	1.01, 1.52
65+	0.97	0.85, 1.11	0.52***	0.44, 0.61	0.94	0.73, 1.21
Race/Ethnicity						
Non-Hispanic White	1.00	Ref	1.00	Ref	1.00	Ref
Hispanic/Latinx	1.24***	1.13, 1.36	1.65***	1.51, 1.80	1.30***	1.13, 1.49
Black/African American	0.76***	0.69, 0.83	1.08	0.98, 1.19	0.80*	0.68, 0.95
Biracial/Multiracial	0.90	0.73, 1.10	0.94	0.75, 1.17	1.02	0.72, 1.45
Others	0.85*	0.73, 0.99	0.65***	0.54, 0.77	0.56**	0.41, 0.78
Educational Attainment						
Less than high school	1.00	Ref	1.00	Ref	1.00	Ref
High school grad	0.74***	0.67, 0.81	1.02	0.92, 1.13	0.89	0.75, 1.04
Some college	1.00	0.91, 1.10	1.00	0.90, 1.11	0.78**	0.67, 0.92
Bachelor's degree or higher	1.33***	1.20, 1.48	0.99	0.89, 1.11	0.77**	0.65, 0.91
Lives in Poverty	0.78***	0.73, 0.84	-	-	-	-
Sexual Orientation						
Heterosexual	1.00	Ref	1.00	Ref	1.00	Ref

Variables Categories	Model 1: Current Alcohol Use		Model 2: Binge Drinking		Model 3: Frequent Binge Drinking	
	AOR ^a	95 % CI	AOR ^a	95 % CI	AOR ^a	95 % CI
Gay/Lesbian/SGL	0.97	0.89, 1.06	0.87**	0.79, 0.96	1.22*	1.03, 1.45
Bisexual	1.10*	1.00, 1.21	1.13*	1.02, 1.24	1.66***	1.42, 1.94
Pansexual	1.18**	1.07, 1.31	1.24***	1.11, 1.38	1.63***	1.37, 1.95
Queer	1.67***	1.48, 1.89	1.33***	1.18, 1.50	1.87***	1.54, 2.28
Asexual	0.60***	0.53, 0.68	0.51***	0.43, 0.59	0.87	0.67, 1.14
Sexual orientation not listed	0.77***	0.67, 0.89	0.68***	0.58, 0.80	0.84	0.63, 1.12
Serious Psychological Distress	0.94	0.88, 1.01	1.13**	1.05, 1.22	-	-
General Health Status						
Excellent	1.00	Ref	1.00	Ref	1.00	Ref
Very Good	1.04	0.95, 1.15	1.09	0.98, 1.21	1.05	0.88, 1.26
Good	0.78***	0.71, 0.86	1.04	0.93, 1.15	1.20*	1.01, 1.42
Fair/Poor	0.64***	0.57, 0.71	1.03	0.92, 1.16	1.27*	1.06, 1.54
Visual Conformity						
Conformers	-	-	-	-	-	-
Somewhat conforming	-	-	-	-	-	-
Non-conformers	-	-	-	-	-	-
Disclosure of Trans Identity						
None to some	1.00	Ref	-	-	1.00	Ref
Most	0.98	0.91, 1.05	-	-	0.92	0.81, 1.04
All	1.06	0.96, 1.17	-	-	0.82*	0.68, 0.98
Discrimination within Public Spaces Index						
None	1.00	Ref	1.00	Ref	1.00	Ref
1 to 2	1.20***	1.10, 1.31	1.28***	1.18, 1.40	1.51***	1.32, 1.73
3+	1.15	0.96, 1.38	1.70***	1.43, 2.02	2.46***	1.94, 3.12
Discrimination within Employment & Workplace Index						
None	1.00	Ref	1.00	Ref	1.00	Ref
1 to 2	1.30***	1.19, 1.41	1.04	0.95, 1.13	1.03	0.89, 1.18
3+	1.23**	1.06, 1.41	1.36***	1.19, 1.56	0.97	0.78, 1.21
Discrimination within Housing Index						

Variables Categories	Model 1: Current Alcohol Use		Model 2: Binge Drinking		Model 3: Frequent Binge Drinking	
	AOR ^a	95 % CI	AOR ^a	95 % CI	AOR ^a	95 % CI
None	1.00	Ref	1.00	Ref	1.00	Ref
1 to 2	1.05	0.96, 1.14	1.22***	1.11, 1.33	1.33***	1.16, 1.54
3+	1.28***	1.14, 1.44	1.27***	1.13, 1.42	1.77***	1.50, 2.09
Discrimination within Educational Settings Index						
None	1.00	Ref	1.00	Ref	1.00	Ref
1 to 2	0.88**	0.81, 0.97	1.00	0.91, 1.10	0.94	0.79, 1.10
3+	0.85***	0.78, 0.92	1.17**	1.07, 1.28	0.95	0.82, 1.10
Discrimination within Healthcare Settings Index						
None	1.00	Ref	1.00	Ref	1.00	Ref
1 to 2	1.01	0.94, 1.07	1.07	1.00, 1.15	0.98	0.88, 1.10
3+	0.99	0.84, 1.16	0.74***	0.62, 0.87	1.08	0.84, 1.37
Nagelkerke R ²	8.2%		8.1 %		8.0 %	

Notes. AFAB, Assigned Female at Birth; AMAB, Assigned Male at Birth; AOR, adjusted odds ratio; CI, confidence interval; SGL, Same Gender Loving; Ref, reference group. An odds ratio of 1.00 is the baseline. Asterisk(s) denotes significant results (* $p < .05$; ** $p < .01$; *** $p < .001$). Data obtained from a weighted sample. Sample sizes ranged from 20,858 (Model 1) to 22,954 (Model 2).

^a Odds ratios are adjusted for control variables which had a significant bivariate association with each drinking outcome (see Table 2).

^b Transgender women were the reference category because they were the largest gender identity/expression subgroup and also because this was consistent with prior work (Tupler et al., 2017).