Short Communication

Minority stress is longitudinally associated with alcohol-related problems among sexual minority women☆

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HIGHLIGHTS

- For young adult lesbian/bisexual women, minority stress is linked to problem drinking
- Sexual minority stress predicted the severity of drinking consequences one year later
- Minority stress was not associated with quantity of alcohol consumed the next year

ARTICLE INFO

ABSTRACT

Compared to sexual minority men and heterosexual women, sexual minority women report elevated alcohol use in young adulthood. Heavy alcohol use and alcohol use disorders disproportionately affect sexual minority women across the lifespan, yet there is limited research investigating reasons for such associations. The present study investigates longitudinal associations between minority stress and both alcohol use as well as self-rated drinking consequences. Participants ($N = 1057$) were self-identified lesbian (40.5%) and bisexual (59.5%) women between the ages of 18 to 25 recruited from across the U.S. using online advertisements. Participants completed four annual surveys. Hurdle mixed effects models were used to assess associations between minority stress and typical weekly drinking and drinking consequences one year later. Minority stress was not significantly associated with subsequent typical drinking. However, minority stress was significantly associated with having any alcohol consequences as well as the count of alcohol consequences one year later after controlling for covariates. Consistent with extant literature, this study provides evidence for a prospective association between minority stress experienced by sexual minority women and drinking consequences. This study also provides support for the potential impact of efforts to reduce minority stress faced by sexual minority women.

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Alcohol use and related consequences are prevalent among emerging adult lesbian and bisexual women (sexual minority women; SMW). Compared to heterosexual women, SMW are at increased risk of hazardous drinking (Gruskin, Hart, Gordon, & Ackerson, 2001) and alcohol use disorders (Goldberg, Strutz, Herring, & Halpern, 2013; Schauer, Berg, & Bryant, 2013). There is a paucity of research focusing on health behavior in young SMW (Coulter, Kenst, & Bowen, 2014). Given high levels of alcohol use among young SMW compared to sexual minority men and heterosexual women (Dermody et al., 2014), there is a need to further evaluate contributory factors of drinking in this population.

The minority stress model posits that stressors associated with sexual minority status can lead to negative physical and mental health outcomes (Meyer, 2003). Distal and proximal social stressors may include institutional discrimination, community prejudice, interpersonal violence, internalized stigma, and anticipation of maltreatment (Meyer, 2003, 2013) and are associated with increased hazardous and disordered alcohol use (e.g. Matthews et al., 2014; McCabe, Bostwick, Hughes, West, & Boyd, 2010; McLaughlin, Hatzenbuehler, & Keyes, 2010). Most U.S. states do not protect sexual minorities from workplace discrimination or hate crimes and sexual minorities living in in these

states are more than twice as likely to have an alcohol use disorder (Hatzenbuehler, Keyes, & Hasin, 2009). Despite these findings, there are no prospective examinations of how young SMW's experiences of minority stress relate to alcohol use and related consequences.

1. Current study

We examined the prospective association between minority stress and alcohol use as well as negative drinking consequences in young adult SMW to extend previous cross-sectional research. As drinking risk is highest during young adulthood, it is of particular import to examine alcohol use during this critical developmental phase. We hypothesized minority stress would be prospectively associated with increased alcohol use and consequences.

2. Methods

2.1. Participants and procedures

Participants were recruited nationally via Craigslist and Facebook online advertisements, and upon recruitment were routed to a website showing an informational statement. Those who consented received an online screening assessment ($n = 4119$). Eligibility criteria were met by 1877 participants and included: 1) U.S. residence, 2) valid e-mail address, 3) age 18 to 25, and 4) self-identified as lesbian or bisexual. Participants were retained in the study if they changed or omitted their reported sexual orientation or gender identity at follow-up. Upon logging into the baseline survey, participants ($n = 1083$) were shown a consent form. Due to inconsistencies in the data (e.g., inconsistent birth dates), a final sample of 1057 (mean age = 20.9; $SD = 2.1$) were enrolled and retained in the study. Of this sample, 40.5% self-identified as lesbian and 59.5% as bisexual; 76.0% were Caucasian, 12.2% African American, 3.5% Asian American, 3.5% multi-racial, and 4.9% other/did not respond; and 11.3% indicated Hispanic ethnicity.

Surveys from baseline, and 12-, 24-, and 36-month follow-up were used in the current study. Participants were compensated $25 and $30 for completing the baseline and follow-up surveys, respectively. A Federal Certificate of Confidentiality was obtained for the study, and all study procedures were approved by the university's Institutional Review Board (for further description of methodology see Litt, Lewis, Rhew, Hodge, & Kaysen, 2015).

2.2. Measures

2.2.1. Demographics

Demographic information included ethnicity, race, sexual identity (lesbian or bisexual), and age.

2.2.2. Alcohol consumption

Alcohol consumption was measured with an item from the Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985), which is a 4-item measure assessing drinking habits with good convergent validity and high test-retest reliability (Marlatt et al., 1998). The outcome was measured with the item: "Consider a typical week during the last three months: How much alcohol, on average, do you drink each day of a typical week?" Alcohol consumption was defined as the sum of standard drinks for all days in a typical week.

2.2.3. Alcohol consequences

The Young Adult Alcohol Consequences Questionnaire (YAACQ; Read, Kahler, Strong, & Colder, 2006) assessed 48 drinking consequences. Participants indicated whether they had experienced each consequence during the past 30 days.

2.2.4. Minority stress

Minority stress was measured using the Daily Heterosexist Experiences Questionnaire (DHEQ; Balsam, Beadnell, & Molina, 2012). Participants rated how often they had each of 35 experiences using a 6-point Likert Scale from 0 (Never) to 5 (Almost Every Day). An example item is: "Having very few people you can talk to about being LGBTQ". Minority stress was calculated by averaging 7 subscale scores, and was standardized to have a mean of 0 and standard deviation of 1. The measure had excellent internal consistency in this study ($\alpha = 0.93$).

2.3. Data analytic plan

Correlations were examined among key study variables using Spearmans' ρ. To examine associations between minority stress and drinking outcomes 1 year later, generalized mixed effects models (GLMMs) were used that allowed intercepts to vary across individuals to account for the clustering of repeated observations. Because alcohol consumption and drinking consequences were non-negative integers, positively skewed, with an excess stack of zeros, we used a hurdle form of the mixed model, where a logistic regression model estimated odds ratios (ORs) for the likelihood of non-zero vs. zero count and a truncated negative binomial model estimated rate ratios (RRs) for the non-zero count associated with covariates (Atkins, Baldwin, Zheng, Gallop, & Neighbors, 2013). The RRs reflect the proportional change in the count associated with a 1-unit increase in the covariate. Models included as covariates minority stress (z-score), baseline age (centered at 18 years), self-reported sexual identity (0: lesbian, 1: bisexual), race/ethnicity (White, non-Hispanic; Black, non-Hispanic; other, non-Hispanic; Hispanic, any race) and baseline level of the outcome.

There were missing data over the course of the study (data available included 77% at the 12-month follow-up, 69% at 24-month, and 68% at 36-month). The final analysis sample consisted of 2126 observations from 864 (81.7%) women. GLMMs provide unbiased estimates in the presence of missing data when data are missing at random (Graham, 2009). Consistent with this assumption, there was no statistically significant association between alcohol use/consequences and likelihood of missingness at a given wave. Further, the distribution of demographic characteristics was similar between the full sample and the current analysis sample. Hurdle mixed models were conducted in R statistical software, version 3.0.3 (R Core, 2015) using the "glmmADMB" package (Skaug, Fournier, Nielsen, Magnusson, & Bolker, 2013).

3. Results

As shown in Table 1, baseline typical drinks per week and drinking consequences were highly correlated ($\rho = 0.68$). Minority stress was weakly correlated with typical drinking ($\rho = 0.07$) and moderately correlated with drinking consequences ($\rho = 0.16$). At baseline, 26.5% of women reported no drinking and 25.0% reported no drinking consequences. Over the 3 follow-up waves, the proportion of women reporting no drinking was similar compared to baseline (25.6%), but the likelihood of reporting no consequences increased (35.7%).

Table 2 shows results from the hurdle mixed model for typical drinks per week and drinking consequences. In the logit part of the model, age and baseline drinking were associated with any drinking at a given follow-up wave. In the count portion of the model, baseline level of drinking was positively associated with drinking behavior and study visit was negatively associated with drinking. Minority stress was not significantly associated with the outcomes (any drinking or level of drinking) in either the logit or count portions of the model.

A different pattern emerged when examining predictors of drinking consequences. In the logit part of the model, women who reported higher levels of minority stress were more likely to report any drinking consequences at the next study wave. White, non-Hispanic ethnicity and baseline levels of drinking consequences were also associated with consequences. For the count portion of the model, a 1-SD increase