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Daily-level associations between PTSD and cannabis use among young sexual minority women

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Abstract

Introduction—Sexual minority women have elevated trauma exposure and prevalence of posttraumatic stress disorder (PTSD) compared to heterosexual women and they are also more likely to use cannabis, although no research has examined relationships between PTSD and cannabis use in this population. Daily- level methodologies are necessary to examine proximal associations between PTSD and use.

Methods—This study included 90 trauma-exposed young adult women who identified as sexual minorities (34.4% identified as lesbian and 48.9% identified as bisexual) and evaluated daily-level associations between their PTSD symptoms and cannabis use. Participants were assessed at two measurement waves, one year apart, each consisting of 14 consecutive daily assessments.

Results—Cannabis use occurred on 22.8% of the days. Results from generalized linear mixed effects models showed that a person's mean level of PTSD symptom severity across days was strongly associated with same-day likelihood of cannabis use (*OR* = 2.67 for 1 *SD* increase in PTSD score; $p < .001$). However, daily deviation from one's average PTSD score was not associated with cannabis use on the same day.

Conclusions—Findings suggest that PTSD severity may confer general risk for cannabis use, rather than being a state-dependent risk factor.

Keywords

marijuana; post-traumatic stress disorder; substance use; sexual orientation; daily diary

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Contributors

DK and CML designed the larger study from which these data were drawn and conceptualized the current analyses. ICR conducted data analyses. ERD and DK wrote the first draft of the manuscript and all authors contributed to and approved the final manuscript.

Conflict of Interest

The authors declare that they have no conflicts of interest.

1. Introduction

High rates of trauma exposure (Roberts, Austin, Corliss, Vandermorris, & Koenen, 2010; Rothman, Exner, & Baughman, 2011) and posttraumatic stress disorder (PTSD) symptoms (Heidt, Marx, & Gold, 2005; Hershberger & D'Augelli, 1995; Hughes, Johnson, Wilsnack, & Szalacha, 2007; Poteat, Aragon, Espelage, & Koenig, 2009) have been observed among sexual minority women (SMW; i.e., lesbians, bisexual women, and other women who partner with women). This is concerning given evidence that PTSD is associated with increased risk for substance use, including cannabis, in the general population (Cougle, Bonn-Miller, Vujanovic, Kvolensky, & Hawkins, 2011; Kevorkian et al., 2015) and in the transition from adolescence to adulthood (Cornelius et al., 2010). Indeed, SMW also report high rates of cannabis use (Marshal et al., 2008; McCabe, Bostwick, Hughes, West, & Boyd, 2010; Trocki, Drabble, & Midanik, 2009).

In general population samples, associations between substance abuse and PTSD symptoms have been explained via self-medication theory, which asserts that psychological distress results in escalating substance use through a reciprocal pattern of negative reinforcement, wherein substance use alleviates distress temporarily but then results in future increased substance use (Allan, 1995; Kushner, Abrams, & Borchardt, 2000). Over time, these patterns lead to the development of a substance use disorder (Chilcoat & Breslau, 1998; Simpson, 2003; Stewart, Conrod, Pihl, & Dongier, 1999). Although this theory is widely accepted, it has been tested primarily in relation to alcohol, and thus fails to address diverse effects of different substances, like cannabis, on PTSD symptoms. To elucidate mechanism of co-occurrence, daily diary studies are needed to examine whether day-to-day symptom variability is associated with the decision to use cannabis at the event-level, as opposed to merely observing the association between greater symptoms and greater use. Further, given that the leading explanatory theory for minority health disparities proposes that stressors associated with minority status lead to negative physical and mental health outcomes (Meyer, 2003, 2013), it is important to conduct research within specific minority groups like SMW to understand the unique processes that could contribute to observed disparities. However, to date, no research has examined associations between PTSD and cannabis use in this population.

The current study addresses these gaps in the literature by using daily diary methodology from a national longitudinal web-based study of SMWs' health to evaluate whether within-person deviations in PTSD at the daily-level and overall between-person levels of PTSD, both collected at the daily-level, are associated with daily cannabis use among young SMW. We hypothesized that: 1) SMW would be more likely to use cannabis on days in which they experienced higher PTSD symptom severity relative to their typical level of symptoms and 2) SMW with higher overall PTSD symptom severity would be more likely to use cannabis on a given day.

2. Method

2.1. Procedures and Participants

Participants for this analysis included 90 women who had been assigned female sex at birth. At baseline, the sample ranged in age from 18 to 25 (M = 21.7, SD = 2.1). Most participants were White (76.1%), with others identifying their race as African American (12.5%), Asian American (3.4%), or some other race (8.0%); 10.2% identified their ethnicity as Latinx. Participants described their sexual identity as lesbian (34.4%), gay (1.1%), bisexual (48.9%), queer (7.8%), two-spirit (1.1%), questioning (3.3%), or some other sexual orientation (3.3%).

All procedures were approved by the University of Washington Institutional Review Board and a Federal Certificate of Confidentiality was obtained. Advertisements for a study on women's health were placed nationally on Craigslist and Facebook. Facebook advertisements were shown to women within the target age range (18–25) who indicated in their Facebook profile that they were interested in same-sex relationships. Women who agreed to participate were directed to a screening assessment to determine eligibility including: 1) U.S. residency, 2) valid e-mail address, 3) age 18–25, and 4) current self-identification as lesbian/bisexual. Eligible participants were sent an email invitation to participate and a link to the online informed consent statement. Participants were directed to the baseline assessment upon provision of informed consent. The broader study included a baseline assessment and three annual web-based surveys (Kaysen et al., 2014; Litt, Lewis, Rhew, Hodge, & Kaysen, 2015). Daily diary monitoring data used in the current analyses were collected from a random subsample of 114 participants who reported consuming at least 2 drinks during a single drinking occasion at least 7 times in the past 30 days. This component of the study involved 5–10 minute twice-daily surveys for 14 consecutive days annually; the morning surveys assessed cannabis use and PTSD symptoms and were thus used for the current study. Data from the 24-month and 36-month waves of daily assessments (i.e., waves 3 and 4), which were the years in which cannabis use and PTSD symptoms were assessed, were used for the present study. Participants in daily diary component were paid $5 for each daily assessment completed; they received a $10 bonus if they completed all 14 assessments per wave. Ninety participants provided data on study variables for (at least) the 24-month wave and were thus included in this analysis.

2.2. Measures

2.2.1. Demographics—Standard items were used to assess socio-demographic information (e.g., age, income, race). To assess sexual orientation, participants were asked, "Understanding that sexual identity can be complex, which ONE category best describes your SEXUAL IDENTITY now?" Response options were lesbian, gay, bisexual, queer, two-spirit, straight/heterosexual, questioning, other, or prefer not to answer.

2.2.2. Cannabis use—Each morning, participants were asked, "Yesterday, did you use marijuana?" Dichotomous (yes or no) response options were used.

2.2.3. Trauma exposure—The Traumatic Life Experiences Questionnaire (TLEQ; Kubany et al., 2000) was used to assess the number of lifetime traumatic events (of 22 possible) that participants experienced. The measure was re-administered annually.

2.2.4. PTSD symptoms—Each day, a 20-item version of the PTSD Checklist (PCL; Weathers, Huska, & Keane, 1991) was administered. The scale was adapted for this study to parallel the DSM-5 diagnostic criteria for PTSD and to assess how the participant felt since yesterday, as opposed to in the last month. Items were assessed in relation to "the stressful life experience" using a 5-point Likert scale from 1=Not at All to 5=Extremely (e.g., "Since yesterday, how bothered were you by repeated, disturbing dreams of the stressful life experience?").

2.3. Analytic Plan

We used generalized linear mixed models to examine the association between PTSD symptoms and cannabis use. A logit form of the model was specified and odds ratios (ORs) were estimated for any cannabis use on a given day. We included two PTSD variables to disentangle between- and within-person effects of PTSD: 1) the time-fixed person-mean (i.e., the mean of a participant's daily PTSD scores for the 14 days of monitoring completed at each of the two waves used in this study), and 2) the time-varying daily deviation from one's time-fixed mean at each wave. Thus, each participant had up to two values (one for each wave) for person-mean PTSD and up to 28 values (one for each assessment day completed) representing a daily deviation from their wave mean. Measurement period (Year 3 vs. 4) was included as a covariate. Models were performed in R version 2.14 (R Development Core Team) using the lme4 package (Bates, Mächler, Bolker, & Walker, 2014).

3. Results

3.1. Sample Characteristics

Ninety SMW completed 1345 daily observations for an average of 14.94 observations per participant (out of a possible 28 observations). Participants reported an average of 8.1 different traumatic events in their lifetime at wave 1. By wave 3, all participants reported lifetime trauma exposure and 21.59% met screening criteria for past-month PTSD (PCL score M=34.57, SD=16.72). Daily PTSD symptoms showed substantial variability within participants; the average standard deviation of scores for a given person from day to day was 13.2. Cannabis use occurred on 22.4% of daily monitoring days, for an average of 8.34 days over the past 30 days.

Consistent with hypotheses, person-mean PTSD score across days was associated with daily likelihood of cannabis use (Table 1). That is, women with higher overall daily PTSD scores across time had a higher likelihood of using cannabis on any given day. Inconsistent with hypotheses, within-subject daily variation in PTSD symptoms was not associated with same-day likelihood of cannabis use. That is, there was no statistically significant elevation in likelihood of cannabis use on days when a woman reported more PTSD symptoms than her average.

4. Discussion

In the first study exploring daily-level associations between PTSD and cannabis, findings suggest that, among SMW, the pattern of association between PTSD and cannabis use does not reflect a pattern of day-to-day self-medication, in which cannabis is used on a given day to manage elevated symptoms of PTSD on that day. Rather, it appears that SMW who, in general, have higher levels of PTSD symptoms tend to use cannabis more regularly.

There are several potential explanations for this finding. First, it is possible that SMW's self-medication of PTSD symptoms with cannabis does not occur on a day-to-day basis. Instead, cannabis use might increase in response to general patterns of PTSD symptoms. A woman who develops PTSD might begin to use cannabis daily in anticipation of elevated symptoms, even if her symptoms are not elevated on a given day. Or, cannabis use might initially be a conditioned response to the stimulus of daily fluctuations in PTSD symptoms, but particular settings and/or social contacts might become additional conditioned stimuli that trigger use in the absence of fluctuations in PTSD symptoms (Siegel, 2001; Siegel & Ramos, 2002; Siegel, 2011). Second, it is possible that the self-medication model does not explain the functional relationship between PTSD and cannabis among SMW. Instead, cannabis might be used to self-medicate among a subset of SMW, or a third variable (e.g., distress tolerance) could moderate the relationship between cannabis and PTSD symptoms on a daily basis. Finally, it is possible that cannabis use *does* fluctuate in response to day-to-day changes in symptoms or stressors among SMW, but the presence of minority-specific stressors masks daily fluctuations in response to PTSD symptoms specifically. That is, cannabis use could increase on a day in which SMW experience increased stress, either related to PTSD symptoms *or* to minority stress. Indeed, SMW are likely to experience substantial day-to-day stressors related to their identity (e.g., sexuality-based discrimination), which have been longitudinally associated with symptoms of PTSD in SMW (Dworkin, Bedard-Gilligan, Gilmore, Lehavot, & Kaysen, 2017). These possibilities should be explored in future research.

This study had several limitations. First, although our daily assessments allowed us to explore proximal relationships between cannabis and PTSD, we did not assess amount of cannabis use on a given day because this variable is difficult to quantify. It is possible that daily relationships between PTSD symptoms and cannabis use would emerge if the amount of cannabis used was directly assessed. Second, we are unable to speak to the degree to which these processes are unique to SMW or generalizable to other sexual minorities or the general population. However, given the elevated prevalence of trauma exposure and PTSD in this population, as well as the possibility that unique functional relationships exist between cannabis and PTSD in this population, SMW-specific research on this topic is critically important. Finally, our daily sample was originally selected for drinking rather than PTSD symptoms or cannabis use, so findings may be unique to SMW drinkers. However, because drinking and cannabis use tend to co-occur (Patton et al., 2007) and not all participants were engaged in drinking at the wave of data collection used in the current study, there is reason to believe that these results are more broadly applicable to SMW.

In sum, this study addresses an understudied research area by examining associations between PTSD and cannabis use among young SMW. Results indicate that general patterns of symptoms, rather than day-to-day fluctuations, are important in understanding associations between cannabis use and PTSD among SMW. Although additional research is needed to explore functional relationships, it will be important to develop prevention and intervention strategies in SMW that consider the risk for cannabis use conferred by overall PTSD severity.

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Highlights

- Young trauma-exposed sexual minority women were assessed over two years
- Daily data was collected regarding cannabis use and PTSD symptoms
- Higher mean PTSD symptoms were associated with daily cannabis use
- Daily fluctuations in PTSD symptoms were not associated with cannabis use

Table 1

Results from generalized linear mixed effects model for daily cannabis use

	OR	95% CI	*p*
Intercept	0.05	0.01, 0.13	<.001
Average PTSD severity	2.67	1.71, 4.41	<.001
Daily deviation in PTSD severity	0.97	0.78, 1.19	.778
Assessment	0.61	0.37, 0.99	.043