



Short communication

Adverse childhood experiences and MSM marijuana use

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ABSTRACT

Background: Past research identified individuals who experienced adverse childhood experiences (ACEs) are at a higher risk of drug use. There is evidence to suggest that identifying as a man who has sex with other men (MSM) may increase the likelihood of drug use when adverse childhood experiences are prevalent. However, research has not addressed if this association is present in both rural and urban MSM, as other studies found that rurality/urbanity is a key determinant in detrimental outcomes for MSM. The current study uses ACEs as an independent variable in comparing rural and urban MSM's self-reported marijuana use.

Methods: Participants included 156 MSM residing in Oklahoma. Linear regression was used to test ACEs' associations with reported marijuana use. To explore nuanced differences between rural and urban populations, split sample regressions were conducted.

Results: ACEs were statistically associated with reported marijuana use in the full sample. However, after splitting the sample, ACEs only predicted reported marijuana use in the urban and not in the rural sample.

Conclusions: Results suggest ACEs may affect rural and urban MSM dissimilarly. It is unclear, however, if rural MSM engage in maladaptive behaviors other than marijuana use, or if factors associated with urban environments make urban MSM more vulnerable to illicit drug use when ACEs are high. Regardless, trauma-informed programming targeting MSM should consider geographic locale as an influential factor. Further investigation is needed with regards to geographic locale, ACEs, and other illicit drug use in MSM populations.

1. Introduction

Those who have experienced adverse events in childhood such as neglect or abuse by a parent or guardian are at a higher risk of developing an array of longitudinal health problems (Reuben et al., 2016; Ridout et al., 2018). Maltreated children face increased odds of adverse addictive behaviors as adults, including associations between negative childhood experiences and illicit drug use (Forster et al., 2018). There is evidence to suggest that identifying as a man who has sex with other men (MSM) may increase the likelihood of drug use when adverse childhood experiences are prevalent (Brennan et al., 2007). Less has been studied, however, on how adverse childhood experiences comparatively affects the drug use of rural and urban MSM populations. This is problematic because most of our knowledge of drug use comes from large urban populations (Lansky et al., 2014), although research has shown that rural areas are equally at-risk for drug use (Dombrowski et al., 2016).

1.1. MSM and rurality

Within the past decade numerous nationally representative datasets have included sexual attraction questions, such as the National Longitudinal Study of Adolescent to Adult Health, thus helping highlight the unique experiences and risk-factors of MSM (Mayer et al., 2008). Geographic locale has been identified as an important factor that contributes to health behavior (Gallagher et al., 2004; Lee and Quam, 2013) and aggregating both rural and urban MSM, therefore, may be problematic. The few studies that have examined direct comparative differences in rural versus urban MSM have found significant differences in environmental factors (i.e., more gay-related stigma in rural areas), behavioral factors (i.e., rural MSM were observed to have higher rates of unprotected sex and earlier sexual debut), and adverse outcomes (i.e., urban MSM were observed to have lower rates of suicide). This suggests that the rurality/urbanity of environments are an often overlooked yet influential variable (Kakietek et al., 2011; Poon and Saewyc, 2009; Williams et al., 2005).

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1.2. Adverse childhood experiences and drug use in MSM

MSM with past histories of adverse childhood experiences were more likely than those without adverse experiences to have ever used illicit drugs in the last six months (Kalichman et al., 2004). Brennan, Hellerstedt, Ross and Welles (2007) found that homosexual and bisexual men with adverse childhood experiences were six and a half times more likely to use illicit drugs.

1.3. Current study

The current study investigates associations between adverse childhood experiences and reported marijuana use in rural and urban MSM in Oklahoma. The research questions are twofold. First, are adverse childhood experiences statistically related to reported marijuana use in MSM? We hypothesize a significant link between the two. Next, is this relationship true for both urban and rural MSM populations separately? We expect that adverse experiences are associated with reported marijuana use in both populations.

2. Methods

2.1. Sample

Participants were recruited via Internet-based direct marketing advertisements via social media platforms. Respondents were eligible if they were male, identified as MSM, 18 years of age or older, and a resident of Oklahoma. Participants were sent a link to an online questionnaire which asked questions related to demographics, childhood experiences, mental health, and drug use. Geographic residence was verified by IP address geolocation identifiers when participants took the online survey. The participants also self-reported county and zip code, which was then cross-checked with their IP address geolocation information. Participants were compensated with a \$20 gift card upon survey completion which took approximately 45 min. The final sample included 156 MSM residing in Oklahoma. The process was approved by the Institution Review Boards of the affiliated universities.

2.2. Measures

2.2.1. Adverse childhood experiences

Adverse childhood experiences (ACEs) were measured using the Early Adverse Experiences Questionnaire (Felitti et al., 1998). Questions about ACEs referred to a respondent's first 18 years of life and used to define emotional/physical abuse and domestic violence. Scores were summed and ranged from 0 to 8, with 8 representing the most adverse experiences. The scale has been used in numerous studies investigating antecedents of substance use in sexual minority populations (Brennan et al., 2007).

2.2.2. Marijuana use

Marijuana use was measured using a self-reported questions asking, "During the past 12 months, on how many occasions (if any) have you used marijuana?" with Likert responses of "0" never, "1" 1–2 occasions, "2" 3–5 occasions, "3" 6–9 occasions, "4" 10–19 occasions, "5" 20–39 occasions, or "6" 40+ occasions, and has been used in previous studies investigating drug use frequency (McCabe et al., 2013). Scores were summed with a range of 0–18. It should be noted that at the time of this study marijuana was considered completely illicit in Oklahoma, both medically and recreationally. More recently Oklahoma moved to legalize the use of medical marijuana (Hanson, 2018).

2.2.3. Urbanity/rurality

Participants were asked to verify their residence by providing their county and zip code. The data were then numerically converted to a number between "1" and "0" using the Index of Relative Rurality (IRR;

Waldorf, 2006) with numbers closer to "1" representing rurality and numbers closer to "0" representing urbanity. The IRR is a measure of urbanity/rurality which combines population size, density, and proximity to the closest metropolitan area. The index was previously used in other studies comparing rural and urban samples (Kaza, 2013). The IRR was used to dichotomize a threshold to operationalize rural and urban areas (namely, the two urban/metropolitan areas in Oklahoma which consisted of Tulsa and Oklahoma City).

2.2.4. Control variables

Participants were deemed *partnered* if they were married, in a domestic partnership, or in a committed relationship "1" or otherwise "0." Age was determined by the question, "How old are you?" Education was assessed by the question, "What is the highest level of education you have completed?" with Likert responses from "0" no formal education, to "7" doctorate/medical/law degree, and was added to the model as a control variable.

2.3. Analytic strategy

Descriptive statistics were conducted to highlight group differences between rural and urban MSM samples. To detect group differences between rural and urban MSM and ACEs, a non-parametric, distribution free test (Mann-Whitney U test) was used. This is due to ACEs typically having a skewed, non-normal distribution (also found in large, nationally represented samples of ACEs; see Rothman et al., 2008 for an example). Additionally, independent *t*-tests were used for reported marijuana use and age; a chi-square test of independence was used for participant partner status, and a Mann-Whitney U test was used for education level. To answer the first research question, a linear regression was used to show the relationship between adverse childhood experiences and reported marijuana use among MSM (full sample); which included a continuous rurality variable. Pending the significance of the rurality variable and in order to investigate nuanced differences between the study variables and rural/urban populations not captured in the full model, a split-sample regression was conducted: one regression including only urban MSM, the other including only rural MSM. This mirrors similar techniques used in studies examining rural versus urban populations (see Kemer and Atik, 2012 and Headey and Hoddinott, 2015 for examples).

3. Results

Table 1 presents descriptive statistics for the study variables. The mean age of the full sample was 35.38 (min = 19, max = 69). The rural sample was significantly younger than the urban (mean = 33.18; mean = 38.31, respectively). Almost half of the population identified as being in a relationship (44%), with most participants attending some college (44%). It should be noted that the majority of the population identified as White (78%; not shown in table). No significant differences in reported marijuana use were found between urban and rural samples. The average ACEs for the full sample was 2.79. Significant differences were not detected between the rural and urban MSM groups with regards to ACEs. No significant differences were found in the partnered or education level variables between groups.

Table 2 shows the regression models using ACEs scores as an independent variable and reported marijuana use as the dependent variable. In the full sample, ACEs were statistically associated with reported marijuana use above and beyond the control variables ($B = .28, p < .001$). Age was also significant; MSM who were younger reported higher levels of reported marijuana use ($B = -.28, p < .001$). Rurality was added to the full model as a continuous variable and was significant ($B = -.19, p = .011$). When split by rural and urban MSM, ACE score was associated with reported marijuana use in urban MSM ($B = .44, p < .001$) but not rural MSM ($B = .11, p = .290$). Similar to the full sample, younger age was significantly associated with reported

Table 1
Sample Descriptive Statistics for Study Variables.

	Full Sample			Rural			Urban			p-Value
	M	SD	%	M	SD	%	M	SD	%	
ACE Score	2.79	2.10		2.67	2.01		2.94	2.22		.296 ^c
Marijuana Use	2.29	2.81		1.99	2.67		2.69	2.96		.125 ^a
Age	35.38	12.33		33.18	12.17		38.31	12.02		.010 ^a
Partnered			43.6%			38.2%			50.7%	.118 ^b
Education Level										.135 ^c
No H.S. or GED			0.6%			1.1%			0.0%	
H.S. or GED			9.0%			10.1%			7.5%	
Some college			44.2%			44.9%			43.3%	
College grad			20.5%			25.8%			13.4%	
Some grad school			6.4%			3.4%			10.4%	
Master's degree			16.0%			12.4%			20.9%	
Ph.D./Medical/Law degree			3.2%			2.2%			4.5%	

Significance is bolded. N = 156 (full), 89 (rural), 67 (urban).

- ^a independent t-test p-value.
- ^b p-value for Chi-Square test.
- ^c p-value for Mann-Whitney U test.

marijuana use in both urban ($B = -.37, p = .001$) and rural MSM ($B = -.22, p = .044$). The model explained only 2% of the variance in the rural sample, but 32% in the urban sample (adjusted r-squared statistic used).

4. Discussion

Our study investigates how ACEs were associated with reported marijuana use in a sample of rural and urban MSM in Oklahoma. Results show that ACEs were significantly associated with reported marijuana use in urban MSM, but not rural MSM. We posit two possible rationales to explain this result. The first is that urban MSM may have more opportunity for exposure to illicit drugs as a byproduct of social gatherings, as past research has shown that drug use is more prevalent in LGBT gatherings, especially in urban areas. For instance, “circuit parties,” defined as extended celebrations primarily attended by MSM in urban areas, have been shown to have a strong relationship with drug use (Troiano et al., 2018). This is not to say that rural areas lack access to drugs (illicit drugs have been shown to be prevalent in rural areas; Revier, 2017). Moreover, social gatherings of MSM are more common in urban areas, and these gatherings have shown associations with higher levels of self-reported drug use (Lieb et al., 2011). Thus, urban MSM with higher ACEs may be at an increased risk of using illicit drugs, particularly if they have a strong social connection to the LGBT community.

Secondly, it could be the case that ACEs equally affect both rural and urban MSM, yet it is manifested differently. Perhaps rural MSM may be less prone to drug use, but more prone to other maladaptive behaviors such as risky sexual encounters, depression and/or loneliness (Heckman et al., 1998; Poon and Saewyc, 2009) than urban MSM when

ACEs are high.

4.1. Implications, limitations and strengths

Studies show strong evidence that the health behaviors of MSM are dependent on their rural or urban classification (Heckman et al., 1998; Poon and Saewyc, 2009). Similarly, our results suggest that rural and urban MSM may be affected differently with respect to ACEs manifesting self-reported marijuana use. This serves as an important implication when discussing trauma informed programming specifically designed for MSM. For example, the American Institute for Research (2013) put forth guidelines for the delivery of trauma-informed and GLBTQ culturally-competent care. While research shows that LGBT individuals benefit from tailored trauma-informed care (Butler et al., 2011), current guidelines do not differentiate nor address considerations for rural versus urban MSM. Our results show it may be the case that resilience and coping strategies differ by rural or urban classification (e.g., Figueroa and Zoccola, 2015; Lyons et al., 2015; Pachankis et al., 2018) and should be considered by practitioners and future research.

This study should be viewed within the confines of several limiting factors. First, our sample strictly used MSM who resided in Oklahoma. Because Oklahoma is largely conservative, our results may lack generalizability with respect to other rural/urban areas located in more liberal venues. Next, although prior studies have included marijuana when specifically investigating “illicit drug use” (Cao et al., 2018), there is a noteworthy argument to be made that marijuana should be treated differently than other “street drugs,” such as methamphetamine. Other studies should consider using measures that examine other more hazardous illicit substances as it pertains to rural and urban MSM.

Table 2
Linear Regressions Predicting Marijuana Use from ACE Scores Between MSM Samples.

	Full Sample			Rural MSM			Urban MSM		
	B	SE	Sig.	B	SE	Sig.	B	SE	Sig.
Partnered	-.05	.42	.456	-.07	.60	.514	-.04	.60	.732
Education Level	.03	.16	.668	-.04	.23	.707	.10	.22	.327
Age	-.28	.01	< .001	-.22	.02	.044	-.37	.03	.001
ACE Score	.28	.05	< .001	.11	.07	.290	.44	.07	< .001
Rurality	-.19	2.02	.011	-	-	-	-	-	-
F Statistic	7.437			1.457			8.761		
Adj. R ²	.17			.02			.32		

Note: Significance is bolded. Coefficients are standardized.

Despite these limitations, this study has several notable strengths. The first is our inclusion of a rural sample- a key element which has been neglected in most studies concerning MSM populations. Next, studies who have used homosexual male populations have used gay or bisexual as inclusion criteria. This is important as it pertains to rural MSM, as rural environments may identify sexual orientation outside of heteronormative constructs without affirming labels such as “gay” or “bisexual.”

5. Conclusion

This study investigates the impact of ACEs on the self-reported marijuana use in both rural and urban MSM populations. Results show that ACEs were associated with self-reported marijuana use in the urban sample, but not the rural sample. It is unclear, however, if rural MSM engage in maladaptive behaviors other than marijuana use, or if factors associated with urban environments make urban MSM more vulnerable to illicit drug use when ACEs are high. Regardless, future research and program implementation should consider the geographic environment that MSM reside as an important influential factor.

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Contributors

Author Hubach designed the study and supervised all aspects of the research. Author Giano performed the tests, modeling, results, and discussion. Author Currin prepared the literature review. Author Wheeler wrote the methods. All authors read and approved the final manuscript.

Conflict of interests

No conflict declared.

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