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Mediators of interpersonal violence and drug addiction severity among methamphetamine users in Cape Town, South Africa

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Abstract

South Africa has high rates of interpersonal violence and a rapidly growing methamphetamine epidemic. Previous research has linked experiences of interpersonal violence to higher rates of substance use, and identified mental health constructs as potential mediators of this association. The aim of this study was to examine the relationship between interpersonal violence and addiction severity among active methamphetamine users in Cape Town, South Africa, and to explore symptoms of posttraumatic stress disorder (PTSD) and substance use coping as mediators of this relationship. A community sample of 360 methamphetamine users was recruited through respondent driven sampling and surveyed on their experiences of violence, mental health, coping,

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Contributors

Drs. Meade and Watt designed the study and wrote the protocol. Dr. Skinner oversaw data collection. Dr. Hobkirk conducted the statistical analysis and wrote the majority of the first draft of the manuscript. Drs. Green and Beckham wrote sections of the first draft. All authors contributed revisions to subsequent drafts and contributed to and approved the final manuscript.

Conflict of Interest

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

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and drug use and severity. A series of one-way ANOVAs were conducted to examine the relationship of self-reported interpersonal violence with drug addiction severity, and multiple mediation analyses were used to determine if PTSD symptoms and substance use coping mediated this relationship. The majority (87%) of the sample reported experiencing at least one instance of interpersonal violence in their lifetime, and the number of violent experiences was associated with increased drug addiction severity. PTSD and substance use coping were significant mediators of this association. Only the indirect effect of substance use coping remained significant for the female sample when the mediation model was conducted separately for men and women. The findings point to the need for integrated treatments that address drug use and PTSD for methamphetamine users in South Africa and highlight the importance of coping interventions for women.

Keywords

South Africa; Methamphetamine; Interpersonal Violence; Addiction; PTSD; Coping

1. Introduction

South Africa has one of the highest burdens of interpersonal violence in the world, including high rates of family violence (e.g., childhood abuse, intimate partner violence), violence between unrelated individuals in the community (e.g., muggings, homicide), and witnessing violent acts (Jewkes & Abrahams, 2002; Norman et al., 2010). The experience of interpersonal violence is unique from other types of trauma because it involves intentional actions perpetrated by other people, in many cases trusted family members or figures of authority. As global beliefs around trust and safety are challenged individuals are more likely to develop symptoms of posttraumatic stress disorder (PTSD) (Forbes et al., 2014). The rates of PTSD among South African populations vary from 26% to 34% depending on the sample (Cluver, Gardner, & Operario, 2007; Joska, Fincham, Stein, Paul, & Seedat, 2010; Kuo, Reddy, Operario, Cluver, & Stein, 2013; Olley, Zeier, Seedat, & Stein, 2005; Peltzer, Pengpid, McFarlane, & Banyini, 2013; Sikkema et al., 2011).

Interpersonal violence and substance use may share a cyclical link because 1) substance use may be a risk factor for interpersonal violence, and 2) victims of interpersonal violence may turn to substance use as a way to cope. There is evidence that people are more likely to develop substance use disorders, like methamphetamine abuse and dependence, after experiencing interpersonal violence and developing PTSD symptoms (Bremner, Douglas, Southwick, Darnell, & Charney, 1996; Breslau, Davis, Peterson, & Schultz, 1997; Stewart, Pihl, Conrod, & Dongier, 1998). Methamphetamine use increased dramatically in parts of South Africa over the past decade (Dada et al., 2012). Methamphetamine users report high rates of interpersonal violence from partners and friends (Cohen et al., 2003), experiences of childhood abuse (Meade et al., 2012), and mental health and behavioral problems like aggression (Pluddemann, Flisher, McKetin, Parry, & Lombard, 2010).

Comorbidities of interpersonal violence, PTSD, and substance use are well documented among non-methamphetamine users in South Africa and the U.S., and new research focused on these associations point to PTSD and substance use coping as mediators between

experiences of violence and substance use (Cusack, Herring, & Steadman, 2013; Ullman, Relyea, Peter-Hagene, & Vasquez, 2013; Watt et al., 2012). In U.S. studies, PTSD and substance use coping mediated the relationship between sexual abuse and substance use (Cusack et al., 2013; Ullman et al., 2013). For South African women in alcohol serving venues, PTSD mediated the association between hazardous drinking behavior and adult and childhood emotional, physical, and sexual abuse (Watt et al., 2012).

Given the rapid increase of methamphetamine use and the high rates of violence in South Africa, it is important to understand how interpersonal violence may be related to drug addiction in this setting. The primary purpose of this study was to identify associations between self-reported experiences of interpersonal violence and addiction severity among adult methamphetamine users, and to determine the role of PTSD symptoms and substance use coping as mediators of this association.

2. Methods

2.1 Setting

This study was conducted in Delft, a racially integrated township with a fairly equal number of residents who are Black African and Coloured. The term Coloured historically refers to people of mixed race, defined during Apartheid, but continues to be used today because of its social relevance. The majority of Delft's 150,000 residents are unemployed and live in poverty (Statistics South Africa, 2013). This community is one of many in South Africa that has been negatively impacted by the growing methamphetamine epidemic (Watt et al., 2014).

2.2 Participants

Respondent driven sampling was used to recruit 360 active methamphetamine users between May and October 2013. Details of recruitment are described elsewhere (Kimani et al., in press). Eligibility criteria were: 18 years of age, positive urine screen for methamphetamine use, and residence in Delft. Exclusion criteria were: observably impaired mental status, acute intoxication, and/or inability to provide informed consent.

2.3 Procedures

Participants provided written informed consent and completed a urine drug screen to confirm eligibility, a clinical interview with a trained research assistant, and an audio computer-administered self-interview (ACASI) programmed using QDS™ 2.6 software (NOVA Research Company, Bethesda, MD, USA). The assessments were offered in English, Afrikaans, and Xhosa. Participants were compensated with grocery store vouchers valuing ZAR 70 (~US\$7). Ethical approval was granted by the institutional review boards of Duke University and Stellenbosch University.

2.4 Measures

Interpersonal violence—We adapted several measures to capture experiences of interpersonal violence (Bernstein et al., 2003; Robins et al., 1988; Straus, Hamby, Boney-McCoy, & Sugarman, 1996). Responses were dichotomized as yes or no for each category

of violence (See Table 1). The number of categories endorsed was summed to create a composite ranging from 0 to 9.

PTSD—The number of symptoms endorsed on the Breslau Short Screening Scale assessed for PTSD (Range: 0–7) (Breslau, Peterson, Kessler, & Schultz, 1999). Participants who endorsed 4 symptoms on this measure were characterized as meeting symptom criteria for PTSD.

Substance use coping—The 4-item substance use coping subscale of the COPE assessed for substance use coping (Range: 4–16, $\alpha = 0.87$) (Carver, Scheier, & Weintraub, 1989).

Addiction severity—The Addiction Severity Index-Lite, a structured clinical interview, provided details of lifetime (years) and recent substance use (number of days in the past 30), including severity of use and associated impairments and yielded a composite score for alcohol and drugs, ranging from 0 (no problems) to 1 (maximal problems). (McLellan, Luborsky, Woody, & O'Brien, 1980). To ease interpretation of the mediation analyses, the ASI score was transformed to range from 0 to 100.

2.4.5 Data analysis—Analyses were conducted using SPSS Software Version 21 (IBM Corporation, Armonk, NY, USA). Chi-square analyses compared experiences of violence across gender. One-way ANOVAs compared substance use coping, PTSD, and addiction severity across individual and composite experiences of violence. Addiction severity was regressed onto coping and PTSD sum scores, and the cumulative sum of all endorsed experiences of interpersonal violence. The INDIRECT SPSS macro (Preacher & Hayes, 2008) examined the hypothesis that PTSD symptoms and coping mediate the association between experiences of interpersonal violence and addiction severity. With gender as a covariate, bootstrapping with 5,000 samples was used to estimate the 95% confidence interval (CI) of the indirect (mediation) effect and contrasts were conducted to determine if the indirect effects of the mediators were significantly different (Preacher & Hayes, 2008). In post-hoc analyses, the multiple mediation model was conducted separately for men and women to examine gender differences.

3. Results

Demographic, trauma-related, and drug-related sample characteristics are displayed in Table 1. Fifty-four percent of participants met symptom criteria for PTSD, with no significant differences by gender. The majority of participants (87%) reported at least one experience of interpersonal violence. Significantly more men than women endorsed experiencing physical assault ($\chi^2 = 7.4, p = .007$), significantly more women than men endorsed sexual assault ($\chi^2 = 24.9, p = .001$), and no differences were found for witnessing assault. Co-occurring use of marijuana, methaqualone, and alcohol were common. Average addiction severity index score was 0.4, which was higher than U.S. samples of treatment-seeking methamphetamine users (0.1–0.2) (Carrico et al., 2014; Roll, Chudzynski, Cameron, Howell, & McPherson, 2013).

All forms of interpersonal violence were associated with PTSD symptoms (all $p < .05$). All of the physical assault items, except assault by the police, and one of the witnessing assault items, observed violence in the home, were related to higher substance use coping scores. Only three of the individual physical assault items (being mugged, held up, car-jacked, or threatened with a weapon; being badly beaten up or physically injured by someone; and being hit, kicked, or beaten by a sex partner) were independently related to addiction severity. The cumulative number of interpersonal violence experiences was significantly associated with addiction severity ($\beta=0.14$, $p=.007$, $R^2=.02$, $p=.007$). PTSD and substance use coping were positively associated with addiction severity ($\beta=0.14$, $p=.010$; $\beta=0.17$, $p=.002$, respectively; $R^2=.06$, $p<.001$).

For the full sample, PTSD and substance use coping partially mediated the association of interpersonal violence with drug addiction severity. The association between experiences of interpersonal violence and addiction severity reduced from 0.96, a significant effect, to 0.14, an insignificant effect, when PTSD and substance use coping were accounted for as mediators (Figure 1). The indirect effects of PTSD and substance use coping were significant, and there was not a significant difference between the two indirect effects when they were contrasted, suggesting that they were equally relevant mediators in the model. In the post-hoc analyses for women, the indirect effect of substance use coping was significant ($CI: 0.09 - 0.78$), but not for PTSD ($CI: -0.05 - 1.34$). For men, the indirect effects of PTSD and substance use coping were not significant (respective CIs: $-0.21 - 1.25$ and $-0.02 - 0.61$).

5. Discussion

Conceptually, these findings suggest that substance use coping and PTSD symptoms play a significant role in the pathway from interpersonal violence to addiction severity among methamphetamine users in this setting. The results are similar to findings with other populations (Cisler et al., 2012; Cusack et al., 2013; Ullman et al., 2013; Watt et al., 2012). The high rates of interpersonal violence endorsed among the current sample are consistent with those documented previously in South Africa. Nearly half of all injury related deaths in South Africa in 2007 were from homicide (Norman, Matzopoulos, Groenewald, & Bradshaw, 2007), and 58% of those killed by homicide were intoxicated with alcohol at the time (MRC/UNISA, 2007), highlighting the link between substance use and violence in this setting. The direction of this relationship remains unclear and is likely cyclical, with interpersonal violence increasing the risk for substance use as a coping mechanism, and substance use placing individuals at risk for increased exposure to violence.

The findings highlight the need for integrated interventions that simultaneously address the sequelae of interpersonal violence, including substance use coping and PTSD. The long-held belief that PTSD should not be addressed in treatment until abstinence from substances has been achieved may be changing with some recommendations to address both simultaneously (Najavits & Hien, 2013). A recent review identified eight current treatment models in the literature that were designed specifically to address comorbid PTSD and substance use disorders (Najavits & Hien, 2013). Although the findings are still limited, there is growing evidence that these combined interventions improve PTSD symptoms over treatment as

usual and substance use interventions alone, in addition to reducing substance use (Amaro et al., 2007; Coffey, Stasiewicz, Hughes, & Brimo, 2006; McGovern, Lambert-Harris, Alterman, Xie, & Meier, 2011; Mills et al., 2012). More research is needed to understand the limitations of using PTSD interventions with individuals who continue to be exposed to interpersonal violence during treatment, which would be relevant for the current study sample. Observed gender differences point to the need to potentially tailor treatment models to men and women separately.

The current study had several limitations that could be addressed in future research. Causality and the temporal link between these factors cannot be inferred given the cross-sectional study design. Longitudinal research examining the development of PTSD and substance use after trauma exposure would be ideal. Additional research is needed to determine whether there are specific PTSD symptom clusters (re-experiencing, avoidance, numbing, hyperarousal) that may be responsible for the mediation observed. Thus, future studies would benefit from a more comprehensive assessment of PTSD to provide data on symptom type, intensity, and frequency. The study has a number of strengths including a large community-recruited sample of active drug users, comprehensive information on polysubstance use among methamphetamine users, and a wide range of assessed traumatic experiences.

The findings point to the need for integrated trauma, PTSD, and substance use interventions for methamphetamine users living in South Africa. Future research is needed to fully understand the temporal associations among these variables and how varying PTSD symptoms and coping styles may differentially contribute to the development of drug addiction in South Africa.

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Highlights

- 87% of meth users endorsed at least one experience of interpersonal violence.
- Interpersonal violence was associated with addiction severity.
- PTSD and coping mediated the association between violence and addiction severity.
- Among women, coping mediated the association of violence and addiction severity.
- Among men, there were no significant mediators of violence and addiction severity.

Figure 1.

Multiple Mediation Model. Unstandardized regression coefficients of multiple mediation analysis of experiences of interpersonal violence and drug addiction severity through PTSD and substance use coping, controlling for gender, among a sample of methamphetamine users in Cape Town, South Africa.

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Note. 95% confidence interval of indirect effects for PTSD = 0.04 – 1.05 and substance use coping = 0.10 – 0.54. Contrast 95% confidence interval = -0.32 – 0.82. Model adjusted $R^2 = 0.08$, $p < .001$.

Table 1

Sample Characteristics (n = 360)

	Women (n = 159)	Men (n = 201)
	M (SD) or n (%)	M (SD) or n (%)
Demographic Characteristics		
Age	29.0 (6.9)	28.9 (7.6)
Coloured	138 (87%)	125 (62%)
Black	21 (13%)	76 (38%)
Completed high school	20 (13%)	22 (11%)
Currently unemployed	22 (14%)	48 (24%)
Currently married	29 (18%)	22 (11%)
Trauma-Related Variables		
PTSD	3.8 (2.4)	3.6 (2.4)
Lifetime Experiences of Interpersonal Violence		
Physical Assault	114 (72.3%)	169 (84%)
Mugged, held up, car-jacked, or threatened with weapon	60 (38%)	117 (58%)
Badly beaten up or physically injured by someone	68 (43%)	101 (50%)
Family member hit you as a child, left bruises or marks	49 (31%)	65 (32%)
Physically assaulted by the police	22 (14%)	107 (53%)
Ever hit, kicked, or beaten by a sex partner	64 (44%)	51 (25%)
Sexual Assault	57 (36%)	26 (13%)
Someone used force to make you have sex with them	34 (21%)	12 (6%)
Anyone force you to have sexual intercourse as a child	39 (25%)	18 (9%)
Witnessing Assault	107 (67%)	142 (71%)
Observed violence in home	61 (38%)	67 (33%)
Seen someone badly injured or killed or seen dead body	86 (54%)	119 (59%)
Substance Use-Related Variables		
Substance Use Coping	9.9 (3.2)	10.2 (3.2)
ASI Drug Addiction Severity	0.4 (0.2)	0.4 (0.1)
Drug Use in the Past 30 days		
Methamphetamine	159 (100%)	201 (100%)
Marijuana	102 (64%)	176 (88%)
Methaqualone	84 (53%)	146 (73%)
Alcohol Intoxication	49 (31%)	83 (41%)
Heroin	15 (9%)	24 (12%)

Note. PTSD = Posttraumatic Stress Disorder; ASI = Addiction Severity Index.