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Trauma-Related Risk Factors for Substance Abuse Among Male Versus Female Young Adults

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Abstract

Clinical efforts to reduce risk for Substance Use Disorders (SUDs) among young adults rely on the empirical identification of risk factors for addictive behaviors in this population. Traumatic events, and Posttraumatic Stress Disorder (PTSD) in particular, have been linked with SUDs in various populations. Emerging data, particularly from adolescent samples, suggest that traumatic event exposure increases risk for SUDs for young women, but not young men. The purpose of the current study was to examine trauma-related risk factors for alcohol and drug abuse among a national sample of young adults and compare such risk factors between men and women. Participants were 1,753 young adults who participated in the 7–8 year follow-up telephone-based survey to the original National Survey of Adolescents. In the full sample, 29.1% met criteria for substance abuse. Trauma-related risk factors for alcohol and drug abuse differed for men and women. Clinical implications of these results are discussed.

Keywords

trauma; PTSD; sexual assault; gender differences

1. Introduction

Substance use disorders (SUDs) are highly prevalent among young adults. For example, epidemiologic data suggest that approximately 67% of individuals with a lifetime history of alcohol dependence met criteria prior to age 25 (Hingson, Heeren & Winter, 2006). Clinical efforts to reduce risk for SUDs among such young adults rely on the empirical identification of risk factors for addictive behaviors specific to this population. A number of risk factors for the development of SUDs have been established, including age, family history of a SUD, ethnicity, and psychiatric disorders (e.g., Kilpatrick et al., 2000). In addition, potentially traumatic events, such as sexual abuse (SA) and physical abuse (PA), as well as Posttraumatic Stress Disorder (PTSD), consistently have been shown to confer increased risk for SUDs (e.g., Breslau, Davis, & Schultz, 2003; Simpson & Miller, 2002). Emerging data, particularly from adolescent samples, suggest that traumatic event exposure increases risk for SUDs for young women, but not young men. For example, Breslau and colleagues (2003) found that within a

large sample of young adults in southeast Michigan, trauma-exposed young women were at increased risk for alcohol abuse/dependence, but not trauma-exposed men. In addition, Becker and Grilo (2006) found that exposure to a potentially traumatic event during childhood predicted SUDs in female, but not male, adolescent patients. PTSD also has been found to be associated with alcohol dependence (Clark et al., 1997) and drug use (Lipschitz et al., 2000) in female adolescents, but not male adolescents. Additional research is warranted to further study the relation between trauma and SUDs and to determine whether traumatic event exposure increases risk for SUDs among male, as well as female, young adults. Thus, the purpose of the current study was to examine trauma-related risk factors for alcohol and drug abuse among a sample of young adults and compare such risk factors between men and women.

2. Methods

2.1. Participants

Participants were 1,753 young adults who participated in the 7–8 year follow-up survey (from 10/03–09/04) to the original National Survey of Adolescents (1995 NSA) conducted from 01/95–08/95 (Kilpatrick et al., 2000). Briefly described, the 1995 NSA was a national probability household sample of U.S. adolescents between the ages of 12 and 17 years who were located and interviewed via telephone. The same methodology, as described below, was utilized in the follow-up survey conducted approximately eight years later. Participants ranged in age from 18 to 26 years old ($M = 22.12$, $SD = 1.75$) and 881 (50.2%) were male. The ethnic/racial breakdown of the participants was as follows: 1,245 (71%) were Caucasian; 220 (12.6%) were African-American; 160 (9.1%) were Hispanic; 46 (2.6%) were Native American; and 56 (3.2%) were Asian. The remaining 26 (2.6%) were of other ethnicity (not specified).

The 1,753 young adults in this sample represented 43.5% of those who participated in the 1995 NSA. Data were not collected from the remainder of the sample at follow-up for the following reasons: 1516 (66.7% of the 2,270 youth did not participate in the follow-up survey) could not be located, 265 (11.7%) were located but either could not be reached or were not successfully scheduled during the assessment period, 449 (19.8%) refused to participate or terminated the interview, and 40 (1.8%) were deceased or had health problems that precluded their participation. Thus, difficulty locating and scheduling participants, rather than participant refusal, accounted for the majority of the observed attrition.

In order to identify attrition bias (Miller & Wright, 1995), Wave 2 completers ($n = 1753$) and noncompleters ($n = 2270$) were compared with respect to selected demographic characteristics, victimization, and mental health outcome variables as measured at Wave 1. Regarding demographics, a greater proportion of female (46.7%) than male (40.3%) participants were completers, $\chi^2(2, N = 4023) = 16.73$, $p < .001$. Nonhispanic Caucasians (46.6%) were also more likely than ethnic minorities (35.8%) to be completers at Wave 2, $\chi^2(2, N = 4023) = 44.39$, $p < .001$. With regard to interpersonal violence, a greater proportion of those participants who did not report rape at Wave 1 (43.8%) than those who did report rape (35.5%) were completers, $\chi^2(2, N = 4023) = 4.21$, $p < .05$. Similarly, participants who had not experienced a physical assault by a noncaregiver had a higher completion rate (45.2%) than those who had (35.6%), $\chi^2(2, N = 4023) = 21.525$, $p = .000$. There were no observed differences in attrition with regard to molestation or physically abusive punishment/physical assault by a caregiver. Concerning mental health outcomes, a greater proportion of participants without a history of PTSD were completers (44.3%) than those who suffered from the disorder (35%), $\chi^2(2, N = 4023) = 10.646$, $p = .001$. Further, although there was no difference in completion rate between those who admitted to alcohol abuse at Wave 1 and those who did not, fewer of those who admitted to drug abuse at Wave 1 (30.0%) were completers compared to those who did not (44.2%), $\chi^2(2, N = 4023) = 16.430$, $p = .000$.

2.2. Measures

The interview used in the current study was designed specifically for the NSA Follow-Up Survey, which was slightly modified from the 1995 NSA interview. The interview is a highly structured measure that assesses several domains, including demographic information, familial variables, lifetime traumatic event history, and psychiatric difficulties. The current study focused on selected modules of the interview, including sexual assault (SA), physical assault (PA) and severe physical punishment, witnessing violence, PTSD, alcohol and drug abuse, and family history of alcohol and drug abuse.

Substance abuse was measured using interview questions that reflected specific DSM-IV criteria for these disorders. Symptoms of abuse included failure to fulfill role obligations, substance use in dangerous situations, legal problems related to substance use, and continued use despite negative social consequences for use. Symptoms of abuse were assessed for alcohol and drug abuse independently and these categories were not mutually exclusive. In order to improve validity of responses by reducing retrospective bias, diagnostic information focused on past-year abuse. Previous research supports the construct validity of this measure (Kilpatrick et al., 1997).

Familial substance use assessed for family alcohol problems and any family drug use (see Kilpatrick, et al., 2000 for detailed questions). Although specific familial alcohol problems were assessed (e.g., “Has anyone—either in your family or who lived with you, not counting you—drank alcohol so much that it became a problem? For example, did anyone drink so much they got into fights with other people, or started to beat the kids, or couldn't get out of bed the next day, or had difficulty holding a job?”), it was deemed significant enough to ask only about the presence of familial drug use because of its illegality and frequent association with problematic behaviors within the family (Kilpatrick et al., 2000).

SA, PA, and Witnessing Violence were measured using close-ended questions that focused on specific behavioral acts. Before being asked these questions, brief, introductory narratives with a rationale and a behavioral description were provided for each area. SA was defined as forced/nonconsensual: (a) vaginal or anal penetration by an object, finger, or penis; (b) oral sex; (c) touching of the respondent's breasts or genitalia; or (d) respondents' touching of another person's genitalia. PA, including severe physical punishment, was defined as having been: (a) attacked or threatened with a gun, knife, or some other weapon; (b) attacked by another person with perceived intent to kill or seriously injure; (c) beaten and injured by another person; (d) spanked so forcefully that the respondent sustained welts or bruises, or required medical care; or (e) cut, burned, or tied up by a caregiver as a punitive consequence. Witnessing Violence was defined as having observed in person someone (a) shoot someone with a gun; (b) cut or stab someone with a knife; (c) threaten someone with a gun, a knife, or other weapon; (d) mug or rob someone; or (e) rape or sexually assault someone. These behaviorally specific questions have been reliably used in multiple epidemiological studies to assess traumatic event exposure in adults (e.g., Resnick et al., 1993) and adolescents (e.g., Kilpatrick et al., 2000). All participants were assessed for PTSD in the past 6-months based on DSM-IV criteria, which includes symptoms of reexperiencing, avoidance/numbing, and hyperarousal. Research on this measure has provided support for concurrent validity and several forms of reliability (e.g., temporal stability, internal consistency, diagnostic reliability; Resnick et al., 1993; Ruggiero et al., 2006). The measure was validated against the PTSD module of the Structured Clinical Interview for the *DSM* administered by mental health professionals (Kilpatrick et al., 1998). The inter-rater kappa coefficient was 0.85 for the diagnosis of PTSD, and comparisons between the NWS-PTSD module and SCID yielded a kappa coefficient of 0.77.

2.3 Procedures

Interviews for the NSA were conducted by Schulman, Ronca, and Bucuvalas, Inc. The 1995 NSA sample was collected using a stratified random digit dialing procedure to contact households across the United States. An oversampling of urban households was conducted in order to ensure appropriate representation of ethnic minority group respondents. In the follow-up survey, participants were re-contacted to obtain permission to participate in the follow-up interview. Of the 4,023 individuals who completed Wave 1, 1,753 completed the 2002–2003 follow-up interview. An appendix listing of certain items from the interview, have been reported elsewhere (Kilpatrick et al., 2000).

2.4. Statistical Analyses

To correct for any demographic discrepancies between the NSA and U.S. population proportions introduced by data collection in 1995 or the aforementioned attrition in the follow-up surveys, a weighting system was created on the basis of age, race, and gender based on statistics from the US Bureau of Census (1988). Predictor variables were selected on the basis of their relevance to young adult substance abuse based on prior research and studies with the 1995 NSA (Kilpatrick 2000; Kilpatrick et al., 2003). First, correlations among the variables were examined to determine the inter-relatedness among the items. Second, logistic regression analyses were conducted predicting past year alcohol and drug abuse in the full sample to determine if gender was a significant predictor. With the exception of age (a three level variable) all predictors were dichotomous variables. Third, as gender was a significant predictor, separate logistic regression analyses to determine the presence (or absence) of significant trauma-related risk factors were conducted by gender, and third the resulting Odds Ratios (ORs) were compared for significance via z-tests. The SUDAAN 10.0 statistical package was used for all analyses to account for survey weighting, as described above. For significance testing, alpha was set a priori at 0.05.

3. Results

In the full sample, 509 (29.1%) met criteria for substance abuse of any kind. In examining abuse by type of substance, 442 (25.2%) met criteria for alcohol abuse and 197 (11.2%) met criteria for drug abuse. Abuse categories were not mutually exclusive; 313 (17.9%) participants met criteria for alcohol abuse only, 67 (3.8%) met criteria for drug abuse only, and 129 (7.4%) met criteria for both alcohol and drug abuse. Among male participants, 276 (31.3%) met criteria for alcohol abuse, and 145 (16.5%) met criteria for drug abuse, with 91 (10.3%) meeting criteria for comorbid alcohol and drug abuse. Among female participants, 167 (19.1%) met criteria for alcohol abuse and 51 (5.9%) met criteria for past year drug abuse, with 38 (n=4.4%) reporting comorbid alcohol and drug abuse. Descriptive statistics for the full sample for specific risk factors examined (gender, age, family history of alcohol abuse, family history of drug abuse, SA, PA, witnessed violence, and PTSD (past 6 months)) are provided for the full sample and by gender in Table 1. Correlations among the target variables are reported in Table 2.

The overall model for alcohol abuse was significant (Wald's $F=29.90$, $p<.001$). As shown in Table 3¹, gender (OR=2.02 vs. being female), ages 18–20 (OR=1.52, vs. being 24–26), ages 21–23 (OR=1.45, vs. being 24–26), minority status (OR=.60, vs. being Caucasian), having a lifetime history of witnessing violence (OR=2.11, vs. not having a history), and past 6-month PTSD (OR=2.30, vs. PTSD negative), were all predictive of past year alcohol abuse. Family drug and alcohol problems, and lifetime history of SA or PA were not significant predictors.

¹The final models are presented in the tables and in text; however, all analyses were conducted in a hierarchical fashion as well, with demographic variables in one block, family history variables in another block, trauma exposure variables in one block, and PTSD in the last block. This method did not change the pattern of results.

Within a significant model for past year drug abuse (Wald's $F=48.15$, $p<.001$) the variables that were significant included gender (OR=4.23 vs. being female), ages 18–20 (OR=2.45, vs. being 24–26), ages 21–23 (OR=1.81, vs. being 24–26), having a lifetime history of SA and PA (ORs=2.44, 1.87, respectively, vs. not having a history), and past 6-month PTSD (OR=2.21, vs. PTSD negative). Racial/ethnic status, family drug and alcohol problems, and lifetime history of witnessing violence were not significant predictors.

As gender was a significant predictor in the full sample for both substance abuse outcomes, analyses were conducted separately by gender. As shown in Table 4, significance patterns for predictors of alcohol abuse differ by gender (models for men and women were significant; Wald's $F_s=10.04$, 25.11, $ps<.001$, respectively); however, results of z -significance testing revealed that only the ORs for lifetime history of SA differed significantly by gender, with females with a history of SA being at a higher risk (OR=2.11) than males with a history of SA (OR=.39), ($z=3.31$, $p<.01$), suggesting that SA moderates the relationship between gender and alcohol abuse.

Table 5 presents the results of regression analyses by gender for drug abuse (models for men and women were significant; Wald's $F_s=22.58$, 30.37, $ps<.001$). Similar to the results from alcohol abuse, gender differences were revealed in predictor patterns; however, z tests did not reveal any significant differences between the ORs yielded by each predictor by gender.

4. Discussion

Results are consistent with previous literature indicating that lifetime exposure to traumatic events increases risk for substance abuse among young adults (e.g., Breslau et al., 2003) and that male young adults report higher rates of alcohol and drug abuse than female young adults (e.g., Nolen-Hoeksema & Hilt, 2006). The current study extends this research by illustrating that male gender remains a specific risk factor for alcohol and drug abuse when simultaneously considering and controlling for traumatic event history—and that exposure to specific traumatic events indeed increases risk for SUDs among young men. This is in contrast to much of the previous literature that has found that trauma exposure increases risk for SUDs among young women, but not young men. One possible explanation for this contrast is the inclusion of introductory narratives and behaviorally specific measurement of traumatic event history in the current study, which may have captured greater numbers of trauma-exposed young men than previous studies and provided a larger sample within which to examine the relation between such traumatic event history and SUDs. Further, as the majority of research in this area has been conducted with adolescents, it is possible that male gender may become more relevant with regard to risk for SUDs in adulthood (vs. adolescence).

The current study also builds upon the existing literature by highlighting different patterns of trauma-related risk factors that emerge for alcohol and drug abuse in men versus women. For example, age was a significant risk factor for women, where those who fell in the lowest age range (18–20 years) were at heightened vulnerability for both alcohol and drug use. SA also was a common predictor for alcohol and drug abuse for young women. These factors are not likely to be independent as the findings coincide with existing literature indicating that women between the ages of 18–20 years are at heightened risk for SA (Abbey et al., 1996). Alternatively, PA and PTSD were common predictors for alcohol and drug abuse for men, indicating that exposure to PA, even in the absence of PTSD, increases risk for SUDs among men. Interestingly, the odds ratio for SA was significantly different between women and men, indicating that young adult women who have been sexually assaulted are at greater risk for alcohol abuse than men who have been sexually assaulted. Thus, gender may moderate the relation between alcohol abuse and SA. Of course, this likely also reflects the significantly higher rate of SA in female versus male participants in the study.

Clinical implications of this study suggest the need for continued substance abuse prevention and treatment efforts targeted at youth as they transition from adolescence to adulthood, as well as the potential need to tailor such efforts to the differing vulnerabilities of young men and women. For example, it appears that alcohol and drug abuse risk reduction efforts targeting younger women who have experienced SA are warranted, as are similar efforts targeting men who have experienced PA and who have witnessed violence. Further, assessing for and addressing substance abuse may be important when providing mental health treatment to young adult men who present with PTSD. It should be noted that the significant level of attrition that occurred between the original 1995 NSA sample and the current follow-up sample is a limitation of the current study. Despite the use of weighted variables to counter such attrition effects, the degree to which these results are fully generalizable to the U.S. young adult population is unknown. Similarly, the high level attrition limited our ability to examine timing of exposure to violence in the current study, which has been shown to be a potentially relevant factor with regard to SUD risk among girls (e.g., Becker & Grilo, 1996). Given more power, future studies should include the timing of violence exposure in their models. Another limitation includes that assessment was solely based on self-report data and collected via telephone interviews. Although random digit dialing procedures were used to gather as representative a sample as possible, participants were limited to those residing in homes with telephones. Despite these limitations, this study supports the growing body of research highlighting that trauma exposure increases risk for SUDs among both male and female young adults and that specific trauma-related risk factors may differ by gender.

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Table 1

Descriptive Statistics on Predictor Variables

Predictor	Full Sample (n=1753)	Men (n=881)	Women (n=872)
18–20 years	377 (21.5%)	184 (13.8%)	194 (22.2%)
21–23 years	941 (53.7%)	465 (52.9%)	444 (54.5%)
25–26 years	436 (24.9%)	233 (26.3%)	204 (23.2%)
Caucasian	1291 (73.7%)	652 (74.1%)	639 (73.3%)
Family Alcohol Problems	327 (18.7%)	140 (15.8%)	188 (21.5%)
Family Drug Problems	228 (13.0%)	89 (12.1%)	140 (16%)
History of SA at Wave 1	133 (7.6%)	27 (3.0%)	107 (12.2%)
History of PA at Wave 1	352 (20.1%)	190 (21.6%)	162 (18.6%)
History of WV at Wave 1	650 (37.1%)	364 (41.3%)	286 (32.8%)
History of SA at Wave 2	119 (6.8%)	3 (0.3%)	116 (13.2%)
History of PA at Wave 2	277 (15.8%)	188 (21.3%)	89 (10.2%)
History of WV at Wave 2	615 (35.1%)	384 (43.7%)	230 (26.4%)
PTSD-Past 6 Months	129 (7.4%)	57 (6.4%)	73 (8.3%)

Note: Due to the low prevalence of SA for men at Wave 2, lifetime history of SA, PA, and WV was used for purposes of the logistic regression analyses.

	Gender	Age	Fam Alc Prob	Fam Drg Probs	Lifetime hx of sa	Lifetime hx of pa or pab	Lifetime hx of witnessed Violence	Psd 6month	Past yr. Alc. Abuse	Past yr drg Abuse
Age	-.02	--	--	--	--	--	--	--	--	--
Fam alc. Probs	.07**	.05*	--	--	--	--	--	--	--	--
Fam drg probs	.09***	.02	.33***	--	--	--	--	--	--	--
SA	.30***	.07**	.20***	.18***	--	--	--	--	--	--
PA	-.13***	.07**	.15***	.16***	.16***	--	--	--	--	--
WV	-.13***	-.05*	.12***	.05*	.10***	.25***	--	--	--	--
PTSD	.04	-.06*	.12***	.07**	.16***	.19***	.07**	--	--	--
Alc. Abuse	-.14***	-.05*	.02	.05*	.03	.13***	.15***	.12***	--	--
Drug Abuse	-.17***	-.07**	.06**	.04	.06*	.16***	.11***	.13***	.33***	--

Table 3
 Logistic Regressions Results: Substance Abuse Outcomes in Full Sample.

Predictor	Alcohol Abuse			Drug Abuse		
	OR	95% CI	p-value	OR	95% CI	p-value
Model 1: Demographics						
Gender						
Male	2.02	1.53–2.66	<.001	4.23	2.76–6.47	<.001
Female	1.00	-		1.00	-	
Age						
18–20	1.52	1.03–2.24	.04	2.45	1.41–4.27	.005
21–23	1.45	1.06–1.99		1.81	1.14–2.88	
24–26	1.00	-		1.00	-	
Caucasian						
No	1.00	-	.003	1.00	-	.34
Yes	.60	.43–.85		.81	.52–1.26	
Family Alcohol Problems (Wave 1 or 2)						
No	1.00	-	.44	1.00	-	.31
Yes	.87	.61–1.24		1.27	.80–2.00	
Family Drug Problems (Wave 1 or 2)						
No	1.00	-	.10	1.00	-	.58
Yes	1.42	.94–2.14		1.15	.70–1.89	
Lifetime History of Sexual Abuse						
No	1.00	-	.11	1.00	-	<.001
Yes	1.36	.93–1.98		2.44	1.44–4.14	
Lifetime History of Physical Abuse						
No	1.00	-	.07	1.00	-	.002
Yes	1.32	.98–1.78		1.87	1.27–2.74	
Lifetime History of Witnessed Violence						
No	1.00	-	<.001	1.00	-	.06
Yes	2.11	1.45–3.08		1.78	.97–3.26	
PTSD - Past 6 Months						
No	1.00	-	<.001	1.00	-	.006

Predictor	Alcohol Abuse			Drug Abuse		
	OR	95% CI	p-value	OR	95% CI	p-value
Yes	2.30	1.47–3.60		2.21	1.25–3.90	

Table 4

Logistic Regressions Results: Alcohol Abuse by Gender

Predictor	Females			Males		
	OR	95% CI	p-value	OR	95% CI	p-value
Model 1: Demographics						
Age						
18–20	2.32	1.31–4.11	.008	1.19	.70–2.02	.72
21–23	.02	1.23–3.32		1.17	.78–1.77	
24–26	1.00	-		1.00	-	
Caucasian						
No	1.00	-	<.001	1.00	-	.36
Yes	.41	.26–.67		.80	.50–1.29	
Family Alcohol Problems (Wave 1 or 2)						
No	1.00	-	.17	1.00	-	.81
Yes	.69	.40–1.18		1.06	.65–1.74	
Family Drug Problems (Wave 1 or 2)						
No	1.00	-	.21	1.00	-	.28
Yes	1.45	.81–2.58		1.38	.77–2.49	
Lifetime History of Sexual Abuse						
No	1.00	-	.001	1.00	-	.03
Yes	2.11	1.35–3.30		.39	.16–.96	
Lifetime History of Physical Abuse						
No	1.00	-	.68	1.00	-	.04
Yes	1.11	.67–1.83		1.48	1.01–2.16	
Lifetime History of Witnessed Violence						
No	1.00	-	.05	1.00	-	<.001
Yes	1.63	.99–2.68		2.65	1.49–4.71	
PTSD - Past 6 Months						
No	1.00	-	.003	1.00	-	.03
Yes	2.44	1.36–4.37		2.11	1.06–4.20	

Table 5

Logistic Regressions Results: Drug Abuse by Gender

Predictor	Females			Males		
	OR	95% CI	p-value	OR	95% CI	p-value
Model 1: Demographics						
Age						
18–20	4.47	1.72–11.65	.009	1.91	.96–3.83	.12
21–23	2.51	1.05–6.01		1.64	.95–2.83	
24–26	1.00	-		1.00	-	
Caucasian						
No	1.00	-	.29	1.00	-	.63
Yes	.69	.35–1.37		.87	.50–1.53	
Family Alcohol Problems (Wave 1 or 2)						
No	1.00	-	.49	1.00	-	.50
Yes	1.32	.60–2.92		1.21	.69–2.13	
Family Drug Problems (Wave 1 or 2)						
No	1.00	-	.78	1.00	-	.42
Yes	.89	.39–2.04		1.30	.69–2.46	
Lifetime History of Sexual Abuse						
No	1.00	-	<.001	1.00	-	.23
Yes	3.43	1.76–6.69		1.78	.69–4.60	
Lifetime History of Physical Abuse						
No	1.00	-	.50	1.00	-	<.001
Yes	1.30	.60–2.82		2.17	1.38–3.42	
Lifetime History of Witnessed Violence						
No	1.00	-	.12	1.00	-	.30
Yes	2.49	.79–7.83		1.47	.71–3.04	
PTSD - Past 6 Months						
No	1.00	-	.30	1.00	-	.001
Yes	1.61	.65–4.00		2.69	1.27–5.67	