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MENTAL HEALTH AND DRUG USE ISSUES AMONG MEN WHO HAVE SEX WITH MEN

Men's Pathways to Risky Sexual Behavior: Role of Co-Occurring Childhood Sexual Abuse, Posttraumatic Stress Disorder, and Depression Histories

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ABSTRACT *Recent reports of sexually transmitted infection-rate increases among men indicate the need for renewed study of male sexual risk behavior to aid development of updated and novel risk reduction interventions. Men who have childhood sexual abuse (CSA) histories consistently report frequent sexual risk behavior. The objective of this sturdy is to explore whether posttraumatic stress disorder (PTSD) and depression are moderators and/or mediators of the association between CSA and sexual risk in adult men. A cross-sectional survey study employing random digit dial recruitment was administered to men aged 18–49 years from Philadelphia County. Two hundred ninety eight men were recruited and screened for CSA history, administered items from the Posttraumatic Stress Diagnostic Scale (PDS) and Center for Epidemiologic Studies—Depression (CES-D), and asked to estimate their number of lifetime sexual partners (LSPs). Effects of sociodemographic characteristics, CSA, PTSD, and depression on the number of LSPs were modeled using Poisson regression. Results show that 197 (66%) men participated; 43 (22%) had CSA histories. CSA was significantly associated with PTSD/depression ($P = .03$). Four sociodemographic variables (age, race, sexual identity, and education), CSA (incidence rate ratio, $IRR = 1.47$, $P < .001$), PTSD ($IRR = 1.19$, $P = .04$), depression ($IRR = 1.29$, $P = .001$), all 2–way interactions, and the 3-way CSA/PTSD/depression interaction ($IRR = 11.00$, $P < .001$) were associated with the number of LSPs ($R^2 = 0.27$). In conclusion, sexual partnership patterns unique to men with CSA histories and comorbid PTSD/depression appear to lead to substantially higher numbers of LSPs. Estimates of this relationship may have been biased toward the null by underreporting that can occur with phone surveys. Cross-sectional studies do not support causal inferences; however, the identification of a moderating and mediating influence of PTSD/depression on the relationship between CSA and sexual risk behavior is important and suggests the need for future studies with larger samples that examine trajectories for CSA, psychiatric illness, and sexual partnerships.*

KEYWORDS *Depression, Men, Posttraumatic stress disorder, Sexual abuse, Sexual behavior.*

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INTRODUCTION

Men with versus men without childhood sexual abuse (CSA) histories report higher numbers of lifetime sexual partners (LSPs), less frequent condom use, more frequent risky sexual behaviors, higher rates of sexually transmitted infections including HIV, and responsibility for more unwanted pregnancies.[1–12] Further study of this sexual risk-taking group may ascertain variables that mediate and/or moderate the relationship between CSA and sexual risk behavior.

Miller has proposed a mediating pathway between CSA and sexual risk behavior for women (Fig. 1).[13] Posttraumatic stress disorder (PTSD) and depression are included. PTSD and depression symptoms are associated with HIV risk behavior in nonabused men.[14] Because PTSD and depression are common—and often comorbid—in men with CSA histories, the presence of a similar relationship between PTSD/depression and HIV risk behavior may exist for abused men as well.[8,9,15–25] This study sought to clarify whether the PTSD/depression pathway of the Miller Model could be extended to men and, if so, whether the PTSD/depression linkage between CSA and sexual risk behavior was solely a mediating one or also a moderating one.

METHODS

We identified potential participants by random digit dialing using telephone exchanges for Philadelphia County areas with high incidences of reported HIV seroconversion.[26] One hundred men were recruited into each of three age groups: 18–29, 30–39, and 40–49 years. A research firm with expertise in telephone surveys on sensitive subjects completed all screening and interviewing. Interviewers recorded contact information for men who agreed to participate in a study of how "childhood experiences have affected adult men's health and well being."

An information packet describing the study and principal investigator, offering a $15.00 incentive for study participation, and including a consent form (originally approved on July 24, 2002, by the University of Pennsylvania Institutional Review Board's Committee on Studies Involving Human Beings) was mailed to potential

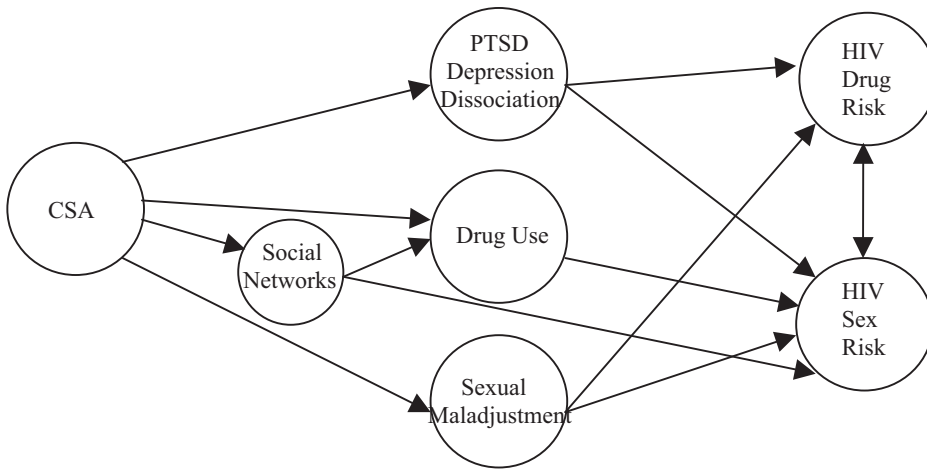


FIGURE 1. Miller model of relationship between CSA and HIV risk behavior.[13]

participants. Men were called back two weeks later and a full telephone interview was administered to those agreeing to participate.

The dependent variable employed was the number of LSPs. This gross estimate of partnering that has occurred over an adult sexual life is associated with lifetime history of sexually transmitted infections.[27,28] More LSPs also increase the likelihood that partners are less known, less exclusive, and less likely to come from the same network.[27,28] Respondents were asked, "How many sex partners would you say you've had in your life since you turned 18 years old?" Reported numbers were right censored at ≥97.

Finkelhor's four "funneling" questions were used to screen for CSA.[29] Men answering "no" to all questions were asked, "Sometimes people's views about experiences change over time. Did you ever have an experience when you felt at the time that you were forced or frightened into doing something sexually that you didn't want to do (sexual experiences like those I just asked questions about)?"[9] Any "yes" led to questions that detailed their experience(s).

CSA was defined as any sexual experience before 18 years of age in which (1) a power differential existed between a victim and perpetrator whereby the perpetrator was ≥5 years older than victim <13 years, was ≥10 years older than victim 13–17 years, or was an authority figure (i.e., teacher); (2) coercion occurred; or (3) penetration (i.e., oral, anal, and vaginal) of victim or perpetrator (by victim) occurred and victim was prepubertal (≤11 years).[30,31]

PTSD symptoms were assessed with the Posttraumatic Stress Diagnostic Scale (PDS); a score >10 (symptom severity more than "mild") indicated likely PTSD.[32] The PDS was modified to begin, "I will read a list of problems that people sometimes have after experiencing a traumatic event. Listen to each stated problem carefully and choose the description that best describes how often that problem has bothered you in the past month. Rate each problem with respect to any traumatic event you have experienced that continues to bother you in some way." Subsequently, all men were asked, "How long have you experienced the (PDS) problems that you reported above? Less than 1 month, 1–3 months, >3 months, or never experienced any of these?" Depressive symptoms were assessed with the Center for Epidemiologic Studies—Depression (CES-D); a score >16 indicated likely depression.[33–35]

LSP data were found to approximate a Poisson distribution. Thus, all analyses involving LSP data as the dependent variable were completed using Poisson regression methods. The (mediation-specific) analysis involving PTSD/depression as the dependent variable and CSA as the independent variable was completed by conducting an ordinal logistic regression analysis after validating assumptions about the ordering of PTSD/depression subgroups via multinomial regression.

Poisson modeling was initiated by placing into a first multivariate regression all sociodemographic variables significantly associated with the number of LSPs (in univariate analyses). Any variable not found to be significantly ($P = .10$) associated with number of LSPs was removed, after which the analysis was repeated. Iterations were considered complete (Initial Model) when all variables remaining in the multivariate model had P values of .10. Modeling continued by placing CSA, PTSD, and depression variables into a regression with all variables from the Initial Model. All main effects and potential interaction terms were included initially. If interaction terms were statistically significant, all main effects and all relevant interaction terms involved were retained along with previously identified sociodemographic variables (Final Model). Model adequacy was evaluated using graphical methods and standard regression diagnostics.

RESULTS

Participants

Two hundred and ninety-eight men were recruited; 197 (66%) participated; 66, 62, and 69 were in the 18–29, 30–39, and 40–49 year old age groups, respectively. The race/ethnicity distribution was African American (54%), Caucasian (32%), Hispanic (9%), Asian/Pacific Islander (2%), Mixed (2%), and Arab (1%). About 8% self-identified as gay/bisexual. Education ranged from <12th grade/General Educational Development (20%), high-school graduate (24%), some college (20%), to college/graduate degree (35%). Income ranged from ≥$20,000 (29%), $20,001–40,000 (27%), $40,001–75,000 (27%), to >$75,000 (18%).

CSA, PTSD, and Depression Histories

Forty-three (22%) of 197 participants met criteria for CSA. Forty-six (23%) and 49 (26%) met criteria for PTSD and depression, respectively. Men with versus men without CSA histories were significantly more likely to have PTSD (OR = 1.8, $P = 0.004$); difference in and direction of difference of subgroups' depression rates were similar, but not significant (OR = 2.2, $P = .18$). PTSD and depression were highly associated (OR = 6.8, $P < .001$).

Number of Lifetime Sexual Partners

The mean number of the LSPs was 17.7 (standard deviation, SD = 23.1); the mean LSP number was higher in older ($P < .001$), gay/bisexual ($P < .001$), African American ($P < .001$), and more educated ($P < .001$) men (Table 1). The number of LSPs was stable or decreased with income up to $75,000, after which the number increased ($P < .001$). Univariate incidence rate ratios (IRR) for CSA, PTSD, and depression were 1.75, 1.57, and 1.42, respectively (all $P < .001$).

Modeling Number of Lifetime Sexual Partners

Table 2 indicates that Initial Model results confirmed univariate associations between sociodemographic variables and number of LSPs. The Final Model—combining significant sociodemographic variables from the Initial Model with CSA, PTSD, and depression—confirmed univariate associations between CSA, PTSD, depression, and number of LSPs. The Final Model also identified significant two-way interactions and a significant three-way interaction, indicating a robust moderating effect of PTSD/depression on the relationship between CSA and number of LSPs. The mean number of LSPs in men with CSA and comorbid PTSD/depression was 11 times higher than for men without the presence of any of these factors ($P < .001$). Inclusion of all main–effects and interaction terms explained 27% of the variation in number of the LSPs.

Compared with the univariate estimate of the association between CSA and number of LSPs, the estimate of its main effect in the Final Model was attenuated, but not to 1.00, suggesting that PTSD/depression also may mediate some but not all of this relationship. The ordinal logistic regression analysis of the association between CSA and PTSD/depression subgroups was significant ($P = 0.03$), providing the added evidence to suggest existence of a mediating effect.

The effect of depression on the number LSPs (Table 3), when stratified by CSA/PTSD status, was small for the strata of men with no CSA histories. In men with CSA histories, however, the effect of depression was dependent on the presence/

TABLE 1. Number of lifetime sexual partners by sociodemographic descriptors and histories of CSA, PTSD, and depression

Characteristics	Mean number of lifetime partners	*P* value
Age (years)		<0.001*
18–29	10.05	†
30–39	16.73	<0.001
40–49	25.77	<0.001
Race/ethnicity		<0.001
African American	20.95	†
Caucasian	14.37	<0.001
Hispanic	14.35	<0.001
Sexual identity		
Heterosexual	16.06	†
Gay/bisexual	37.00	<0.001
Education		<0.001
Less than 12th grade/GED	20.85	†
High-school graduate	20.33	0.62
Some college	16.56	<0.001
College or graduate degree	14.82	<0.001
Income ($)		<0.001
20,000	17.15	†
20,001–40,000	15.66	0.08
40,001–75,000	14.06	<0.001
>75,000	28.38	<0.001
Childhood sexual abuse		
No history	15.28	†
History	26.72	<0.001
PTSD		
Likely absent	15.70	†
Likely present	24.59	<0.001
Depression		
Likely absent	16.07	†
Likely present	22.83	<0.001

**P* value from joint test evaluating equality of means across all categories.
†Denotes the comparison group used in univariate analysis.

absence of PTSD. With PTSD, comorbid depression was associated with an increase in the number of LSPs. Without PTSD, depression was associated with a decrease in the number of LSPs. The effect of PTSD on the number of LSPs followed a similar pattern (Table 4). Stratification data highlight, however, how small the numbers were for some subgroups.

The interactive effect of CSA history, PTSD, and depression on the number of LSPs did not appear to be explained by a difference in symptom severity (Tables 3 and 4). In a manner that was equivalent across CSA strata, those likely versus not likely to be depressed had higher depression scores, and those likely versus not likely to have PTSD had higher PTSD scores.

Ninety percent of men with PTSD and CSA histories reported PTSD-related symptoms for >3 months compared to 58% men with PTSD and no CSA histories ($P=0.11$).

TABLE 2. Multivariate Poisson regression models using sociodemographic, CSA, and psychiatric disorder variables

Variable*	Initial model IRR (*P* value)	Final model IRR (*P* value)
Age (years)	(<.001)†	(<.001)
30–39	1.43 (<.001)	1.43 (<.001)
40–49	2.06 (<.001)	1.91 (<.001)
Race/ethnicity	(<.001)	(<.001)
Caucasian	0.58 (<.001)	0.58 (<.001)
Hispanic	0.78 (<.001)	0.45 (<.001)
Sexual identity	2.61 (<.001)	2.21 (<.001)
Education	(<.001)	(.02)
High-school degree	0.89 (.03)	0.95 (.37)
Some college	0.87 (.01)	0.81 (<.001)
College/graduate degree	0.86 (.004)	0.77 (<.001)
CSA	—	1.47 (<.001)
PTSD	—	1.19 (.04)
Depression	—	1.29 (.001)
CSA×PTSD	—	0.65 (.009)
CSA×depression	—	0.28 (<.001)
PTSD×depression	—	0.78 (.05)
CSA×PTSD×depression	—	11.00 (<.001)
Model R^2	0.16 (<.001)	0.27 (<.001)

IRR, incidence rate ratio.

*Comparison groups for each variable are the same as those described in Table 1.

†For variables with more than two subgroups, overall *P* value for variable is that determined across subgroups.

TABLE 3. Effect of depression on lifetime sexual partner number, depression severity, and PTSD severity, stratified by CSA and PTSD status

	Partner number	CES-D score	PDS score
Positive history of CSA			
With PTSD			
With depression (n = 7)	54.29	28.40	21.60
Without depression (n = 3)	20.00	11.30	15.80
Without PTSD			
With depression (n = 6)	6.00	27.60	3.00
Without depression (n = 18)	23.67	6.70	3.80
Negative history of CSA			
With PTSD			
With depression (n = 7)	18.00	28.80	20.20
Without depression (n = 3)	15.36	10.90	17.00
Without PTSD			
With depression (n = 6)	19.50	23.50	5.40
Without depression (n = 18)	14.64	6.30	1.70

TABLE 4. Effect of PTSD on lifetime sexual partner number, depression severity, and PTSD severity, stratified by CSA and depression status

	Partner number	CES-D score	PDS score
Positive history of CSA			
Depressed			
With PTSD (n = 7)	54.29	28.40	21.60
Without PTSD (n = 6)	6.00	27.60	3.00
Not depressed			
With PTSD (n = 3)	20.00	11.30	15.80
Without PTSD (n = 18)	23.67	6.70	3.80
Negative history of CSA			
Depressed			
With PTSD (n = 15)	18.00	28.80	20.20
Without PTSD (n = 14)	19.50	23.50	5.40
Not depressed			
With PTSD (n = 11)	15.36	10.90	17.00
Without PTSD (n = 91)	14.64	6.30	1.70

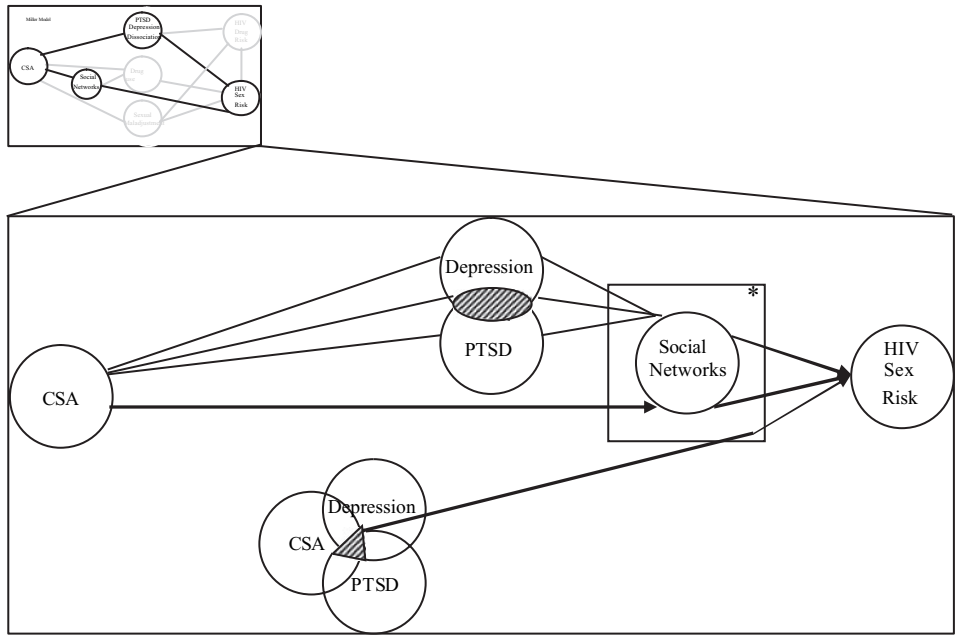
DISCUSSION

Consistent with prior studies, men with versus men without CSA histories from this study reported significantly more LSPs.[5,7,11,12] Not previously reported is the link between CSA and LSPs that appears to occur via PTSD, depression, and comorbid PTSD/depression. Findings revealed that this PTSD/depression linkage appears to be both moderating and mediating in nature, as characterized diagrammatically in Fig. 2.

A possible hypothesis for the moderating effects of PTSD/depression is that this comorbidity increases vulnerability for sexual risk behavior known to be associated with CSA. Figure 2 posits that one potential explanation for this increased vulnerability may be the influence of PTSD/depression on social network membership. Similar to Miller's arguments for social network influences surrounding risky drug use, those with PTSD/depression may be more likely to come into contact with and join networks of individuals with psychopathology who provide a specific context within which CSA effects on increased sexual partnerships may be enhanced.[13]

A possible hypothesis for the mediating effects of CSA begins by considering that many men with CSA histories may develop PTSD and may express PTSD-related avoidant behaviors within the sexual realm (much like someone who develops PTSD related to a car accident expresses PTSD-related avoidant behaviors within the realm of motored transport). The hypothesized avoidance is not of sexual activity in general—the men do not choose celibacy—but of sex within intimate relationships that mirror those from childhood within which CSA occurred.[36] Sexual activity of men with CSA and PTSD, then, could be more likely to involve serial nonintimate partnerships, rapid cycling of intimate partnerships (due to swift, frequent failures), or a combination of both.

Runyon et al.[37] have reported that PTSD comorbid with depression is associated with an increase in trauma flashbacks, a decrease in trauma-specific amnesia, and poor sleep. This effect of comorbid depression on PTSD symptom severity could underlie a worsening of the hypothesized PTSD-related avoidance of intimate



* The boxed area indicates that placement and location of social networks is conjectural.[13]

FIGURE 2. Possible revised CSA→PTSD/depression→sexual risk pathway for men.

sex that, in turn, worsens the hypothesized pattern of serial partnerships. Figure 2 notes that the hypotheses about this PTSD/depression mediating pathway may require consideration of social networks as well.[13,38]

This study used self-reported, current symptoms for diagnostic assumptions (supported by the operating characteristics of the PDS and CES-D) but any assumption that currently observed symptoms are also chronic (i.e., existing since the CSA experience) is problematic.[39,40] More men with than men without CSA (all with likely PTSD) did report PTSD symptoms for >3 months, and the literature does support an assumption of PTSD chronicity.[41–46] However, there were no data in this study on whether depression was chronic.

Assuming that the absence of current symptoms indicates no PTSD/depression history is also problematic. Whether this potential misclassification is informative or not is uncertain, but other misclassification, such as that caused by underreporting due to phone-survey methods, may have biased findings toward the null. Thus, the actual relationship between CSA, PTSD, depression, and the number of LSPs may have been underestimated and may be more robust than reported.

As previously noted, the cross-sectional design of this study precludes causal inferences. Small numbers in some subgroups also could indicate that some estimates of association may be highly unstable. Future studies of CSA, PTSD/depression, and sexual risk behavior should document better the timelines of abuse, interim outcomes, and sexual histories, and do so using samples that provide adequate power to explore modeling as complex as is indicated here.

This study examined the Miller Model pathway that conceptualizes a PTSD/depression linkage between CSA and HIV risk behavior in women. Results suggest that this pathway of the model may be extendable to men with some potential modifications

(Fig. 2). Such model changes, however, await replication of the study's findings to confirm the potentially novel importance of the mediating and moderating influences of comorbid PTSD/depression on sexual behavior in men with CSA histories. Until then, studies of sexual behavior in men who have sex with men should consider including assessments of and analytical adjustments for CSA, PTSD, and depression.

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