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Childhood Sexual Abuse Is Highly Associated With HIV Risk–Taking Behavior and Infection Among MSM in the EXPLORE Study

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Abstract

Background—Previous studies have found high rates of childhood sexual abuse (CSA) among US men who have sex with men (MSM). CSA history has been associated with a variety of negative effects later in life including behaviors that place MSM at greater risk for HIV acquisition and transmission. The present analysis is the first to examine the longitudinal association between CSA and HIV infection, unprotected anal sex, and serodiscordant unprotected anal sex, as well as mediators of these relationships among a large sample of HIV-uninfected MSM.

Methods—The EXPLORE Study was a behavioral intervention trial conducted in 6 US cities over 48 months with HIV infection as the primary efficacy outcome. Behavioral assessments were done every 6 months via confidential computerized assessments. Longitudinal regression models were constructed, adjusting for randomization arm, geographical location of study site, age at enrollment, education, and race/ethnicity.

Results—Of the 4295 participants enrolled, 39.7% had a history of CSA. Participants with a history of CSA [adjusted hazards ratio = 1.30, 95% confidence interval (CI): 1.02 to 1.69] were at

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increased risk for HIV infection over study follow-up. A significant association was seen between history of CSA and unprotected anal sex (adjusted odds ratio = 1.24, 95% CI: 1.12 to 1.36) and serodiscordant unprotected anal sex (adjusted odds ratio = 1.30, 95% CI: 1.18 to 1.43). Among participants reporting CSA, the EXPLORE intervention had no effect in reducing HIV infection rates. Participants reporting CSA were significantly more likely to have symptoms of depression and use nonprescription drugs.

Conclusions—A predictive relationship between a history of CSA and subsequent HIV infection was observed among this large sample of HIV-uninfected MSM. Findings indicate that HIV-uninfected MSM with CSA histories are at greater risk for HIV infection, report higher rates of HIV sexual risk behavior, and may derive less benefit from prevention programs. Future HIV prevention interventions should address the specific mental health concerns of MSM with a history of CSA.

Keywords

child sexual abuse; EXPLORE; HIV; MSM; sexual risk taking

INTRODUCTION

Previous studies in the United States have found that the prevalence of childhood sexual abuse (CSA) among men who have sex with men (MSM) is significantly higher than those in the general male population. Using a probability sample of urban MSM, Paul et al[1] found that 20% of their sample reported CSA, whereas Lenderking et al[2] and Doll et al[3] reported rates of 35.5% and 37%, respectively. In comparison, Finkelhor[4] estimated that between 5% and 10% of men in the general population have experienced CSA and that at least 20% of women were sexually abused as a child. Although cross-study comparisons are hampered by differing definitions of CSA (eg, noncontact experience like indecent exposure versus contact experiences like kissing, fondling, or intercourse to whether or not the individual considered the experience to be abusive), high prevalence rates of CSA have been consistently documented in samples of MSM, with rates of CSA closer to those of heterosexual women than those of heterosexual men.[1]

A predictive relationship between CSA and high-risk sexual behavior among MSM has been shown in a number of studies. Lenderking et al[2] found that MSM who were sexually abused as children were more likely to have an increased number of male partners across their lifetime and were more than twice as likely to have had unprotected receptive anal intercourse in the past 6 months relative to MSM who were not sexually abused. Paul et al[1] reported that MSM who experienced CSA were significantly more likely to engage in high-risk sex. In this study, men who experienced CSA 6 or more times (reported number of incidents without specifying same or new perpetrator) were nearly 2.5 times as likely to have unprotected insertive or receptive anal intercourse with a nonprimary partner and over 5 times as likely to do so with a serodiscordant male compared with those who experienced no CSA.[1] Jinich et al[5] reported similar findings, with 21.4% of abused men engaging in unprotected anal intercourse with a nonprimary partner in the previous 12 months compared with 15.0% of those who were not abused in childhood. Examining a sample of MSM of a Puerto Rican ancestry living in New York City, Carballo-Diéguez and Dolezal showed that men who experienced CSA and participated unwillingly and/or felt hurt by the experience engaged in unprotected receptive anal sex at higher rates (56%) than those who experienced childhood sexual contact with an older partner but identified as willing and not hurt (42%). Likewise, the willing/not hurt group exhibited a higher risk profile than a control group, which experienced no childhood sexual contact with an older partner (22%).[6] O'Leary et al demonstrated that MSM who were abused in childhood not only placed themselves at risk

through sexual behavior but also put others at risk. Examining a sample of HIV-infected MSM in New York and San Francisco, they found that those with a history of CSA were significantly more likely than those without a history of abuse to have unprotected anal (UA) sex with partners of HIV negative or unknown serostatus (33% versus 20%).[7]

In addition to the association of CSA to later sexual risk taking, CSA has been shown to be associated with other negative effects later in life. For instance, in a review of the literature, Browne and Finkelhor[8] reported fear, anxiety, depression, anger, hostility, aggression, and sexually inappropriate behavior as initial effects of CSA. Long-term effects reported frequently were depression and self-destructive behavior, anxiety, feelings of isolation and stigma, poor self-esteem, difficulty in trusting others, a tendency toward revictimization, substance abuse, and sexual maladjustment. Additionally, Boudewyn and Liem[9] showed CSA to be predictive in both men and women of depression and self-destructive behaviors such as acts of self-harm, suicidal ideation, and suicide attempts. Moreover, severity of CSA (use of force, genital contact versus noncontact exposure) has been associated with greater severity of sequelae.[8]

In light of the noted association between CSA and risky sexual behavior, MSM who were sexually abused in childhood have been shown to have higher rates of HIV and other sexually transmitted infections (STIs) compared with those with no history of CSA.[2,3] Although these past studies have shown a cross-sectional association between higher rates of HIV and other STIs among MSM with a history of CSA, the current study is the first, multisite, longitudinal study to show the predictive association between a history of CSA and subsequent HIV infection among a large sample of HIV-uninfected MSM. We a priori hypothesized that MSM with a history of CSA would be more likely to engage in UA sex, more likely to engage in serodiscordant unprotected anal (SDUA) sex, more likely to become infected with HIV, and have a poorer response to a behavioral HIV risk reduction intervention because previous studies have suggested that coexisting psychopathologies or substance use disorders may interfere with HIV treatment effect. We further hypothesize that substance use, depression, self-efficacy, safer sex norms, and communication skills regarding sexual safety will mediate the relationship between CSA and (1) UA sex, (2) SDUA sex, and (3) HIV infection.

METHODS

Participants and Procedures

The EXPLORE study was a large-scale randomized HIV prevention trial among MSM conducted in 6 US cities, with a total of 4295 participants over a 48-month period.[10] Inclusion criteria for the EXPLORE study were men who were uninfected with HIV, were 16 years or older (although none of the sample was under age 18 at enrollment for the present analysis), had anal sex with another man during the past year, and had not been involved in a mutually monogamous relationship in the past 2 years with a male partner who was HIV uninfected.[11] Men were randomized to receive a behavioral intervention versus standard risk reduction counseling. The experimental intervention, described in detail by Chesney et al,[12] consisted of 10 core counseling modules delivered at one-on-one counseling sessions. In the main EXPLORE trial, participants in both arms had HIV testing every 6 months and completed a sexual risk behavior and psychosocial assessment battery using audio computer–assisted self-interviewing. Recruitment strategies varied by city but included advertizing; street outreach and outreach at clubs, bars, bathhouses, sex clubs, health clubs, and video arcades; referrals from other cohort studies, current study participants, and community agencies and clinics; and use of Internet sites targeting MSM, community forums, mailings, and a recruitment video. Additional methods for data collection of the EXPLORE cohort have been described previously.[10–12]

Measures

Primary Predictor—History of CSA was defined as: (*a*) having had a sexual experience before the age of 13 years with someone who was 5 years older and/or (*b*) having had a sexual experience between 13 and 17 years old with someone who was 10 years older. Specifically, the following questions were asked of all participants at their baseline enrollment visit: (1) "before you turned 13 years old, did you have any sexual experience with someone who was 5 years, or more, older than you?" and (2) "between the time you turned 13 and your 17th birthday, did you have any sexual experiences with someone who was 10 years or more older than you?." If a participant answered yes to either or both of these questions, he was considered to have had a history of CSA. The rationale for this comes from the fact that much of the literature on CSA defines it as an underage sexual experience with an adult.[1–9]

HIV Risk Outcomes—Three of the following HIV risk outcomes were utilized: (1) HIV infection: HIV antibodies were detected by enzyme-linked immunosorbent assay. Sera shown to be reactive after a first test were retested in duplicate. Repeatedly reactive samples were confirmed through Western blot assay or immunofluorescence assay. Participants were tested for HIV at each 6-month follow-up visit over the study's duration; (2) UA sex was defined as self-reported insertive or receptive anal sex without a condom with any HIV status partner in the previous 6 months and asked at each 6-month follow-up visit; and (3) SDUA sex was defined as self-reported insertive or receptive anal sex without a condom with either an HIV-infected partner or a partner of unknown serostatus in the previous 6 months and asked at each 6-month follow-up visit for which the participant remained HIV uninfected.

Covariates—Adjustments were made for geographical location of study site (Boston, Chicago, Denver, New York, San Francisco, and Seattle), age at enrollment, education, and race/ethnicity. Due to significant multicollinearity among education, employment status, and household income, we only retained and adjusted for education in all models. When the intervention effect was not of direct interest in the model, adjustments were also made for study arm (intervention or control).

Potential Mediators—Potential mediators of relationship of CSA and the 3 separate HIV risk outcomes in this cohort were baseline measures of nonprescription drugs, alcohol, and psychosocial measures. Drug use was classified as "ever used" versus "never used" in the last 6 months and asked at each 6-month follow-up visit. Nonprescription drug types considered were as follows: (1) marijuana or hashish; (2) poppers or inhaled nitrites (including ampoules); (3) crack or rock cocaine (smoked) or cocaine (snorted or sniffed); (4) amphetamines, such as speed, crystal, or crank (swallowed, snorted, or smoked); (5) hallucinogens (such as phencyclidine [PCP], Special K, angel dust, acid, d-lysergic acid diethylamide [LSD], mushrooms, or Ecstasy); and (6) any injected nonprescription drugs. Heroin use was also assessed but occurred in less than 1% of participants.

Alcohol use in the previous 6 months was categorized as "light" (3 or less drinks/d on no more than 1–2 d/wk), "moderate" (4 or 5 drinks/d on no more than 1–2 d/wk, 1–5 drinks/d on 3–6 d/wk, or 1–3 drinks/d on a daily basis), or "heavy" (4 or more drinks every day or 6 or more drinks on a typical day when drinking). By a drink, we specified"a 12-oz can or glass of beer, a 4-oz glass of wine, a 1.5-oz shot of liquor, or a mixed drink with that amount of liquor."

The EXPLORE questionnaire asked participants to qualify symptoms of depression on a scale of 1–4 based on a shortened version (7 items) of the Center for Epidemiologic Studies

Depression scale.[13] As a cutoff point has not been established for this shortened version, the score was divided in quartiles for analytic purposes, with a higher score indicating more depressive symptoms. Measures of self-efficacy for adopting safer sexual behaviors, communication skills for safer sex, and higher safe sex norms were 3 variables created from an exploratory factor analysis of 22 baseline questions on the EXPLORE questionnaire.[12] These variables consisted of 9, 6, and 5 items, respectively. Factor-based scales were constructed using scores for each question (based on the 1–6 scoring) rescaled to 0–100. The scales were scored so that higher values reflected higher self-efficacy, higher safe sex norms, and better communication skills. Our analysis dichotomized these scores at 50, the midpoint of the range, to create variables measuring poorer safe sex norms, so that "1" corresponded to poorer self-efficacy, poorer communication skills, and poorer safe sex norms.

Data Analysis

SAS statistical software was used to perform each analysis. Although 4295 enrolled participants were included in this study, 51 participants were missing the baseline assessment of CSA, and a further 182 men were excluded from the longitudinal analyses because they were lost to follow-up before their first visit (6-month postbaseline assessment). Data for this study were collected every 6 months, over a 48-month period, providing 8 waves of data collection.

Descriptive statistics to assess the association between CSA on demographic variables and hypothesized mediators use logistic regression analysis.

Cox Proportional Hazards Regression Models—To assess if a history of CSA had a measurable effect on the rate of HIV infection, Cox proportional hazards regression modeling[14] was adopted on the discrete timescale of twice-yearly visits over the course of study follow-up. These models were adjusted for age at enrollment, education, race/ethnicity, randomization arm, and study site.

To assess the effect of the EXPLORE intervention on the rate of HIV infection for the CSA status (CSA versus no CSA), an individual Cox proportional hazards model with HIV infection as the outcome was conducted, with CSA status by treatment condition categories as the independent variable. Of particular interest was assessing if history of sexual abuse was an effect modifier of the EXPLORE intervention effect.

Generalized Estimating Equation Modeling—Generalized estimating equation models[15,16] were used to determine the relationship between (1) a history of CSA and UA sex and (2) a history of CSA and SDUA sex. These equations account for the within-subject correlations of the repeated measures across time. These models were adjusted for age at enrollment, education, race/ethnicity, randomization arm, and study site.

Mediation Analysis—Because potential mediators are hypothesized to be on the causal pathway between our primary exposure (CSA) and HIV risk outcomes (UA sex, SDUA sex, and HIV infection), it is not appropriate to control for these variables in the final regression models.[17]

We followed the procedures for testing mediator effects as outlined by Baron and Kenny[18] and updated by Kraemer et al.[19] According to Kraemer et al, a mediational relationship exists in the present analysis if: (1) the proposed mediator is associated with CSA, (2) the mediator has either a main or an interactive effect on the HIV risk outcome, and (3) changes in the mediator variable precede changes in the dependent variable. The test for mediator effects (ie, variables that actually account for the relationship between CSA and outcome

variables) involves 3 steps. First, separate regression analyses (generalized estimating equation models for UA sex and SDUA sex and Cox proportional hazards model for HIV infection) were conducted to test for the relationship between CSA and each of the hypothesized mediator variables. Second, both the CSA and the mediator variables (separate models for each mediator) were included in a regression model as predictor variables for the 3 HIV risk outcomes (separate models for each outcome). Finally, the mediator must be a significant predictor of the given HIV risk outcome in an equation including both the mediator and CSA variables and attenuate the magnitude of effect for the CSA indicator.

RESULTS

Of the 4244 participants enrolled with baseline assessment of CSA, 1686 of the overall EXPLORE cohort (39.7%) reported a history of CSA. Additional characteristics of the overall EXPLORE cohort and main outcome analysis have been described previously.[10–12]

Bivariate Procedures

When comparing a history of CSA with no history of CSA, the men who reported CSA were significantly more likely to be Hispanic or black, have less than a college degree, be unemployed, and have an income of less than $30,000 (Table 1). Assessing the potential mediator outcomes, those with CSA were significantly more likely to have symptoms of depression, use alcohol, use nonprescription drugs, have lower self-efficacy for adopting safer sexual behaviors, have poorer communication skills regarding safer sex, and have poorer safer sex norms (Table 2).

Cox Proportional Hazards Regression Models

There were 258 HIV-1 infections in the EXPLORE study, with an overall rate of 2.1 per 100 person-years. Notably, the rate of HIV-1 infections differed by abuse history: 1.8 per 100 person-years among those with no history of CSA and 2.5 per 100 person-years among those with a history of CSA. Participants who reported experiencing CSA had an increased risk of HIV infection in the trial relative to those who had no history of CSA (adjusted hazards ratio [AHR] = 1.30, 95% confidence interval (CI): 1.02 to 1.69) (Table 3).

Overall, the EXPLORE intervention had a modest effect on reducing the hazard of HIV infection (AHR = 0.82, 95% CI: 0.64 to 1.05).[10] Our subset analysis of the EXPLORE intervention's effect on HIV infection by CSA status indicated that compared with participants with no CSA history who did not receive the EXPLORE intervention (referent group; AHR = 1.0), participants who reported no CSA but received the intervention had a decreased rate of HIV infection (AHR = 0.93, 95% CI: 0.66 to 1.30); however, participants with a history of CSA who received (AHR = 1.06, 95% CI: 0.74 to 1.52) and did not receive (AHR = 1.46, 95% CI: 1.04 to 2.04) the EXPLORE intervention were at increased risk for HIV infection over study follow-up.

Generalized Estimating Equation Models

A significant association was observed between UA sex and SDUA sex and a history of CSA as compared with participants who had no history of CSA: adjusted odds ratio (AOR) = 1.24 for UA sex (95% CI: 1.12 to 1.36) and AOR = 1.30 for SDUA sex (95% CI: 1.18 to 1.43) (Table 4).

Mediation Analysis

Marijuana/hashish, poppers/inhaled nitrites (including ampoules), crack/rock cocaine and powder cocaine, amphetamines (such as speed, crystal, or crank), depression (SDUA sex only), lower self-efficacy for adopting safer sexual behaviors, poorer communication skills

regarding safer sex, and poorer safer sex norms were found to significantly mediate the primary relationships between (1) CSA→UA and (2) CSA→SDUA, supporting the hypothesis that these mediators are on the causal pathway of these 2 HIV risk outcomes (all *P*'s < 0.001). (Data from the mediation analyses are available upon request.)

Similarly, marijuana/hashish, poppers/inhaled nitrites (including ampoules), crack/rock cocaine and powder cocaine, amphetamines (such as speed, crystal, or crank), depression, lower self-efficacy for adopting safer sexual behaviors, poorer communication skills regarding safer sex, poorer safer sex norms, UA sex, and SDUA sex were found to significantly mediate the primary relationship between CSA→HIV infection, supporting the ultimate hypothesis that these mediators are on the causal pathway between having a history of CSA and subsequent HIV infection (all *P*'s < 0.001).

DISCUSSION

This is the first study of which we are aware to demonstrate a predictive relationship between a history of CSA and higher rates of HIV infection among HIV-uninfected MSM, when controlling for study arm, study site, age at enrollment, education, and race/ethnicity. This finding extends previous research that has documented higher rates of CSA among HIV-infected MSM by identifying CSA as a risk factor for HIV infection in an HIV-uninfected sample of MSM. These findings are particularly noteworthy as no other study to date has documented this increased hazard ratio, particularly among a large-scale multisite sample of HIV-uninfected MSM enrolled in a longitudinal cohort study. In addition, MSM with a history of CSA were more likely to engage in UA sex and SDUA sex. These results corroborate findings from other studies of MSM. For example, in a study of over a thousand adult MSM, Bartholow et al[20] reported a significant association between CSA and HIV risk behavior.

Another pertinent finding from the current study is that among participants reporting CSA, the EXPLORE intervention had no effect in reducing HIV infection rates. It is not clear that this study had sufficient power to detect a significant effect; however, these findings provide good initial evidence that the presence of CSA history in MSM interferes with their ability to derive benefit from traditional HIV prevention interventions. This finding speaks to the importance of conducting postintervention analyses in intervention trials to understand why interventions do not work or for whom they do not work.

These findings are particularly relevant for HIV prevention efforts as the observed rates of CSA in this cohort were very high. The rate of CSA (39.7%) among the MSM in this study is similar to the rates found in other studies of MSM[1–3] but substantially higher than the rates found in the general male US population.[4] This is particularly concerning due to the harmful consequences of CSA that have been demonstrated specifically in MSM, including mental health counseling and hospitalization, psychoactive substance use, depression, and suicidal thoughts or actions.

In this study, depression was significantly more prevalent among MSM with a history of CSA relative to those without. In addition, MSM with a history of CSA versus those without were more likely to use illicit substances and alcohol. These findings support the notion that sexual risk taking among MSM, particularly those with a history of CSA, is often occurring in the context of "intertwined syndemics."[21] The coexistent untreated depression and increased substance use that are often associated with sexual risk–taking behavior in this population need to be addressed in future HIV prevention interventions to decrease further infection, acquisition, or transmission of HIV and other STIs.

Notably, individuals with a history of CSA compared with those without reported (1) lower self-efficacy for adopting safer sex behaviors, (2) poorer communication skills regarding safer sex, and (3) lower social norms that favor safer sex.[12] The cognitive and behavioral consequences of CSA can affect many of the psychosocial variables that have been used to explain HIV risk taking. Three of the most common psychosocial models that have been employed to explain HIV risk–taking and/or HIV prophylactic behavior are the health belief model, the theory of reasoned action/planned behavior, and the social cognitive theory (ie, self-efficacy models).[22,23] Health belief models emphasize the role of perceived benefits and barriers to condom use and perceived vulnerability to and consequences of acquiring HIV.[24] In the theory of reasoned action/planned behavior,[25,26] health behavior, such as condom use, is a function of intentions to use condoms, and, in turn, intentions to use condoms are a function of variables such as attitudes and norms regarding HIV and condom use. Social cognitive models (ie, self-efficacy) explain condom use as a function of an individual's knowledge about HIV, his or her expectancies about the outcomes of using condoms (ie, pleasure reduction versus disease prevention), and his or her own self-efficacy that he or she will be able to use a condom in different sexual situations.[27,28] These psychosocial models of HIV prophylactic behavior have been tested both cross sectionally and longitudinally in a variety of populations, including MSM, HIV-infected and HIV-uninfected individuals, and heterosexual men and women.[29] All these models include social and cognitive variables that can become distorted in individuals who have a history of CSA. CSA and the resulting negative emotions and negative beliefs about oneself, for example, can interfere with self-efficacy, perceived social norms about sexual risk taking, and the perceived costs and benefits of condom use and norms and attitudes.

Findings from this study suggest that the reasons why MSM continue to engage in risky sexual practices may differ depending on whether individuals experienced CSA or not. Analyses of the baseline EXPLORE data[12] demonstrated that the 4295 men enrolled in the study had widely divergent responses to the screening questions associated with sexual risk taking, and about 60 different patterns of responses were seen. For some of the men, unsafe sex was highly correlated with alcohol or other substance abuse, whereas for others, condoms decreasing sexual pleasure seemed more important and others reported low levels of self-efficacy and depression. The data in the present study suggest that the EXPLORE intervention, which included some skills building but was predicated on participants' perceptions that they could change their behavior, might not have been robust enough to change patterns of internalized anger, depression, and lack of self-efficacy that may have been long standing in the participants who experienced CSA.[30–32] Future behavioral interventions for this group of at-risk MSM may need to incorporate counseling and skills building that address the traumatic memories and coping strategies that ensue after young men are abused, given the high prevalence of these childhood experiences and their role in potentiating sexual risk–taking behavior.

The pathways to sexual risk behavior in MSM are complex, particularly among MSM with CSA histories. Catania et al[33] examined mediators of the relationship between CSA and subsequent HIV risk taking among MSM using cross-sectional data and concluded that CSA contributes to the ongoing HIV epidemic among MSM by distorting or undermining critical motivational, coping, and interpersonal factors that, in turn, influence adult sexual risk behavior. Similarly, in this study, substance use, depression, lower self-efficacy for adopting safer sexual behaviors, poorer communication skills regarding safer sex, poorer safer sex norms, UA sex, and SDUA sex were found to significantly mediate the primary relationship between CSA and subsequent HIV infection, supporting our hypothesis that these mediators are in fact on the causal pathway. Future research could usefully examine the social, behavioral, and cognitive sequelae of CSA that contribute to adult sexual risk taking and increased risk for HIV infection. Specifying these pathways may also lead to the

development of HIV prevention technology to specifically target the unique prevention needs of this at-risk group.

The limitations of this study include reduced generalizability to a wider population of MSM. Moreover, the enrollment criteria for EXPLORE may have biased this study toward the very high prevalence of CSA. This seems likely as the study excluded MSM who were in a mutually monogamous relationship. The primary exposure—having a history of CSA—relied on retrospective reports, as all other studies of MSM and CSA do, which may potentially introduce recall bias. In addition, interpretation of statistical significance of findings from subset analyses needs to be performed with caution, given the nominal nature of the computed *P* values and CIs.

Another limitation important to consider has to do with our operationalization of CSA using age differentials. Given that the long-term negative mental and physical health effects of CSA have been shown to be associated most robustly with high severity of trauma,[1] using age differentials alone to categorize CSA mixes those MSM who experienced less severe and more severe trauma and may occlude important differences that exist by type or severity of trauma. Future research is warranted to not only examine trauma by age but also explore differences along other dimensions of trauma including severity, type of CSA-associated sexual contact, number of contacts, and use of violence/threat of violence.

Furthermore, several unique conceptual issues are introduced when using age differentials to operationalize CSA for MSM in particular. Age discrepancy is often used to operationalize CSA such that the power dynamic in the sexual relationship between child or teen and older adult inherently constitutes abuse.[2,34,35] For young adolescent or teenage MSM, however, this approach may be problematic due to unique developmental challenges associated with being gay or bisexual or questioning that further complicate the relationship between age and power. For example, young MSM may have a difficult time finding sexual partners or romantic relationships with same-sex same-age peers, and the process of finding same-sex age-mates during adolescence may itself be risky in terms of facing harassment and violence from peers.[36–38] As a consequence, it is usual to find that many MSM report that some of their first sexual partners during adolescence included sexual encounters with older partners.[34,39] Thus, further data on consensual versus forced sexual encounters with older partners are important to consider for future studies.[33,34] Taken within this context of "normal" MSM adolescent development, therefore, it is possible that the current study overestimates the prevalence of CSA and that the statistical relationships between CSA and health outcomes may have been attenuated (ie, the relationships between CSA and mediators or outcomes may be stronger than the current study).

Finally, other developmental issues and stressors should be considered while interpreting findings. Sexual trauma is situated amid other developmental factors that may acerbate or confound the CSA–adult outcome relationships. For example, Friedman et al[40] examined the role of sexual orientation–related abuse during adolescence in relation to CSA and adult health outcomes, and Paul et al[1] examined the role of other types of childhood abuse (eg, physical abuse) that may co-occur with CSA. Thus, it is important to understand that for some MSM, we may be observing the broader effects of multiple developmental traumas/stressors on later life health outcomes and not just a singular traumatic event. Interventions with MSM with CSA histories should likewise consider the possible role of multiple developmental traumas/stressors in addressing HIV risk behavior.

Of note, despite the high rates of CSA in the sample, these data do not suggest anything causal regarding the association of abuse to later homosexuality. In fact, one interpretation of the existing data is that children may be more likely to be sexually abused or victimized

because of the perception that they might be gay/homosexual. Regardless, this study did not collect or analyze data that would be able to confirm or reject this hypothesis in either direction. Furthermore, the majority of men in EXPLORE did not report any type of CSA, so there is little to suggest that CSA "causes" homosexuality, but rather, CSA makes MSM more likely to engage in HIV risk behaviors. Similarly, we did not collect data on adult revictimization in this study and hence cannot confirm or reject whether MSM with CSA histories were more or less likely to experience further abuse in adulthood.

HIV-uninfected MSM with CSA histories are at greater risk for HIV infection, report higher rates of HIV sexual risk behavior, and derive less benefit from prevention programs. The efficacy of HIV prevention interventions may be enhanced by incorporating treatment components designed to address the specific mental health concerns of individuals with a history of CSA.

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TABLE 1

Demographic Characteristics of Sample by History of CSA Status (n = 4244)

	No History of CSA		History of CSA		History of CSA Compared With No History	
	n	%	n	%	Odds Ratio	95% CI
Age (yrs)						
<25	453	17.71	348	20.64	1.13	0.93 to 1.37
26–30	569	22.24	333	19.75	0.86	0.71 to 1.04
31–35	543	21.23	358	21.23	0.97	0.80 to 1.17
36–40	464	18.14	287	17.02	0.91	0.75 to 1.11
>40	529	20.68	360	21.35	1.00	—
Race/ethnicity						
White	2013	78.69	1067	63.32	1.00	—
Hispanic	270	10.56	373	22.14	2.61	2.19 to 3.10
Black	136	5.32	141	8.37	1.96	1.53 to 2.50
Other	139	5.43	104	6.17	1.41	1.08 to 1.84
Education						
High school or less	191	7.47	206	12.23	2.16	1.71 to 2.72
Some college	589	23.03	530	31.47	1.80	1.52 to 2.13
College	970	37.92	544	32.30	1.12	0.96 to 1.32
After college	808	31.59	404	23.99	1.00	—
Household annual income (US$)						
<12,000	273	10.68	277	16.47	2.12	1.71 to 2.64
12,000–29,999	653	25.56	500	29.73	1.60	1.34 to 1.92
30,000–59,999	1022	40.00	615	36.56	1.26	1.06 to 1.50
60,000+	607	23.76	290	17.24	1.00	—
Employment status						
Full time	1998	78.11	1210	71.77	1.00	—
Part time	230	8.99	188	11.15	1.35	1.10 to 1.66
Unemployed	227	8.87	199	11.80	1.45	1.18 to 1.77
Other	103	4.03	89	5.28	1.43	1.07 to 1.91
Geographic location						

	No History of CSA		History of CSA		History of CSA Compared With No History	
	n	%	n	%	Odds Ratio	95% CI
Seattle	440	17.20	293	17.38	1.00	—
Boston	453	17.71	270	16.01	0.90	0.73 to 1.11
Chicago	390	15.25	229	13.58	0.88	0.71 to 1.10
Denver	429	16.77	291	17.26	1.02	0.83 to 1.26
New York	411	16.07	316	18.74	1.16	0.94 to 1.42
San Francisco	435	17.01	287	17.02	0.99	0.80 to 1.22

TABLE 2

Substance Use, Depression, Self-Efficacy, Communication Skills, and Social Norms by History of CSA (n = 4244)

	No History of CSA		History of CSA		History of CSA Compared With No History	
	n	%	n	%	Odds Ratio	95% CI
Alcohol use						
None	245	9.60	197	11.72	1.00	—
Light	1235	48.39	750	44.62	0.76	0.61 to 0.93
Moderate	848	33.23	508	30.22	0.75	0.60 to 0.93
Heavy	224	8.78	226	13.44	1.26	0.96 to 1.63
Marijuana use	1143	44.72	821	48.70	1.18	1.04 to 1.33
Popper use	906	35.46	647	38.37	1.13	1.00 to 1.29
Crack use	69	2.70	108	6.40	2.47	1.81 to 3.36
Amphetamine use	304	11.91	240	14.23	1.23	1.03 to 1.47
Heroin use	17	0.66	18	1.07	1.61	0.83 to 3.14
Hallucinogen use	608	23.79	409	24.26	1.03	0.89 to 1.19
Injection drugs	243	9.50	190	11.27	1.21	0.99 to 1.48
Depression score						
0%–25%	1445	56.67	784	46.67	1.00	—
26%–50%	798	31.29	597	35.54	1.38	1.20 to 1.58
51%–75%	231	9.06	233	13.87	1.86	1.52 to 2.27
76%–100%	76	2.98	66	3.93	1.60	1.14 to 2.25
Low self-efficacy for adopting safer sexual behaviors	332	13.38	301	17.85	1.45	1.22 to 1.72
Poor communication skills regarding safer sex practices	732	30.54	644	38.20	1.55	1.35 to 1.76
Weaker safe sex norms	368	15.17	352	20.88	1.55	1.32 to 1.83

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TABLE 3

Cox Proportional Hazards Model of HIV Infection on History of CSA Over Study Follow-Up (n = 4066)

CSA Status	Number at Enrollment*	No. HIV Infections	Hazard Ratio†	95% CIs
None	2465	136	1.00	—
Sexual abuse	1601	122	1.30	1.02 to 1.69

*Number at enrollment for which HIV outcome data are available.

†Adjusted for study arm, study site, age at enrollment, education, and race/ethnicity.

TABLE 4

Generalized Estimating Equation Models of UA and SDUA Sex on History of CSA Over Study Follow-Up (n = 4244)

CSA Status	No	Yes	Odds Ratio*	95 % CIs
UA sex†				
None	5882	7818	1.00	—
Sexual abuse	3341	5192	1.24	1.12 to 1.36
SDUA sex†				
None	9860	3837	1.00	—
Sexual abuse	5695	2839	1.30	1.18 to 1.43

*Adjusted for study arm, study site, age at enrollment, education, and race/ethnicity.

†Numbers for UA and SDUA sex represent the number of times (individual acts) these behaviors occurred over study follow-up (up to 8 waves).