HIV RISK AMONG MEN WHO HAVE SEX WITH MEN WHO HAVE EXPERIENCED CHILDHOOD SEXUAL ABUSE: SYSTEMATIC REVIEW AND META-ANALYSIS

Shane Lloyd and Don Operario

Previous research has indicated a high prevalence of childhood sexual abuse (CSA) among men who have sex with men (MSM) in the United States, and has suggested that CSA history is a risk factor for HIV infection in MSM. We conducted a systematic review to identify, synthesize, meta-analyze, and critique the current state of relevant literature. Systematic review methodology was utilized to identify 12 studies that compared MSM with a history of CSA to MSM without a history of CSA on HIV risk indicators including HIV serostatus, sexually transmitted infections (STIs), sexual behaviors, and illicit drug use. Overall, 27.3% (n = 4,263) of the MSM in all included studies (n = 15,622) reported a CSA history. Across the studies that used probabilistic sampling (n = 8,240), the estimated prevalence of CSA was 21.8% (n = 1,800). Meta-analysis indicated that MSM with CSA history were more likely to be HIV positive [odds ratio (OR) = 1.54; 95% confidence interval (CI) = 1.22–1.95)] and to engage in recent unprotected anal intercourse (OR = 1.85, 95% CI = 1.36–2.51). Studies also indicated that MSM with a history of CSA were more likely to report frequent casual male partners, substance use, and sex while under the influence of alcohol or other drugs. Trends across studies indicated a need for interventions to assess CSA history and address effects of CSA on sexual risk behavior of MSM. Inconsistencies across studies indicated a need to reach consensus among researchers and providers in defining CSA.

The Institute of Medicine (IOM) recently released a report on the health of gay, lesbian, bisexual, and transgender people (GLBT) in the United States, and highlighted the role of lifespan and developmental processes on the health of GLBT adults (Institute of Medicine, 2011). The focus on lifespan and developmental processes in the IOM report corresponds with growing literature over the past decade pointing to the influence of early childhood experiences on later morbidity and mortality in adulthood (Centers for Disease Control and Prevention [CDC], 2010; Gluckman, Hanson, Cooper, & Thornburg, 2008; Halfon & Hochstein, 2002; Poulton et al., 2002). Among the early childhood experiences that have been linked to later mor-

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tality and morbidity in adulthood are adverse childhood experiences (ACEs), which include physical, emotional, or sexual abuse (Anda et al., 2006; Brown et al., 2009; Felitti et al., 1998).

Childhood sexual abuse (CSA) is a specific form of ACE that has been previously linked with adult physical and mental health, and has been identified as a potential risk factor for HIV (Senn, Carey, & Vanable, 2008; Zierler et al., 1991). There are many definitions of childhood sexual abuse (CSA). One of the more frequently used definitions of CSA is by Finkelhor (1979), which states that "sexual abuse is a sexual experience with a person at least 5 years older if the child was 12 or under, or 10 years older if the child is between 13 and 16 inclusive, with or without physical contact and whether or not sex was wanted by the child."

The social epidemiology of CSA has been reviewed previously (Beitchman, Zucker, Hood, daCosta, & Akman, 1991; Browne & Finkelhor, 1986; Holmes, 1997; Holmes & Slap, 1998; Senn et al., 2008). CSA is associated with negative health outcomes including sexual risk behavior and mental health problems (depression, suicidality, and substance abuse) among adults (Holmes, 1997; Koening, Doll, O'Leary, & Pequegnat, 2004). Prevalence estimates of CSA in the United States are higher among females than males (Finkelhor, 1979; Senn et al., 2008), but males are less likely to report experiencing CSA (Boney-McCoy & Finkelhor, 1995; Remafedi, Farrow, & Deisher, 1991). Among males, CSA is significantly higher among men who have sex with men (MSM; Bartholow et al., 1994; Holmes & Slap, 1998; Lenderking et al., 1997). Lenderking et al. (1997) and Doll et al. (1992) estimated prevalence of CSA at 35.5% and 37%, respectively, for MSM. In comparison, Finkelhor (1979) estimated CSA prevalence between 5% and 10% for men in the general population. A meta-analysis by Friedman et al. (2011) showed that GLBT individuals were 3.8 times more likely to experience sexual abuse than non-GLBT individuals.

There is growing interest in research on the effects of CSA on the health of men who have sex with men (MSM) in the United States, including risk for HIV (Arreola Neilands, & Diaz, 2009). High HIV prevalence and incidence rates among MSM in the United States underscore the continuing threat that HIV poses to this population (Jaffe, Valdiserri, & De Cock, 2007). Many studies of the determinants of HIV risk behavior in MSM focus on recent or more proximal factors such as substance use behaviors, partner characteristics, partner concurrency, and contextual factors that influence condom use and sexual decision making (Hart & Elford, 2010; Wolitski & Fenton, 2011), and these recognized factors are targeted in HIV prevention programs. By comparison, earlier life events are less frequently considered as determinants of HIV risk behavior and tend to be overlooked in preventive interventions. A number of observational studies have shown potential associations between CSA and HIV risk, warranting a need to synthesize this growing literature to identify trends and patterns across studies. To the extent that CSA might contribute to HIV risk behavior in MSM, then interventions must account for this unique issue as a potential determinant of HIV transmission.

We conducted a systematic review of scientific literature to examine the association of CSA and HIV risk behavior among MSM in the United States. The objective of this review was to identify and summarize all of the literature to date that investigated the differential HIV risk behaviors of MSM in the United States with or without CSA histories. The study had three aims: (1) to describe the characteristics of the included studies; (2) to assess their methodological quality; and (3) summa-

rize the findings across the studies. We hypothesized that MSM in the United States with a history of CSA would be significantly more likely to show elevated HIV risk compared to MSM without CSA histories, including greater HIV seroprevalence, increased likelihood of unprotected sex, greater numbers of sex partners, and increased use of alcohol and other drugs during sexual intercourse.

METHODS

STUDY SELECTION

We searched for any study assessing HIV serostatus or HIV-related behavioral risk factors among adult MSM, and which compared MSM with a history of CSA to MSM without a history of CSA. In conducting the systematic review, studies were included if they met all of the following criteria: (1) they assessed for CSA history in adult MSM, (2) they assessed for at least one HIV-related outcome, including HIV-infection, STI-infection, or sexual risk behavior, (3) the study was conducted in the United States or its territories, and (4) the study compared adult MSM with a history of CSA to MSM without a history of CSA. Studies that only reported qualitative data were excluded. The investigators carried out all searches and procedures for study selection, data extraction, and analysis.

SEARCH STRATEGY

Electronic searches of PubMed/Biomed Central/Medline, PsycINFO, ERIC, SocINDEX, AMED, and CINAHL were carried out in April 2011 including studies from 1980 onwards. The search strategy included MeSH terms for HIV and terms associated with child sexual abuse, truncated where relevant, e.g., "[Sexual child abuse OR (sex* AND abuse AND child*)] OR [hiv or aids] [OR risk or risk*]". We cross-referenced previous reviews and primary studies for additional citations, and we reviewed conference abstract archives for grey literature.

All identified records (n = 755) were initially screened by one author to exclude citations that were not relevant. A short-list of records (n = 310) was prepared for further more detailed review. If the article fit preliminary criteria, a full-text copy was obtained and assessed for inclusion. Two independent assessors approved the final list of included studies (n = 12); disagreements about inclusion were resolved by discussion (see Figure 1 for flowchart of systematic review).

DATA EXTRACTION

Data were extracted by one coder and verified by a second coder, and included details about study design, sampling approach, participant characteristics, variables of interest, analysis, and results (see Table 1). The authors were not blind to any aspect of the studies.

META-ANALYSIS

We conducted meta-analysis to compare MSM with and without CSA history on outcome variables using Review Manager version 5.0. Odds ratios were computed using the Mantel-Haenszel approach, which weighs studies using the inverse-variance approach. The chi-square test was used in the meta-analysis to assess between-study heterogeneity; significant heterogeneity for the chi-square test is reflected if p < .01.
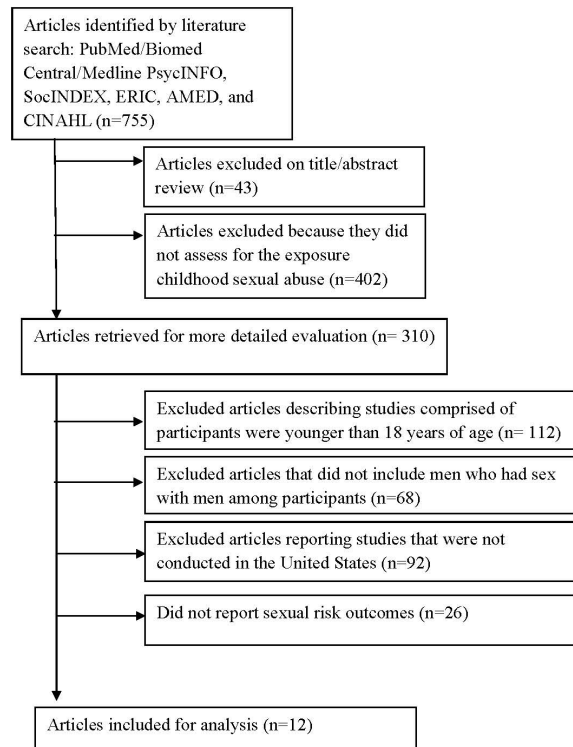
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┌─────────────────────────────────┐
│ Articles identified by literature│
│ search: PubMed/Biomed            │
│ Central/Medline PsycINFO,        │
│ SocINDEX, ERIC, AMED, and        │
│ CINAHL (n=755)                   │
└─────────────────────────────────┘
            │         ┌─────────────────────────────┐
            ├────────▶│ Articles excluded on title/abstract │
            │         │ review (n=43)                │
            │         └─────────────────────────────┘
            │         ┌─────────────────────────────┐
            ├────────▶│ Articles excluded because they did │
            │         │ not assess for the exposure  │
            │         │ childhood sexual abuse (n=402)│
            │         └─────────────────────────────┘
            ▼
┌─────────────────────────────────────────────────┐
│ Articles retrieved for more detailed evaluation (n= 310) │
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FIGURE 1. Flow Chart of the Systematic Search.

The flow chart continues with:

- Excluded articles describing studies comprised of participants were younger than 18 years of age (n= 112)
- Excluded articles that did not include men who had sex with men among participants (n=68)
- Excluded articles reporting studies that were not conducted in the United States (n=92)
- Did not report sexual risk outcomes (n=26)

Articles included for analysis (n=12)

ASSESSMENT OF METHODOLOGICAL QUALITY

The STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) checklist was used to assess the methodological quality, which outlines criteria for assessing studies using cross-sectional designs (von Elm et al., 2007). The following characteristics were appraised: (1) sampling approach; (2) assessment of independent variable; (3) comparability of independent variable subgroups; (4) assessment of dependent variables of interest; (5) participation rate; and (6) statistical analyses.

RESULTS

CHARACTERISTICS OF INCLUDED STUDIES

Of the 310 short-listed articles, 12 studies were selected for the systematic review reporting data from 15,622 participants recruited from 12 U.S. states and the District of Columbia. Characteristics of the included studies are provided in Table 1. The included studies were published between 1995 and 2009, with the years of data collection ranging from 1992 to 2006 (the period of data collection for two studies were not reported). Ten studies employed cross-sectional surveys, one study reported data from a randomized controlled trial, and one study was based on a 5-year longitudinal survey (reporting cross-sectional data from year 3 of data collection). Data

TABLE 1. Description of the Included Studies

Study	Location (Year)	Study Design and Sampling Method	Definition of CSA	Sample Characteristics	Main Findings
Arreola et al. (2009)	Miami, FL, Los Angeles, CA, New York, NY (Oct 1998 – Mar 1999)	Cross-sectional; Probability sample using time-location sampling	Any non-consensual sex before the age of 16	n= 912 MSM; only Latino MSM; CSA prevalence = 15.8% (n = 144)	Self report: CSA associated with risky sexual behavior in the past 12 months (OR = 2.0, 95% CI = 1.1–3.8) and risky sexual situations in the past 12 months (OR = 3.0. 95% CI = 2.0–4.3). In path analyses, CSA directly predicted psychological distress (β= .160, p < .01) and indirectly predicted risky sexual situations (β = .034, p < .05) and risky sexual behavior (β = .016, p < .05).
Arreola et al. (2008)	Los Angeles, CA, San Francisco, CA, Chicago, IL, New York, NY (Nov 1996 – Mar 1998)	Cross-sectional. Population based sampling using random-digit-dialing	Any non-consensual sex before the age of 18	n=2,506; CSA prevalence = 21% (n = 526)	Self report: CSA associated with HIV-positive status (Adj. OR = 2.67, 95% CI = 1.77–4.03), high-risk sex in the past 12 months (Adj. OR = 2.31, 95% CI = 1.58–3.37), heavy drinking in the past 6 months (Adj. OR = 2.15, 95% CI = 1.18–3.89), polydrug use in the past 6 months (Adj. OR = 2.42, 95% CI = 1.59–3.70), frequent drug use in the past 6 months (Adj. OR = 2.80, 95% CI = 1.88–4.20), depression (Adj. OR = 1.98, 95% CI = 1.39–2.82), suicidal ideation (Adj. OR = 2.63, 95% CI = 1.78–3.89). Reference group = no sex before age 16 Biological assessment: HIV serostatus.
Brennan et al. (2007)	Minneapolis and St. Paul, MN (Jun 1997–Jun 1998)	Cross-sectional; Convenience sample	(a) Ever forced to have unwanted sexual activity with adults during childhood or adolescence; (b) frequency of unwanted forced sex with adult (never, once, sometimes, regularly)	n = 862; CSA prevalence = 15.5% (n = 134); Participation rate: 56%; Age range: 28–41 years	Self report: "Regular CSA" associated with being HIV-positive (Adj. OR = 2.9; 95% CI = 1.05–7.85); current use of sex-related drugs (Adj. OR = 6.37; 95% CI = 2.15–18.91); exchange sex (Adj. OR = 6.98; 95% C I = 2.74–17.78); STI diagnosis (Adj. OR = 3.10, 95% CI = 0.95–10.10). "Sometimes CSA" associated with exchange sex (Adj. OR = 3.25, 95% CI = 1.16–9.14). "Once CSA" associated with exchange sex (Adj. OR = 3.93, 95% CI = 1.94–7.96). Reference group = no CSA.
Carballo-Diéguez et al. (1995)	New York, NY (Jan 1992-Mar 1993)	Cross-sectional; Convenience sample	Non-consensual sex before the age of 13 with someone 4 years older	n = 182; only Puerto Rican MSM; CSA prevalence = 18% (n = 32); Age range: 19–59 years	Self report: Compared with MSM with CSA history, MSM who did not experience CSA were less likely to report unprotected receptive anal intercourse in the past 12 months (Adj. OR = 0.30; 95% CI = 0.11–0.83)

Díaz et al. (1999)	San Francisco, CA (1999)	Cross-sectional; Convenience sample	Sex before the age of 16 with a partner at least 5 years older	$n = 110$; only Latino MSM; CSA prevalence = 50% ($n = 55$); mean age: 30 years	Self report: CSA significantly more likely than non-CSA to report UAI with a non-monogamous partner in the past 30 days (73% v. 44%, $p = .03$), more frequency sex with casual partners in the past 30 days (4.22 v. 2.13, $p = .06$), more frequency sex while under the influence of drugs in the past 30 days (2.67 v. 0.73, $p = 0.04$).
Jinich et al. (1998)	Portland, OR and Tucson, AZ (1992–1997)	Cross sectional analysis based on a 5-year longitudinal study design (data from Year 3 reported); Two population-based surveys using time location sampling or random digit dialing	Sex before the age of 13 with a partner at least 5 years older or between the ages 13 to 15 with a partner at least 10 years older	$n = 1,941$ included in analysis; CSA prevalence = 28% ($n = 537$); Response rates for time-location sampling approach: 66% in Portland ($n = 1,151$) and 64% in Tucson, ($n = 750$); Response rates for telephone survey approach: 59% in Portland ($n = 416$), and 75% in Tucson ($n = 283$)	Self report: CSA significantly more likely than non-CSA men to report being HIV positive (20.5% v. 15.9%, $p < .05$), transmission risk behavior in the past 30 days (9.5% v. 5.7%, $p < .005$), UAI in the past 12 months (21.4% v. 15.0%, $p < .001$), sexual events in the past 30 days (8.9 v. 7.1, $p < .01$), number of male sexual partners (2.4 v. 1.8, $p < .01$), number of sexual encounters with a non-primary male partner (2.5 v. 1.7, $p < 0.01$), number of sexual episodes while under the influence of drugs (0.57 v. 0.34, $p < 0.05$).
Kalichman et al. (2004)	Atlanta, GA (year not specified)	Cross-sectional; Convenience sample	Non-consensual sexual activity at the age of 16 or younger by a man at least 5 years older	$n = 608$; CSA prevalence = 15% ($n = 93$); Mean age: 34.8 years; Participation rate: 85%	Self-report: CSA significantly more likely than non-CSA to report HIV positive status (40% v 19%, $p < .01$), URAI (1.58 v. 0.93, $p < .01$), exchange sex (31% v. 13%, $p < .01$), undergo substance abuse treatment (28% v. 9%, $p < .01$). CSA associated with greater likelihood of UAI with 2 or more partners in the past 6 months (Adj. OR = 2.11, 95% CI = 1.08–4.12).
Lenderking et al. (1997)	Cambridge, MA (year not specified)	Cross-sectional; Convenience sample	Sexual experience under the age of 13 with a person at least 5 years older, or between the ages of 13 and 16, inclusive, with a person 10 years or older, with or without physical context and whether or not sex was wanted by child	$n = 327$; CSA prevalence = 35.5% ($n = 116$); Age range: 25.5 to 67.2 years	Self report: CSA associated with greater likelihood of URAI in the past 6 months (Adj, OR = 2.00, 95% CI = 1.01–3.99). CSA significantly more likely than non-CSA to report more than 50 lifetime partners (64.7% v. 50.2%, $p < .05$), receptive anal intercourse in the past 6 months (32.8 v. 24.2, $p < .05$), ever lied to have sex (14.9 v. 7.8, $p < .05$). Biological assessment: HIV serostatus

TABLE 1. continued

Study	Location (Year)	Study Design and Sampling Method	Definition of CSA	Sample Characteristics	Main Findings
Mimiaga et al. (2009)	Boston, MA, Chicago, IL, Denver, CO, New York, NY, San Francisco, CA, Seattle, WA (Jan 1999 – Feb 2001)	Randomized control trial; Convenience sample based on advertising; street outreach, referrals; HIV infection assessed over 48 months of follow-up	Sexual experience under the age of 13 with a person at least 5 years older, or between the ages of 13 and 16, inclusive, with a person 10 years or older	$n = 4,244$; CSA prevalence = 39.7% ($n = 1,686$); only HIV-negative MSM at enrolment	Self report: CSA associated with greater likelihood of HIV infection (Adj. HR = 1.30, 95% CI = 1.02–1.60), UAI (Adj. OR = 1.24, 95% CI = 1.12–1.36), serodiscordant UAI (Adj. OR = 1.30, 95% CI = 1.18–1.43). Biological assessment: HIV serostatus
O'Leary et al. (2003)	New York, NY and San Francisco, CA (1998)	Cross-sectional; Convenience sample based on venue-based and snow-ball sampling	Under the age of 16, ever had non-consensual sexual activity; also assessed how upsetting the experience was	$n = 456$; only HIV-positive MSM; CSA prevalence = 15% ($n = 68$); Mean age: 37	Self report: CSA significantly more likely than non-CSA to report UIAI in the past 90 days (33% v. 20%, p < .05) and URAI in the past 90 days (43% v. 27%, p < .02).
Paul et al. (2001)	San Francisco, CA, New York, NY, Los Angeles, CA, and Chicago, IL (Nov 1996–Feb 1998)	Cross-sectional telephone probability sample	Non-consensual sex under the age of 17	$n = 2,881$; CSA prevalence = 20.6% ($n = 593$); Participation rate = 78%	Self report: Frequency of CSA associated with non primary partner sexual risk the past 12 months ($p < .001$), serodiscordant sexual risk in the past 12 months ($p < .001$), frequent sex under the influence of alcohol ($p < .001$), frequent anal sex under the influence of drugs ($p < .001$), one night stand in the past 12 months ($p < .001$)
Welles et al. (2009)	Seattle, WA, Washington, DC, Boston, MA, New York, NY, Los Angeles, CA, Houston, TX (2005–2006)	Cross-sectional; Convenience sample	(a) Ever forced to have unwanted sexual activity with a male or female adult during childhood or adolescence; (b) frequency of unwanted forced sex with adult (never, once, sometimes, regularly)	$n = 593$, only HIV-positive MSM; CSA prevalence = 47% ($n = 279$)	Self report: CSA more likely than non-CSA to be in top quartile of compulsive sexual behavior (39.8% v. 25.5, p < .01), top quartile of depression and anxiety (39.2% v. 23.6%, p < .01), lower sexual comfort (63.4% v. 52.4%, p < .01), past (24.2% v. 18.4%) or current (16.4% v. 9.6%) drug use and current drug use (p < .01), sometimes (7.7% v. 3.7%) or always (6.4% v. 4.0) use methamphetamines before sex (p < .05), sexual acts in the past 90 days (24 v. 18, p < .05), anal intercourse acts in the past 90 days (15 v.12, p = .006). Frequency of CSA associated with greater likelihood of UAI: ("Often" v. "Never" Adj. RR = 1.49, 95% CI = 1.32–1.68; "Sometimes" v. "Never" Adj. RR = 1.97, 95% CI = 1.77–2.20)

were collected from Arizona, California, Colorado, Florida, Georgia, Illinois, Massachusetts, Minnesota, New York, Oregon, Texas, Washington, and the District of Columbia. Study sample sizes ranged from 110 to 4,244.

METHODOLOGICAL APPRAISAL OF INCLUDED STUDIES

Methodological quality of the studies was mixed. Four studies used probability sampling techniques to acquire their study population (Arreola et al. 2008; Arreola et al., 2009; Jinich et al., 1998; Paul et al., 2001), including random household dialing in geographic settings with high concentrations of same-sex adult couples (Arreola, Neilands, Pollack, Paul, & Catania, 2008; Arreola et al., 2009; Paul, Catania, Pollack, & Stall, 2001), and time-location sampling (Jinich et al., 1998). Eight studies used convenience sampling (Brennan, Helderstedt, Ross, & Welles, 2007; Carballo-Diéguez & Dolezal, 1995; Díaz, Morales, Bein, Dilán, & Rodriguez, 1999; Kalichman, Gore-Felton, Benotsch, Cage, & Rompa, 2004; Lenderking et al., 1997; Mimiaga et al., 2009; O'Leary, Purcell, Remein, & Gomez, 2003; Welles et al., 2009). Convenience samples were recruited from AIDS service organizations; mainstream gay environments such as pride events and gay bars; public sex environments such as commercial sex venues and outdoor cruising areas; and through social network referrals. Only four studies reported participation rates (Brennan et al., 2007; Jinich et al., 1998; Kalichman et al., 2004; Paul et al., 2001), which ranged from 56% to 85%.

Definitions of CSA varied by study. Most studies analyzed CSA as a dichotomous variable based on a variation of the definition provided by Finkelhor (1979). In addition to assessing CSA history, three studies also assessed frequency of CSA (Brennan et al., 2007; Paul et al., 2001; Welles et al., 2009) and one study assessed how upsetting the experience was (O'Leary et al., 2003). Two studies by Arreola and colleagues (Arreola et al., 2008; Arreola et al., 2009) subdivided childhood sexual experiences into three discrete categories: none, consensual sex before the age of 16, and forced sex before the age of 16. Paul et al. (2001) also used a three-category measure for number of abuse experiences (never, 1–5 times, and 6 or more times). Self-report was the primary method to determine HIV/STI infection, sexual risk behavior, and substance use in all studies. HIV seroprevalence was confirmed by biological testing in three studies (Arreola et al., 2008; Lenderking et al., 1997; Mimiaga et al., 2009). Studies differed in assessment period of sexual risk behavior, ranging from previous 30 days (Jinich et al., 1998) to previous 12 months (Arreola et al., 2008; Arreola et al., 2009; Carballo-Diéguez & Dolezal, 1995; Paul et al., 2001); one prospective study assessed sexual risk behavior over 48 months of follow-up (Mimiaga et al., 2009). O'Leary et al. (2003) reported data separately for unprotected receptive anal intercourse (URAI) versus unprotected insertive anal intercourse (UIAI), whereas the other studies reported data on general unprotected anal intercourse (UAI). Eight studies used multivariate analyses to test associations between CSA and HIV risk, adjusting for various co-factors (Arreola et al., 2008; Brennan et al., 2007; Carballo-Diéguez & Dolezal, 1995; Kalichman et al., 2004; Lenderking et al., 1997; Mimiaga et al., 2009; Paul et al., 2001; Welles et al., 2009). Four studies statistically examined the influence of hypothesized factors that mediate the association between CSA and HIV risk (Arreola et al., 2009; Jinich et al., 1998; O'Leary et al., 2003; Paul et al., 2001).

CHILDHOOD SEXUAL ABUSE

The prevalence of CSA was reported in all studies, ranging from 15% in two studies of 608 MSM recruited from Atlanta (Kalichman et al., 2004) and 456 MSM recruited from New York (O'Leary et al., 2003) to 50% in a study of 110 MSM recruited from San Francisco (Díaz et al., 1999). Overall, 27.3% (n = 4,263) of the participants in all included studies reported a CSA history. Across the studies that used probabilistic sampling (n = 8,240), the reported prevalence of CSA was 21.8% (n = 1,800).

HIV PREVALENCE

Six studies reported greater likelihood of HIV infection among MSM with CSA history (Arreola et al., 2008; Brennan et al., 2007; Jinich et al., 1998; Kalichman et al., 2004; Lenderking et al., 1997; Mimiaga et al., 2009). Estimates of HIV infection among MSM with CSA history ranged from 10% (Brennan et al., 2007) to 38% (Lenderking et al., 1997). Meta-analysis was conducted on five studies, which included 7,796 participants, that reported data on HIV infection according to CSA history (Brennan et al., 2007; Jinich et al., 1998; Kalichman et al., 2004; Lenderking et al., 1997; Mimiaga et al., 2009) and indicated significantly greater odds of HIV infection among men with CSA history compared with men without CSA history (OR = 1.54; 95% CI = 1.22-1.95; see Figure 2).

SEXUALLY TRANSMITTED INFECTIONS OTHER THAN HIV

Prevalence of STIs was reported in only one study. Brennan et al. (2007) found that MSM who had a history of CSA were significantly more likely to be diagnosed with an STI compared to men who reported no CSA history.

SEXUAL BEHAVIORS

All studies used self-report measures to evaluate sexual risk behavior. Studies consistently found that, compared to MSM without a history of CSA, MSM with a history of CSA were significantly more likely to engage in risky sexual practices (see Table 1). Meta-analysis of six studies that reported data on UAI according to CSA history (Brennan et al., 2007; Carballo-Diéguez & Dolezal, 1995; Jinich et al., 1998; Kalichman et al., 2004; Lenderking et al., 1997; O'Leary et al., 2003), based on data from 4,367 participants, indicated significantly greater odds of recent UAI among men with CSA history compared with men without CSA history (OR = 1.85; 95% confidence interval = 1.36–2.51; see Figure 3).

Seven studies found that men with CSA history were more likely to have more frequent casual sexual encounters (Arreola et al., 2009; Díaz et al., 1999; Jinich et al. 1998; Kalichman et al., 2004; Lenderking et al., 1997; Paul et al., 2001; Welles et al., 2009); meta-analysis was not conducted for this outcome due to reporting inconsistencies and lack of data in the primary articles. Moreover, two studies found that men with CSA history were more likely to have engaged in transactional sex (Brennan et al., 2007; Kalichman et al., 2004) and one study found that men with CSA history were more likely to have more than 50 lifetime partners (Lenderking et al., 1997).

SUBSTANCE USE

Eight studies assessed for substance use (Arreola et al., 2008; Arreola et al., 2009; Brennan et al., 2007; Jinich et al., 1998; Kalichman et al., 2004; Lenderking et al., 1997; Paul et al., 2001; Welles et al., 2009), of which seven studies reported
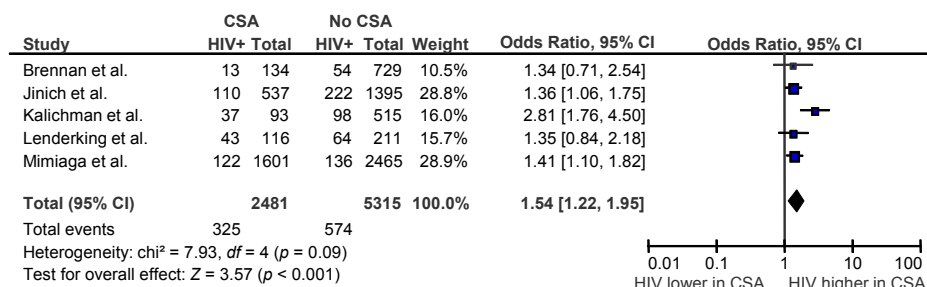
Study	CSA HIV+	CSA Total	No CSA HIV+	No CSA Total	Weight	Odds Ratio, 95% CI
Brennan et al.	13	134	54	729	10.5%	1.34 [0.71, 2.54]
Jinich et al.	110	537	222	1395	28.8%	1.36 [1.06, 1.75]
Kalichman et al.	37	93	98	515	16.0%	2.81 [1.76, 4.50]
Lenderking et al.	43	116	64	211	15.7%	1.35 [0.84, 2.18]
Mimiaga et al.	122	1601	136	2465	28.9%	1.41 [1.10, 1.82]
Total (95% CI)		2481		5315	100.0%	1.54 [1.22, 1.95]
Total events	325		574			

Heterogeneity: chi² = 7.93, *df* = 4 (*p* = 0.09)
Test for overall effect: *Z* = 3.57 (*p* < 0.001)

Odds Ratio, 95% CI

0.01 0.1 1 10 100
HIV lower in CSA   HIV higher in CSA

FIGURE 2. Meta-Analysis of 5 Studies (n = 7,796) Comparing HIV Status in MSM With History of CSA Versus MSM Without History of CSA.

significant associations between CSA history and substance use including sex while under the influence of alcohol or drugs (no association observed in Lenderking et al., 1997). Meta-analysis of substance use behavior was not possible due to heterogeneity in substance use measures.

DISCUSSION

This systematic review aimed to summarize the state of research concerning the association of CSA with HIV risk, sexual and substance use behaviors among MSM in the United States. This review included 12 studies, representing 12 states and the District of Columbia, which reported data from 15,622 participants recruited between 1992 and 2006. Approximately 27.3% of the participants in all included studies reported a CSA history. Across the studies that used probabilistic sampling, the estimated prevalence of CSA was 21.8%. The pattern of findings across the studies indicated that CSA is associated with elevated HIV risk among MSM, including greater HIV prevalence, increased likelihood of unprotected anal sex, more frequent casual sex, and increased use of alcohol and other drugs during sexual intercourse. These findings are especially alarming in light of the research showing that CSA prevalence among MSM is nearly four times greater than among men in the general population (Friedman et al., 2011).

The association of childhood abuse and HIV risk has also been observed in the general population (Senn et al., 2008). Recent data from Wilson and Widom (2008, 2009) showed similar results from a 30-year prospective cohort study of males and females in the United States who reported sexual or physical abuse or neglect (assessed in 1967–1971) and followed into middle adulthood (average age at follow-up was 41 years old). Compared with a matched sample who did not report childhood abuse, adults with abuse history were significantly more likely to have HIV infection and to report recent sexual risk behavior. This association was mediated by risky sexual and romantic relationships—i.e., adults who reported childhood abuse were more likely to have relationships that were unstable, prone to disruptions, and nonmonogamous.

The findings in this review support the assertion that early life experiences should be considered when designing studies or interventions for preventing HIV in MSM. The life course approach highlights the need to investigate factors that ac-
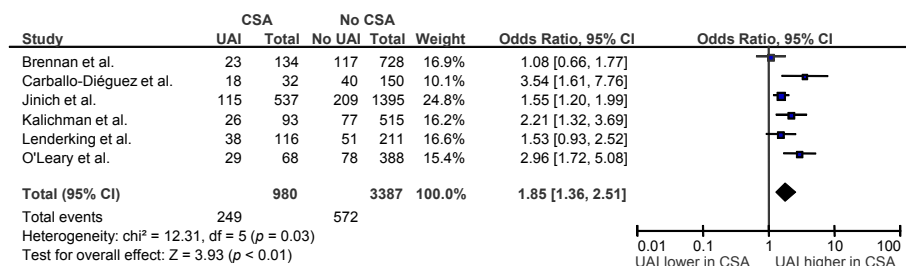
Study	CSA UAI	CSA Total	No CSA No UAI	No CSA Total	Weight	Odds Ratio, 95% CI
Brennan et al.	23	134	117	728	16.9%	1.08 [0.66, 1.77]
Carballo-Diéguez et al.	18	32	40	150	10.1%	3.54 [1.61, 7.76]
Jinich et al.	115	537	209	1395	24.8%	1.55 [1.20, 1.99]
Kalichman et al.	26	93	77	515	16.2%	2.21 [1.32, 3.69]
Lenderking et al.	38	116	51	211	16.6%	1.53 [0.93, 2.52]
O'Leary et al.	29	68	78	388	15.4%	2.96 [1.72, 5.08]
Total (95% CI)		980		3387	100.0%	1.85 [1.36, 2.51]
Total events	249		572			

Heterogeneity: chi² = 12.31, df = 5 (p = 0.03)
Test for overall effect: Z = 3.93 (p < 0.01)

FIGURE 3. Meta-analysis of 6 studies (n = 4,367) comparing recent unprotected anal intercourse in MSM with history of CSA versus MSM without history of CSA

cumulate over an individual's lifetime (i.e., CSA) that influence future health behavior. Currently, there are no empirically supported HIV prevention interventions for MSM that address the potential sequelae of CSA on HIV-related risk behavior. By assessing the social and developmental context that influences disease risk, researchers and interventionists can acquire a more complete picture of the dynamics that influence risk in order to design more holistic intervention strategies.

Addressing CSA in HIV prevention programs will not be easy. Community-based HIV prevention providers might not be able to address the complex psychological and behavioral consequences of CSA, particularly for individuals who experience recurring trauma. Linkages between HIV prevention counselors and culturally sensitive psychological services can facilitate referrals for high-risk adult MSM who experience ongoing effects of CSA on their mental and physical health. Psychological services working with MSM affected by CSA will benefit from training and capacity building on HIV/AIDS, sexuality, and MSM sexual behaviors.

Explanations for why MSM with CSA history show greater HIV risk behaviors have been offered previously. A frequent explanation, supported by statistical analysis in two studies (Arreola et al., 2009; Paul et al., 2001), is that the psychological sequelae of CSA compromise adult men's abilities to make optimal sexual behavior decisions. Another study found that CSA was associated with greater levels of anxiety, hostility, and suicidality, which can then contribute to unsafe sexual behaviors (O'Leary et al., 2003). Díaz et al. (1999) showed that MSM with CSA history reported lower levels of self-efficacy to practice safer sex, lower intentions to practice safer sex, and weaker norms about safer sex practices, and Jinich et al. (1998) postulated that sexual abuse impacts men's perceptions of power in intimate relationships, the ability to negotiate sexual safety, choice of sexual partners, and personal meanings attached to sexual activity. Another frequent explanation for the association between CSA and HIV risk is due to substance use, which was higher among MSM with CSA history in seven studies (Arreola et al., 2008; Arreola et al., 2009; Brennan et al., 2007; Jinich et al., 1998; Kalichman et al., 2004; Paul et al., 2001; Welles et al., 2009) and which might affect sexual risk taking and abilities to discuss or use condoms. Further research is needed to understand the specific pathways and mechanisms by which CSA contributes to HIV risk in adult MSM. Additional potential factors that might influence the association between CSA and adult HIV risk, include the specific age at which CSA episode(s) occurred, relationship to the person who committed the CSA episode(s), availability of psychological

support, parental/family communication, and experience of other forms of physical or emotional abuse. Studies of individual differences among MSM in the behavioral sequelae and coping strategies for CSA will be useful areas for further research.

A notable challenge to this literature is in the definition of CSA. As Table 1 shows, studies varied in their operationalization and measurement of CSA. Although several studies adhered to the Finklehor (1979) definition, other studies specified different cut-off ages for assessing CSA. Some studies did not specify any age but asked participants to report unwanted sexual acts that occurred during childhood and adolescence. Definitions and measures of CSA also varied in their inclusion of coercion/volition in early sexual behavior, frequency of CSA exposure, severity of CSA exposure, and involvement of physical contact. A consensus on the definition of CSA for the purpose HIV prevention programs targeting MSM in the United States is recommended (Senn et al. 2008).

Although the studies included in this review support the relationship between CSA and HIV risk, there are noteworthy limitations to consider. First, because most of the studies included in the review used cross-sectional surveys, we cannot make causal inferences about the association between CSA and HIV or about the direct pathways that link CSA and HIV risk behavior in adulthood. Potential mediators of the relationship between CSA and HIV risk behavior include depression, adult substance abuse, adult victimization, self-destructive behavior, lower self-esteem, and diminished sense of control over one's sexual activity. Potential co-factors of both CSA and HIV, such as mental illness and other forms of abuse or violence, may confound the observed associations. Second, assessment of CSA can be problematic due to the sensitive nature of this experience, biases in recall, and individual differences in the subjective experience of early sexual activity that might influence self-assessed CSA. In particular, the Finkelhor (1979) measure of CSA may not have adequately captured MSM with a CSA history but who did not perceive the experience(s) as being forced or coerced. A third factor that limits conclusions drawn from this review is the uncertainty in the definition of CSA which emphasizes an age differential between partners (i.e., partner 5 years older for those under the age of 12, and 10 years older for those between 10 and 17). Arreola et al. (2009) and Mimiaga et al. (2009) noted that some young MSM might have a difficult time finding sexual partners or romantic relationships with same-sex and same-age peers, and might seek encounters with older partners. Additionally, the majority of studies only assessed for the occurrence of sexual abuse but not the severity of the abuse experience. Arreola et al. (2009) asserted that labeling all childhood sexual experiences as CSA—independent of the nature and severity of the sex acts—overlooks potentially important roles of individual agency and the psychological sequelae of early sexual behavior. A fourth limitation is generalizability, as most studies were conducted in major cities where large gay and MSM populations reside, and most studies used convenience samples.

This systematic review offers empirical support to the association between CSA and HIV/STI infection, sexual risk behaviors, and substance abuse in MSM in the United States. These findings underscore the need to assess CSA in HIV prevention studies targeting MSM. Interventions designed for MSM must not only take into account recent sexual risk behaviors but acknowledge the experiences, such as physical and psychological trauma, that contribute to risk behaviors over the life course. Moreover, interventions must help to resolve psychological sequelae of CSA in order to improve the behavioral issues that place MSM with CSA histories at greater risk for HIV infection. This systematic review also highlights the need for a more stan-

dard definition of CSA. The widely accepted definition of CSA provided by Finkel-hor et al. (1979) provides a broad umbrella encompassing many childhood sexual experiences irrespective of age gaps, level of agency, and subjective experiences. A more precise understanding of the complexity in childhood sexual experiences is needed to inform the development of HIV prevention interventions for MSM with histories of CSA.

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