SUMMARY. This paper describes crystal methamphetamine (crystal) use and sexual risk behaviors for two web-based surveys of men who have sex with men (MSM). The subjects were recruited online. Crystal
use was associated with young age, having a greater number of sex partners, having unprotected anal intercourse (UAI), having a sexually transmitted infection (STI), and being HIV-positive. Significant regional differences were seen in the prevalence of crystal use. Findings are discussed in relation to the need to integrate messages about the relationship between drug use and sexual behavior into HIV prevention programs. [Article copies available for a fee from The Haworth Document Delivery Service; 1-800-HAWORTH. E-mail address: <docdelivery@haworthpress.com> Website: <http://www.HaworthPress.com> © 2006 by The Haworth Press, Inc. All rights reserved.]

**KEYWORDS.** AIDS, crystal, gay, HIV, HIV prevention, homosexuality, Internet research, men who have sex with men (MSM), methamphetamine, STI, substance use, unprotected anal intercourse (UAI)

**INTRODUCTION**

Crystal methamphetamine (crystal) use among men who have sex with men (MSM) has been on the rise, and its relationship to high-risk sexual behavior, and consequently HIV risk, has received recent research (Halkitis et al., 2001; Reback and Ditman, 1997; Semple et al., 2002) and media attention (Halkitis & Galatowitsch, 2004; Owen, 2004; Reuters, 2004). With an 11% increase in the number of newly diagnosed HIV infections among MSM between 2000 and 2003 (CDC, 2004), a better understanding of crystal and other drug use in connection with high-risk behavior is needed. Previous research has indicated that crystal use is associated with “marathon sex” (prolonged sexual activity) and unprotected anal intercourse (UAI) (Reback and Ditman, 1997; Semple et al., 2002; Whittington et al., 2002).

Medical and Health Research Association of New York City, Inc. (MHRA), in collaboration with the New York State Psychiatric Institute, Columbia University (NYSPI/CU) and the Centers for Disease Control and Prevention (CDC), conducted two national Internet-based surveys of high-risk sexual behavior among MSM. Data from these surveys were analyzed to better understand the relationship between substance use and UAI. As the majority of research on HIV and risk behavior has been conducted in small geographic areas or within cities where HIV is endemic (Leigh and Stall, 1993), this overview will describe differing levels of crystal use across U.S. regions and associations found between substance use and unprotected sex among MSM recruited online.
METHODS

Both Internet studies were anonymous and cross-sectional, inquiring about sexual and drug-using behaviors among MSM. The surveys were linked to online recruitment banners that were posted on participating websites. Both surveys included information on demographics (age group, race/ethnicity, education, income and residence), and assessment of risk behaviors, such as type of sexual contact (anal, oral, vaginal-each with and without condoms), knowledge of respondents’ HIV status, knowledge of partners’ HIV status, type of illicit drug use, frequency of alcohol consumption, whether drugs or alcohol were used before or during sex, and how sex partners were met. No personally identifying information was collected. For Study 1, year of birth and the first three digits of the zip code were obtained. For Study 2, year of birth and the state and country of residence were obtained. Links to STI/HIV prevention and treatment websites and mental health hotlines appeared at the end of each survey. Survey questions were adapted from questionnaires used by the investigators in previous studies.

Study participation for both studies was limited to men 18 and older, and all participants clicked on an online consent form before gaining access to the survey. The surveys neither used cookies nor collected user IP addresses with submitted data. Both surveys received Institutional Review Board approval (Study 1: MHRA and NYSPI/CU, Study 2: MHRA, CDC and NYSPI/CU). There were no monetary incentives to complete either survey.

Study 1

Participants were recruited from one general interest, gay-oriented site between June and July 2002. The survey inquired about behaviors during a recent 6-month period. Analysis was limited to 2,915 men who reported sex with other men or who self-identified as gay or bisexual. Survey questions addressed drug and sex behaviors occurring within this 6-month period and did not focus on any particular sexual encounter. Detailed reports on drug use and sexually transmitted diseases from this study have been reported elsewhere (Hirshfield Remien, Humberstone et al., 2004; Hirshfield, Remien, Walavalkar et al., 2004).

Study 2

Participants were recruited between October and March 2003-2004 from 14 gay-oriented sites, ranging from general news, to chat, to com-
mercial sex sites. This study built on the research and technological experience of Study 1 and was multidimensional. The respondent’s answers to questions dictated the course of the survey. For example, if the respondent met his last sex partner online, he would see questions about meeting people online, whereas if the respondent met his last partner offline, he would not see these particular questions. The goal of this study was to elicit information on the last sexual encounter within the past 3 months. The survey collected data on participants’ last sexual encounter, as well as the demographic and behavioral information mentioned above. Analysis was limited to the 2,770 men from the United States or Canada who self-identified as gay or bisexual or reported oral or anal sex with a man within three months prior to the survey.

RESULTS

Participants in Studies 1 and 2 were similar with regard to race/ethnicity, sexual orientation, HIV prevalence and regional use of crystal. Both samples were predominately white (80%). Most men reported having sex only with men. The self-reported HIV prevalence of both samples was 7%. Both studies found a strong association between crystal use and UAI despite differing study time frames (Study 1, 81% of crystal users reported UAI vs. 55% of non-users; Study 2, 81% of crystal users reported UAI vs. 54% of non-users).

Crystal use was reported significantly more in the western U.S. than eastern in both studies. In Study 1, 6% of the overall sample reported crystal use during the six-month study period. The Pacific and Mountain regions each had a 7% higher reporting of crystal use than the Northeast region and a 6% higher reporting than the North Central region (Pacific regional difference, p = <.01; Mountain regional difference, p = <.05). In Study 2, 3% of the overall sample reported crystal use in their last sexual encounter. Crystal use was reported more in the Pacific region than any other U.S. region (a range of 6%-8% higher; p = <.001 for all regions).

Study 1

Participants resided in all fifty states, roughly in proportion to the population of each state. Nearly half were between 18 and 30 years of age, with a range of 18 to 83. Most reported up to $40,000 income and some college education or more. About 80% reported meeting sex partners online. The number of lifetime sex partners ranged from 0 to over 1,000,
with about one quarter of the participants reporting more than 100 lifetime partners. The majority reported more than one sex partner during the six-month study period. About one-third of the overall sample reported any drug or alcohol use before or during sex.

Demographic differences were found between crystal and non-crystal users. Men aged 40 and over were significantly less likely to report crystal use than men aged 18-24 \((p < .01)\), men aged 25-29 \((p < .01)\), or men aged 30-39 \((p < .05)\). Crystal use was also reported significantly less among men with some college education or more \((p < .01)\) and those earning over $40,000 \((p = .001)\). There were no differences by race/ethnicity.

Compared to those not reporting crystal during the study period, crystal users were significantly more likely to report polydrug use (two or more drugs), alcohol before or during sex, UAI, and any sexually transmitted infection (STI). Of note, 82% of crystal users reported having UAI at least once in the six months before taking the survey, compared to 55% of the non-crystal users. Additionally, 93% of crystal users reported a range of 2-100+ partners in the prior six months compared to 79% of non-crystal users. The most common drugs also reported by crystal users were marijuana, ecstasy, poppers, cocaine, and Viagra. Crystal users were somewhat more likely to be HIV-positive than non-users \((p = .07)\).

**Study 2**

Participants were from all 50 U.S. states and Canada. Nearly half were between ages 18 and 35, with a range of 18 to 85. Slightly more than half earned over $40,000 per year. Half had a college degree or more. The number of lifetime sex partners ranged from 1 to over 1,000, with 30% of participants reporting over 100 lifetime partners. In the three months prior to the survey, respondents reported a range of 0 to 150 male partners. Fifty-four percent reported anal sex in their last encounter; of those, 56% reported UAI. Roughly equal proportions met their last partner online \((51\%)\) and offline \((49\%)\). About 20% reported drug or alcohol use before or during their last sexual encounter.

In the three months prior to the survey, crystal users reported a range of 0 to 130 sex partners, with a median of 6, while non-crystal users reported a range of 0 to 150 partners with a median of 2. There was no difference in use by race/ethnicity, income, or education. However, men aged 30-39 years were significantly more likely to report crystal \((p < .05)\) than men aged 18-24 and men 40 years or older.

Main comparisons between crystal and non-crystal users found that, in the last encounter, crystal users were significantly more likely to report
engaging in receptive UAI, binge drinking (5 or more drinks) or using Viagra before or during sex, polydrug use, and being diagnosed with an STI since this last sexual encounter. Additionally, crystal users were significantly more likely to be a commercial sex worker and to be HIV positive than non-users ($p < .001$). Most crystal users reported anal sex in their last encounter (82%); of those, 83% exchanged money or drugs for UAI. The most common drugs used in the same encounter with crystal were Viagra, poppers, Gamma Hydroxy Butyrate (GHB), ecstasy, and marijuana. Although crystal users and non-users were similar in their “yes/no” responses about wanting to learn more about HIV or prevention online, crystal users were significantly more likely than non-users to report that they were “not sure” if they wanted to learn more about these topics (22% versus 13%, $p < .01$).

**DISCUSSION**

Conducting Studies 1 and 2 via the Internet enabled us to recruit participants from all U.S. states, including smaller cities and rural areas, which are missed in behavioral surveys that typically recruit from large cities. The high-risk drug use and sexual behaviors found in Studies 1 and 2 confirm previous research (using traditional methods) on crystal use among MSM, which indicates that it is associated with young age, having a greater number of sex partners, having unprotected anal intercourse, having an STI, and being HIV-positive (Molitor et al., 1998; Reback and Ditman, 1997; Semple et al., 2002, 2003). Further, the rate of unprotected anal intercourse among crystal users was nearly identical across Studies 1 and 2. This consistency may indicate a common pattern of drug use and sexual behavior. The similarity of findings from our Internet-based surveys to those using more traditional forms of recruitment and interview methods suggests that online surveys are a reliable way to study high-risk sexual behavior in MSM.

Although the proportion of MSM who reported crystal use in Studies 1 and 2 was relatively small, crystal users were significantly more likely than non-users to report unprotected sex, potentially putting them at risk for HIV and other STIs (Halkitis et al., 2001; Reback and Ditman, 1997; Semple et al., 2002).

Crystal use among MSM has been an increasing public health concern in the western U.S. since the early 1990s (Halkitis et al., 2001; Semple et al., 2003). Regional findings from Studies 1 and 2 indicate that the highest reporting of crystal use was found in the Pacific region, where it has
historically been most prevalent (Sullivan et al., 1998; Thiede et al., 2003). According to a recent national report (NIDA, 2003), indicators of methamphetamine use remained highest in Pacific and Mountain regions. Relatively low indicators of crystal abuse were found in North East and South Atlantic regions. However, reports of crystal use in MSM in the North East appear to be on the rise (Halkitis, 2004; Owen, 2004; Reuters, 2004).

Some limitations of these studies deserve mention. Since both surveys were anonymous, we could neither verify the reliability of respondents’ identities nor their responses. In Study 1, we could not link risk behavior to any specific encounter. In Study 2, we had only one event to base sexual and drug information upon and therefore could not detect a pattern of behavior. In both studies, we did not collect information on the level and frequency of current or past drug use (and context of use). Further, we cannot determine from these Internet studies whether the men that participated are representative of the population of MSM using the Internet, of MSM in general, or of MSM with HIV, since the MSM population has never been enumerated. Nevertheless, Internet research is an efficient and inexpensive way to reach large samples of high-risk groups.

Studies conducted over the past 20 years have found associations between substance abuse treatment and a reduction in HIV risk behaviors (Metzger and Navaline, 2003). There are challenges to treating crystal abuse; drug treatment must focus on helping men addicted to crystal re-learn to have sex without it (Frosch et al., 1996). There is a need for greater integration of substance use education and treatment into HIV prevention and care. Ongoing drug surveillance is necessary to document new trends in substance use patterns among MSM (Stall et al., 2001) in order to create multifaceted interventions. This study’s ability to quickly reach large numbers of men reporting high-risk behaviors demonstrates the potential for online HIV education, prevention, and outreach.

REFERENCES


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