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## The relationship between pornography use and sexual behaviors among at-risk HIV negative men who have sex with men

Lisa A. Eaton, PhD, Demetria N. Cain, MPH, Howard Pope, MA, Jonathan Garcia, PhD, and Chauncey Cherry, MPH

University of Connecticut, Center for Health, Intervention, and Prevention, 2006 Hillside Road, Storrs, CT 06269-1248, USA

### Abstract

**Objectives**—Although pornography is widely available and frequently used among many adults in the US, little is known about the relationship between pornography and risk factors for HIV transmission among men who have sex with men.

**Methods**—Baseline assessments from a behavioral intervention trial for at-risk men who have sex with men were conducted in Atlanta, GA in 2009. Univariate and multivariate generalized linear models were used to assess the relationships between known risk factors for HIV infection, time spent viewing pornography, and sex behaviors.

**Results**—One hundred forty nine men reporting HIV-negative status and two or more unprotected anal sex partners in the past six months were enrolled in an intervention trial and completed survey assessments. Time spent viewing pornography was significantly associated with having more male sexual partners ( $B=.45$ ,  $SE=.04$ ,  $p<.001$ ) and unprotected insertive anal sex acts ( $B=.28$ ,  $SE=.04$ ,  $p<.001$ ). Moreover, increased substance use (drug use,  $B=.61$ ,  $SE=.14$ ,  $p<.001$ ; alcohol use,  $B=.03$ ,  $SE=.01$ ,  $p<.01$ ) and decreased perception of risk for HIV infection ( $B=-.09$ ,  $SE=.04$ ,  $p<.05$ ) were found to be significantly associated with greater time spent viewing pornography.

**Conclusions**—This exploratory study is novel in that it sheds light on the associations between viewing pornography and sexual risk taking for HIV infection. Future studies in this area should focus on understanding how the content of pornography, in particular the viewing of unprotected and protected sex acts, may affect sexual risk taking behavior.

In the U.S. alone, there are over 56,000 incident HIV infections each year; the majority of which occur among men who have sex with men (MSM; Centers for Disease Control, 2007). The steady number of MSM becoming HIV infected testifies to the need for continual efforts to eliminate the spread of HIV infection among MSM. In order to stifle the epidemic, effective behavioral and structural-level interventions must be incorporated into existing health care infrastructure. These interventions need to include addressing the whole individual and taking into consideration the social epidemiology of HIV infection, namely how social determinants shape protective and risky behaviors related to HIV transmission.

A key focus of social determinants includes understanding the psychosocial factors that affect sexual decision making. Prior research has identified multiple psychosocial factors as playing key roles in sexual contexts, such as depression (Reisner et al., 2009a), HIV

treatment optimism (Reisner et al., 2009b), sexual attraction (Jarama et al., 2005), and sensation seeking (Adam et al., 2008). However, one area that has been virtually overlooked among MSM and risk taking for HIV is that of pornography use. We know little about the relationship between pornography use and sexual behaviors among MSM, yet gay pornography is a major genre within the adult entertainment industry and many MSM view pornography (Silvera et al. 2009). Among heterosexual men, there is evidence for both protective factors -the sexual fantasy provided by pornography may replace risky sexual behaviors from being acted out (Youn et al., 2006)- and risk factors- some evidence suggests that pornography is related to sexual aggression (Kingston et al., 2009; Diamond, 2009). However, the bulk of the literature on pornography use is almost exclusively focused on heterosexuals and our understanding of pornography use among MSM is virtually non-existent. Our literature review revealed no studies on the possible relationship between pornography use and sexual behaviors among MSM.

Given the dearth of information regarding pornography and sexual risk taking among MSM, an initial important step in understanding this area of research is to establish whether exposure to pornography is associated with sex related behaviors and psychosocial factors. Pornography engenders possible exposure to both displays of condom protected and unprotected sexual acts and sex with one or multiple partners. As such, it is possible for pornography to influence risk taking, yet it is unclear if any relationship actually exists and, if so, whether it is associated with risk taking or risk reducing behaviors and beliefs. Factors such as perception of risk for HIV transmission (Eaton et al., 2007) and beliefs around condom use (Harawa et al. 2006) may be important theoretical factors in understanding these relationships. Furthermore, if viewing pornography is associated with relevant psychosocial variables relating to sexual decision making then these factors may be important for understanding possible relationships between sex behaviors and pornography usage. The nature of the relationship between sexual risk taking and pornography consumption remains to be examined and is potentially an important factor in explaining determinants of STI/HIV transmission.

The current paper is an exploratory study of psychosocial factors and sexual behaviors as they relate to pornography use. Specifically, the relationships between substance use, condom use self-efficacy, perceptions of risk for HIV, viewing pornography, and sexual behaviors among MSM are examined and discussed. We investigate possible factors associated with pornography use that are not only established risk factors for HIV infection, but potentially conceptually relevant to understanding the sexual patterns and thoughts of men who watch pornography. We then test the relationship between pornography use and sexual behaviors while controlling for key variables (drug and alcohol use) associated with HIV transmission risk.

## **METHODS**

### **Study design**

As part of a randomized controlled trial described elsewhere (Eaton, in press) participants completed baseline assessments at a community-based research site in the downtown area of Atlanta, GA from March 2009 to October 2009. Briefly, the trial tested the effectiveness of a one-on-one, single-session, intervention addressing partner selection strategies for at-risk MSM. Here, we present data from the baseline assessment of this trial.

### **Participants**

Participants were recruited through flyers, advertisements, and in-field recruitment methods to capture a diverse sample of men. In order to participate in the study, potential participants

were screened using 4 criteria: (a) male/transgendered, (b) eighteen years of age or older (c) did not report HIV positive status, and (d) reported two or more male unprotected anal sex partners in the last six months.

## Measures

**Demographics**—Participants were asked their age, years of education, ethnicity, employment status, sexual orientation, how out they are about sexual orientation, and income.

**Substance use**—Participants were asked whether or not they had used nitrite inhalants (poppers), methamphetamine, or viagra/cialis/levitra without a prescription in the past three months. Responses to these items were used to form a composite measure with scores ranging from 0 = no drug use to 3 = all three drugs used. We primarily focused on the use of these three substances due to their association with a sexual context and risk behaviors (Forrest, 2010). In addition, the Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993) was administered to assess alcohol abuse. As determined by prior research, alcohol related problems were defined as scoring a 7 or greater on the AUDIT.

**Risk perceptions and condom use self-efficacy**—Participants were instructed to report on how much risk for HIV infection they perceived when asked, “How risky is anal sex without a condom as the bottom partner with a man you just met who tells you his HIV status is negative?” and “How risky is anal sex without a condom as the bottom partner with a man you just met who tells you his HIV status is negative and that he just recently tested negative?”. Response ranged from 0 = *No or Low Risk* to 10 = *Very High Risk*. Responses to the two items were highly correlated and, thus, averaged together and treated as one variable. This measure demonstrated internal consistency, Cronbach’s  $\alpha = .89$ . Six questions were used to assess participants’ self-efficacy for condom use during sexual negotiation with a partner (adapted from Brafford and Beck, 1991). For example, questions included, “I feel confident in my ability to discuss condom usage with any partner I might have” and “I feel confident in my ability to put a condom on myself or my partner”. Responses ranged from 1 = *strongly disagree* to 6 = *strongly agree*. This scale demonstrated internal consistency, Cronbach’s  $\alpha = .81$ .

**Pornography use**—Participants were asked how many minutes in an average week they spend viewing pornography. An eight-point scale was used for responses and ranged from 0 = 0 minutes through 7 = 180 minutes or more, with each time point in between representing 30 minute time-point ranges.

**Sexual behavior outcomes**—Participants reported their total number of sexual partners they had in the past month. They were then asked about the number of unprotected (condomless) anal sex acts they had in the past month as both the receptive and insertive partner.

## Data analysis

Both univariate and multivariate models were run to identify factors associated with either time spent viewing pornography or number of sex acts/partners. For of these models, generalized linear modeling using a linear distribution for pornography viewing and a Poisson distribution for sex acts/partners were used to analyze factors relating to these variables. We examined sex behaviors for overdispersion in the data and did not find any evidence of it. PASW Statistics version 18.0 (SPSS Inc., Chicago, IL) was used for all analyses. For models investigating time spent viewing pornography, variables were included in the multivariate model due to their significant association with pornography use in the

univariate model. For models investigating sex act and sex partners, variables were included in the multivariate model due to their significant association with at least one sexual behavior in univariate analyses, doing so allowed for comparing of variables across all models.

## RESULTS

For this study, 911 men were screened during the recruitment process to determine eligibility for the intervention study. Participants who reported HIV negative/unknown status were included, while participants who reported being HIV positive ( $n = 111$ ) were screened out of the study and referred to alternate study opportunities at the research site. A total of 544 men did not screen into the study because of not reporting at least two unprotected anal sex partners in the past six months. In total, of the 256 (28%) men screened into the study, 149 (58%) men enrolled in the study.

### Demographic characteristics

On average, participants reported being 29.1 ( $SD = 10$ ) years old and some college ( $M = 13.9$ ,  $SD = 1.9$ ). Most participants were Black (Black = 105, White = 32, Hispanic = 5, other = 6), slightly less than half were working (working = 67, not working = 82) and most were out about their sexual orientation (out = 70, out sometimes = 67, not out = 11). Incomes among participants varied with most either reporting less than \$10,000 or over \$31,000 annually.

### Substance use

On average, participants reported a mean of .32 ( $SD = .66$ ) for sex drug use in the past three months. About a quarter of the sample reported using one of these drugs with 16.8% using one drug, 4.7% using two drugs, and 2.0% using all three drugs. On average, participants scored 7.4 ( $SD = 7.4$ ) on the AUDIT. As such, a substantial number of participants reported problem alcohol use. Specifically, 41.6% of the sample scored above 7 on the AUDIT.

### Risk perceptions and condom use self-efficacy

Overall, participants reported perceiving considerable risk in engaging in unprotected anal intercourse, including with men who were believed to be HIV negative ( $M = 8.1$ ,  $SD = 2.4$ , range 0 = *No or Low Risk* to 10 = *Very High Risk*). Participants reported high levels of condom use self-efficacy ( $M = 5.1$ ,  $SD = .91$ , range 1 = *strongly disagree* to 6 = *strongly agree*).

### Pornography use

On average, participants scored 3.73 ( $SD = 2.16$ ) in terms of pornography use. This mean corresponds closest to watching pornography on average 61-90 minutes per week. Ten percent of the sample reported no pornography viewing, while 12% reported watching pornography 180 minutes or more on average.

### Sexual behavior outcomes

For number of sex partners, 91% of men reported at least one male sex partner ( $M=3.72$ ,  $SD = 5.49$ ) in the past month. For number of sexual acts, 48% of men reported unprotected insertive anal sex acts ( $M=1.69$ ,  $SD = 4.30$ ) and 38% of men reported unprotected receptive anal sex acts ( $M=1.44$ ,  $SD = 3.62$ ) in the past month.

### **Univariate and multivariate models identifying factors associated with pornography use**

In univariate analyses, sex drug scores, AUDIT scores, perceived risk, and condom use self-efficacy were found to be significantly associated with viewing pornography. Specifically, those who reported higher rates of sex drug and alcohol use, and those with lowered perceived risk and condom use self-efficacy reported more time spent viewing pornography. As for the multivariate model, sex drug use, alcohol use, and perceived risk remained statistically significant, and thus uniquely associated with pornography use. Similar to the univariate model, in the multivariate model men who were reported greater use of sex drugs and alcohol, and lowered perceived risk were more likely to spend time viewing pornography (Table 1).

### **Multivariate models identifying factors associated with sexual behaviors and partners**

For Model 1, participants who were older, had lower incomes, reported greater use of sex drugs and alcohol, and spent more time viewing pornography, were more likely to report a greater number of male anal sex partners (perceived risk and condom use self-efficacy were not significant predictors). In Model 2, participants who reported lower incomes, greater sex drug use, lowered perceived risk and lowered condom use self-efficacy, were more likely to report a greater number of unprotected receptive anal sex acts (age, alcohol use, and time spent viewing pornography were not significant predictors). Finally, in Model 3, participants who were younger, had greater incomes, higher rates of sex drug and alcohol use, less condom use self-efficacy, and spent more time viewing pornography, were more likely to report a greater number of unprotected insertive anal sex acts (perceived risk was not a significant predictor, see Table 2).

## **DISCUSSION**

Overall, data from the current study sheds light on a relationship between perceiving oneself at lower risk for HIV, lowered condom use self-efficacy, and increased time spent viewing pornography. Established risk factors for HIV, i.e. substance abuse, were also shown to be associated with greater time spent viewing pornography and increased sexual risk behavior. Most notably, we found an association between number of sexual partners, number of unprotected insertive anal sex acts, and increased pornography usage. To the best of the authors' knowledge, these relationships have not been identified in prior research even though pornography use appears to be an important factor associated with risk. Moreover, almost all men reported viewing pornography on a regular basis, that is, at least weekly, which suggests that this activity is one that is frequently engaged in by many participants in the current study who also report considerable sexual risk taking for HIV. Given the frequency of viewing pornography and its evidenced link to other risk factors, further investigation into this area is warranted.

Time spent viewing pornography was significantly associated with unprotected insertive sex acts but not unprotected receptive sex acts in multivariate models. Insertive anal sex confers less risk for HIV than does receptive anal sex (Baggaley et al., 2010), and, therefore, some men use this information to guide their behaviors in order to reduce their risk for HIV. This finding is consistent with prior research demonstrating the use of seropositioning to prevent HIV transmission among MSM (Snowden et al., 2009). The fact that unprotected insertive and not receptive anal sex was associated with pornography use suggests that although there appears to be a link between sexual risk taking and viewing pornography, in this case sexual risk may be best characterized as engaging in seroadaptive behaviors (Eaton et al., 2009) and not necessarily explicit sexual risk taking.

Findings from the current study need to be further investigated. Qualitative research with relevant focus groups to address key questions emerging as a result of the current study's findings is needed. Further questions of inquiry should be centered on explaining the nature of the relationship between pornography viewing and sexual risk. For example, questions regarding how the content of pornography, i.e., bareback versus condom protected sex, may affect sexual risk taking; the direction of causality between pornography, psychosocial factors, and sexual risk; alcohol and drug use patterns involving pornography use; and discussions on how different sexual acts may influence the viewers' risk taking and sexual decision making are needed.

Although our measure of pornography usage was associated with sexual risk taking, more detailed measures assessing pornography exposure are needed to fully explicate this line of research. It's possible that time spent viewing pornography is indicative of a general interest in sexuality or a diverse sexual repertoire and not an absolute gauge of risk taking. We did observe an association between number of sexual partners and time spent viewing pornography which does indicate greater risk taking (Catania et al., 2005). However, future research should control for partner specific variables, such as, steady or casual partner, and the specific sexual acts engaged in with this partner when investigating the relationship between pornography usage and sexual behaviors.

Findings from the current paper should be considered in light of limitations. Descriptive information on the types of pornography being viewed and the medium used to watch pornography are needed to more fully understand findings presented in this paper. Our measure of risk focused on the perceived risk of HIV transmission for the receptive partner during anal sex. This measure does not include perceptions of risk for the insertive partner and responses to measures of risk perception may vary depending on the behaviors presented. The current study was conducted with MSM who reported sexual risk for HIV infection during study recruitment. As such, the generalizability of study findings may be limited to men at highest risk for HIV infection. Findings may also be limited to men living in the Southern US where religious and conservative beliefs are more wide spread than in other parts of the country. This study reports on a single time point, precluding causal conclusions. Lastly, the survey method also relied on self-report of sensitive experiences. The potential for social desirability influences were minimized by assuring participant confidentiality. Significant rates of high risk sexual behavior were reported by participants, which suggest that they were generally honest in their responses.

Future research should focus on exactly what is driving the association between viewing pornography and sexual risk behavior. For example, it is possible that pornography viewing desensitizes individuals to the health risks associated with risky sexual behavior due, in part, to fact that negative health outcomes are not portrayed in pornographic material. On the contrary, it is also possible that men who spend considerable time viewing pornography would engage in even greater risk behavior in the absence of pornography, and, thus, pornography acts as a substitute to risk taking. Information garnered from understanding how contextual cues, such as pornography use, affect risks for HIV infection and how this relationship is related to known HIV risk factors, can help in developing more accurately tailored interventions.

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Demographics, substance use, and psychosocial measures associated with time spent viewing pornography among at-risk HIV negative men who have sex with men

**Table 1**

	Univariate analyses			Multivariate analysis		
	B	SE	Wald $\chi^2$ p	B	SE	Wald $\chi^2$ p
<b>Demographic Controls</b>						
Age	-.01	.01	.04 .83			
Income	.06	.04	1.69 .19			
<b>Substance Use</b>						
Sex drug score	.78	.12	39.6 <.001	.61	.14	20.4 <.001
AUDIT score	.05	.01	19.1 <.001	.03	.01	7.37 <.01
<b>Psychosocial Measures</b>						
Perceived risk	-.15	.03	18.9 <.001	-.09	.04	5.28 <.05
Condom use self-efficacy	-.26	.09	8.0 <.01	.06	.11	.28 .60

**Table 2**

Multivariate models investigating the relationships between sexual behaviors and relevant variables among at-risk HIV negative men who have sex with men

	Model 1			Model 2			Model 3			
	Number of male partners			Number of unprotected receptive anal sex acts			Number of unprotected insertive anal sex acts			
	B	SE	Wald X <sup>2</sup>	B	SE	Wald X <sup>2</sup>	B	SE	Wald X <sup>2</sup>	p
<b>Demographic Controls</b>										
Age	.03	.01	9.04	<.01	.01	.01	.01	.01	38.67	<.001
Income	-.21	.05	17.19	<.001	-.14	.05	8.45	.05	164.07	<.001
<b>Substance Use</b>										
Sex drug score	3.61	.14	634.50	<.001	.72	.15	24.54	.15	9.60	<.01
AUDIT score	.12	.01	95.78	<.001	-.02	.01	2.14	.01	10.10	<.01
<b>Psychosocial Measures</b>										
Perceived risk	-.03	.04	.44	.51	-.37	.04	80.29	.04	.01	.92
Condom use self-efficacy	-.12	.11	1.32	.25	-1.04	.11	91.28	.11	37.15	<.001
<b>Pornography</b>										
Time spent viewing	.45	.04	127.08	<.001	-.01	.04	.03	.04	46.58	<.001