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Patterns and Correlates of Sexual Activity and Condom Use Behavior in Persons 50-Plus Years of Age Living with HIV/AIDS

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Abstract

This study characterized rates of sexual activity and identified psychosocial and behavioral correlates of sexual activity and condom use in a metropolitan sample of 290 HIV-infected adults 50-plus years of age. Thirty-eight percent of participants were sexually active in the past three months, 33% of whom had at least one occasion of anal or vaginal intercourse that was not condom protected. Rates and correlates of sexual activity and condom use differed between gay/bisexual men, heterosexual men, and heterosexual women. In the past three months, 72% of heterosexual men were sexually active compared to only 36% of gay/bisexual men and 21% of heterosexual women. However, among sexually active persons, only 27% of heterosexual men reported inconsistent condom use compared to 37% of gay/bisexual men and 35% of heterosexual women. As the number of older adults living with HIV/AIDS in the U.S. continues to increase, age-appropriate secondary risk-reduction interventions are urgently needed.

Keywords

HIV/AIDS; Older adults; Sexual activity; Condom use

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Introduction

Through 2005, 956,666 people in the United States had been diagnosed with AIDS (CDC 2006). Of these, 119,184 (or 12.4%) were 50 years of age or older at the time of their AIDS diagnosis. Furthermore, epidemiologic data portend that the number of AIDS diagnoses in late middle-aged and older adults will increase in the future due, in part, to better clinical care and the improved efficacy of highly active antiretroviral therapy (HAART) that has extended the lives of many people living with HIV/AIDS (Porter et al. 2003). A second factor contributing to the rising number of HIV/AIDS cases in middle-aged and older adults is the increase in the number of new HIV infections in persons 50-plus years of age (CDC 2006). Between 2001 and 2005, there were 186,203 new diagnoses of HIV in persons living in one of 33 states with well-established confidential HIV surveillance (CDC 2006). In 2001, 13.3% of these newly-infected individuals were 50-plus years of age. By 2005, this percentage had risen to 15.9% (an increase of nearly 20% from the 2001 estimate).

Increasing HIV/AIDS incidence and prevalence rates in older adults are disconcerting because, compared to their younger counterparts, older persons are more likely to be at advanced stages of the disease when first identified as living with HIV, progress to AIDS more rapidly, and have poorer medical prognoses and shorter periods of life expectancy (Carre et al. 1994; Justice and Weissman 1998; Nichols et al. 2002). HIV-infected older adults also experience poorer quality of life than younger persons due to the deleterious effects of comorbid health conditions associated with normal aging (e.g., diabetes, osteoarthritis, hypertension), naturally-occurring immunological senescence, cognitive decline, and harmful interactions of HAART with medications taken for other chronic health conditions (Nichols et al. 2002; Rainey 2002; Valcour and Paul 2006). Finally, HIV-infected older adults are at risk for experiencing multiple forms of stigma and discrimination, including AIDS-related phobia, ageism, and—for older adults who are gay or bisexual—homophobia (Siegel et al. 1998).

To date, HIV risk reduction interventions for persons living with HIV/AIDS have focused almost exclusively on younger persons (e.g., Gasiorowicz et al. 2005; Hoff et al. 2006; Kalichman et al. 1997). Given the challenging physical and mental health needs of older adults living with HIV/AIDS (e.g., lower knowledge about HIV-risk transmission behaviors, higher rates of comorbid health conditions) and because secondary risk reduction interventions developed primarily for younger persons living with HIV/AIDS may be inappropriate for HIV-infected older adults (e.g., they may not address physiologic changes experienced by aging persons, particularly women; Klein et al. 2001; Orel et al. 2005; Williams and Donnelly 2002), research that delineates rates and predictors of continued sexual risk behaviors in HIV-infected older adults is needed to inform the development of risk reduction interventions for this population.

Most research examining sexual risk behaviors in older adults has focused on HIV-seronegative persons (e.g., Abel and Werner 2003; Allison-Ottey et al. 1999; Kwiatkowski and Booth 2003; Maes and Louis 2003; Winningham et al. 2004); only a few studies have characterized sexual behavior in older adults already living with HIV/AIDS (e.g., Cooperman et al. 2007; Schable et al. 1996; Siegel et al. 2004). Schable et al. (1996) examined sexual behavior in 59 HIV-infected women who were 50 years of age or older at the time of their AIDS diagnosis and found that 55% had no sexual partners in the past year, 36% had one partner, and 9% had more than one partner. Data for condom use during these sexual encounters, however, were not available. Siegel et al. (2004) surveyed 59 racially-diverse HIV-infected gay/bisexual and heterosexual men who were at least 50 years old. When compared to African-American gay/bisexual men, a smaller percentage of White gay/bisexual men had engaged in unprotected sex since being diagnosed with HIV (22% vs. 67%) and within the previous six months (9% vs. 42%). Other apparent differences were observed between heterosexual African Americans and

gay/bisexual African Americans and Whites; however, because of sample size limitations, these tests lacked adequate power for observed differences to reach statistical significance.

Both studies described above were limited by their small sample sizes, which precluded the conduct of more sophisticated analyses to identify factors associated with risky sexual practices. Furthermore, neither study assessed relationships among sexual risk behaviors and psychosocial, cognitive, behavioral, and physical health factors that are known to be related to risk taking behaviors in younger HIV-infected persons (Crepaz and Marks 2002; Gonzalez et al. 2005) and that may predict risky sexual practices in older adults (e.g., Chesney et al. 2003; Heckman et al. 2002; Oursler et al. 2006; Pitts et al. 2005; Valcour and Paul 2006).

A more recent study using a larger sample examined rates and correlates of sexual activity and sexual risk behavior in HIV-negative and HIV-positive men who were at least 49 years of age (Cooperman et al. 2007). Of the 356 HIV-infected men in this sample, 72% had engaged in anal, vaginal, and/or oral sex in the past six months and 42% of the sexually active participants engaged in one or more sexual acts that were not condom protected. Psychological, physical, and behavioral correlates of sexual risk behavior were also examined. Sexual risk was defined as having engaged in sex without a condom, having multiple sexual partners, and/or paying or receiving money or drugs for sex in the past six months. In their multivariate model, greater alcohol consumption and the use of erectile dysfunction medications were associated with a greater likelihood of engaging in risky sexual acts. Because the definition of sexual risk that was used in their multivariate model included multiple acts that have traditionally been considered risky, it is difficult to determine which sexual acts (i.e., unprotected sex, multiple partners, or exchanging sex for drugs or money) were more influential. Furthermore, the authors' definition of sex included oral intercourse, which has much lower HIV transmission risk than anal or vaginal intercourse (Campo et al. 2006).

In response to the lack of information on sexual behaviors in HIV-infected older adults, this study explored patterns of sexual behavior in 290 HIV-infected persons 50 years of age or older. A second aim was to extend the work of Cooperman et al. (2007) and identify correlates of sexual activity and condom use behavior. This study was part of a randomized clinical trial (RCT) that evaluated the efficacy of two mental health group interventions for HIV-infected older adults. Sociodemographic, psychological, cognitive, and behavioral correlates of sexual activity and patterns of condom use behaviors were identified across three subgroups of participants: (1) gay and bisexual men (n = 136); (2) heterosexual men (n = 57); and (3) heterosexual women (n = 97). Participants were stratified across these three subgroups because patterns of sexual activity and condom use behavior may differ by group (e.g., unlike women, sexual risk behaviors in men may be related to their use of erectile dysfunction medications). Results from this descriptive/predictive study can guide the development of age- and gender-appropriate interventions to reduce HIV-transmission risk behaviors in middle-aged and older adults living with HIV/AIDS.

Methods

Recruitment and Eligibility Criteria

To recruit participants, AIDS service organizations (ASOs) in New York City, Columbus, OH, and Cincinnati, OH distributed recruitment brochures to their HIV-infected clients via regular mail, during face-to-face interactions involving clients and ASO staff, and by placing brochures in "high-traffic" areas of the facility (e.g., waiting rooms and reception areas). Recruitment procedures in New York City also included the distribution of study brochures to community based organizations and hospitals across the five boroughs, advertisements in HIV/AIDS publications and on e-mail listserves for HIV-infected older adults, and presentations to social

workers, HIV case managers, infectious disease physicians, and community outreach organizations.

All eligible participants satisfied the following inclusion criteria: (1) 50 years of age or older; (2) a self-reported diagnosis of HIV infection or AIDS; (3) a *Beck Depression Inventory-II* (BDI-II; Beck et al. 1996) score of 10 or higher at eligibility screening; (4) a score of 75 or greater on *the Modified Mini-Mental State Examination* (3MS; Teng and Chui 1987); and (5) voluntary provision of informed consent. Because the active intervention in this randomized clinical trial aimed to reduce depressive symptomatology in HIV-infected older adults, a minimum value of 10 on the BDI-II was used to ensure inclusion into the study of persons who were experiencing at least mild levels of depression and to prevent "floor effects" in intervention-outcome analyses. A cutoff score of 75 on the 3MS was used to screen out participants who might have dementia and thus have difficulty completing questionnaires and/or participating in intervention activities. Four hundred five individuals sought enrollment into the study between November 2004 and March 2007. Of these, 349 (86.2%) satisfied eligibility criteria. Of the 56 individuals excluded from the study, 53 did not meet the BDI-II screening criterion, and three scored below 75 on the 3MS. Three hundred ten of the eligible participants completed the study's pre-intervention assessment (New York City, $n = 242$; Columbus, OH, $n = 36$; and Cincinnati, OH, $n = 32$).

Data Collection Procedures

In a community-based setting (either their local ASO or a community health center), participants completed the study's computerized, pre-intervention questionnaire, which was administered using audio-computer-assisted self interview (A-CASI) assessment technology. The computer program provided a visual display and audio reading of each question and its response options. Participants used audio headsets to minimize potential interruptions in the assessment environment and to address potential literacy limitations. Past research suggests that the use of A-CASI increases participants' understanding of questions, honesty when answering sensitive questions, and the fidelity of skip patterns (Perlis et al. 2004).

Assessment Measures

The current study analyzed data collected at the RCT's pre-intervention assessment. The assessment required approximately 90 min to complete and participants received a $30 incentive payment for completing the assessment. Because the study's main experimental intervention was based on the Lazarus and Folkman (1984) Transactional Model of Stress and Coping, the study's assessment instrument consisted primarily of measures that assessed psychological distress, coping behaviors, coping self-efficacy, social support, and quality of life. The psychosocial, physiologic, and behavioral measures used in this study's statistical analyses were selected from the assessment battery because the existing empirical literature suggests that constructs assessed by these measures may be related to sexual activity and condom use behaviors in risky HIV-positive and HIV-negative persons (e.g., see Bancroft et al. 2005; Crepaz and Marks 2002; Martin and Knox 1997; Parsons et al. 2003; Van de Ven et al. 2005). A variable measuring cognitive functioning was also included in analyses because impaired cognition has been linked to risk-taking behavior (e.g., disinhibition, sexually inappropriate behaviors, and medication non-adherence; Black et al. 2005; Hinkin et al. 2002; Starkstein et al. 2004). Pre-intervention measures used in the current study included:

Geriatric depression scale (GDS; Yesavage et al. 1983)—The GDS consisted of 30 items, each of which used a "yes/no" response format. Items focused solely on cognitive and affective aspects of depression; no somatic items were included, thereby avoiding potential overlap between somatic symptoms of depression, HIV disease manifestation, and medication

side effects. Items were summed so that higher scores indicated greater depressive symptomatology (Min = 0, Max = 30, α = .92, current study).

Beck anxiety inventory (BAI; Beck et al. 1988)—The BAI consisted of 21 common symptoms of anxiety (α = .93, current study). Participants used a four-point scale to indicate if they experienced these symptoms in the previous month (0 = "Not at all" to 3 = "Severely—it bothered me a lot").

UCLA loneliness scale (Russell et al. 1978)—A 10-item version of the UCLA Loneliness Scale (sample item: "I lack companionship") used a four-point scale (1 = "Never" to 4 = "Often") to assess perceptions of loneliness. Items were summed, with higher scores indicating greater perceptions of loneliness (α = .86, current study).

Functional assessment of HIV infection (Cella et al. 1996)—Perceived physical well-being was assessed using the 13-item Physical Well-Being subscale (e.g., "I get tired easily"). Participants responded to each item using a five-point rating scale (0 = "Not at all" to 4 = "Very much"). After reverse coding appropriate items, responses were averaged (Min = 0, Max = 4), with higher scores indicating greater perceived physical health (α = .90, current study).

Modified mini-mental state examination (3MS; Teng and Chui 1987)—The 3MS measures abstract reasoning, executive functioning, and cognitive functioning and is more reliable and sensitive to the detection of dementia than the briefer Mini-Mental State Examination (Folstein et al. 1975). Scores on the 3MS range from 0 to 100, with lower scores suggesting greater cognitive compromise (range for the current study: Min = 75, Max = 100 due to study inclusion criteria).

Knowledge about living with HIV/AIDS (Carey et al. 1997)—Nineteen questions assessed participants' knowledge about living with HIV/AIDS (e.g., "Can a person with an undetectable viral load also have AIDS?"). Response options were "yes," "no," and "don't know." Items to which participants responded "don't know" were scored as incorrect. Correct responses were summed to yield a summary score ranging from 0–19 (Kuder-Richardson 20 = .73, current study).

Erectile dysfunction medication—Participants reported whether they were currently taking medication for erectile dysfunction (yes/no).

Alcohol/Drug Use—Participants indicated the number of days in the past 60 during which they used alcohol or various illicit drugs (e.g., marijuana, crack or cocaine, ecstasy or poppers, and injection drugs). From these data, five categories of substance use were created—(1) alcohol, (2) marijuana, (3) stimulants (i.e., crack/cocaine or amphetamines), (4) "club drugs" (i.e., ecstasy or poppers), and (5) injection drugs—in order to discriminate between those substances that are perceived to have excitatory (e.g., stimulants and club drugs) vs. inhibitory (e.g., alcohol) physiological effects on sexual libido (see NIDA Research Reports Index 2007).

Sexual behavior—Participants indicated the number of males and/or females with whom they had sex in the past three months. Previous studies have shown that participant reports of sexual activity and condom use are more reliable for 3- and 6-month retrospective recall periods than for 12-month recall periods (Jaccard et al. 2002). A 3-month, rather than 6-month, recall was used in the current study because a shorter recall period may ensure greater reporting accuracy among participants in this population whose memories may be compromised due to age-related cognitive decline and HIV-associated dementia.

In addition to reporting the number of sexual partners, the type of sexual contact (i.e., anal or vaginal), frequency of sexual behaviors, and the HIV serostatus of participants' partner(s) was assessed. Sexually active participants also reported whether they used condoms "often," "sometimes," "rarely," or "never" during intercourse. "Regular" condom use was defined as using condoms "often," whereas participants who used condoms "sometimes," "rarely," or "never" were defined as "irregular" condom users. Four sexual behavior groups were created based on participants' responses to these sexual behavior items: (1) not sexually active; (2) sex with regular condom use; (3) irregular condom use during intercourse with HIV seroconcordant partner(s); and (4) irregular condom use during intercourse with HIV serodiscordant partner (s) or partner(s) of unknown HIV serostatus.

Sociodemographic variables—A standard battery of sociodemographic variables assessed each participant's age, sex, race/ethnicity, education level, and annual income. In addition, participants reported their current relationship status as well as HIV-specific information (e.g., year they were diagnosed with HIV).

Data Analysis

Preliminary analyses found that participants recruited in New York City were more likely to be females and heterosexual males, more likely to be persons of color, and less likely to have received a high school diploma compared to participants recruited in Ohio (all P_s<.05). However, New York City and Ohio participants did not differ on rates of sexual behavior. Accordingly, data were aggregated across the three cities for subsequent analyses. Study site, however, was included as a covariate in all multivariate analyses.

Sexual behaviors were first characterized in the full sample. Additional analyses were conducted on each of three subgroups (gay/bisexual men, heterosexual men, and heterosexual women) because past research suggests that rates of sexual activity in HIV-infected older adults may differ across these groups (Cooperman et al. 2007; Schable et al. 1996; Siegel et al. 2004). For each subgroup, the proportion of participants who had sex in the past three months and the proportion of sexually active persons who used condoms irregularly during sexual intercourse was determined. Second, bivariate analyses were conducted to identify variables correlated with: (1) sexual activity (i.e., having sex in the past three months versus not having sex in the past three months) and (2) using condoms regularly versus irregularly among participants who were sexually active. Independent sample t-tests examined differences on continuous variables by sexual behavior group. For the continuous variables of age, cognitive functioning, and substance use, Wilcoxon rank-sum tests were used to address skew in sample distributions. Chi-square tests characterized associations among sexual behavior and nominal variables. Finally, a series of stepwise multiple logistic regression analyses were conducted to model sexual behavior (See Table 1 for bivariate correlations among variables entered into the regression models). As noted previously, study site was included as a covariate in all multivariate models to statistically account for between-site demographic differences. The *P*-value from the Wald chi-square test was used as the model inclusion and exclusion criteria. A *P*-value < .10 was set as the criterion to ensure the inclusion of potentially influential model variables (Hosmer and Lemshow 1989).

Results

Complete data on sexual behavior were available for 296 participants. Sexual behavior data were not provided by 14 participants. Participants who did not provide data on sexual behaviors were more likely to be heterosexual males. Six female participants who self-identified as lesbian or bisexual were also excluded from analyses because: (1) the small sample size precluded sufficient statistical power or generalizability and (2) it seemed imprudent to

combine lesbian/bisexual women with heterosexual women in analyses examining sexual behavior.

Of the 290 participants in the analytic sample, 62% (n = 180) were not sexually active in the past three months, 26% (n = 74) used condoms regularly when having sex, 7% (n = 19) used condoms irregularly but had sex with only HIV seroconcordant sexual partners, and 6% (n = 17) used condoms irregularly with at least one sexual partner of HIV-negative or unknown serostatus. These proportions, however, differed by sexual orientation and gender (see Table 2). Specifically, while only 36% (n = 49) of gay/bisexual men and 21% (n = 20) of heterosexual women were sexually active in the past three months, 72% (n = 41) of heterosexual men were sexually active during this same time period.

In the three sections that follow, sexual behavior is further described for each of the "gender by sexual orientation" subgroups (i.e., gay/bisexual men, heterosexual men, and heterosexual women). In addition, results of bivariate analyses and multivariate stepwise logistic regressions are presented for the criterion variables of sexual activity (active vs. abstinent) and condom use behavior (regular vs. irregular condom use). Sample size limitations precluded analyses of condom use behavior for persons who had unprotected sex with serodiscordant partners versus those who had unprotected sex with partners of HIV-negative or unknown serostatus. Consequently, irregular condom users were defined as those who had unprotected sex, regardless of sexual partners' HIV serostatus.

Gay/Bisexual Men

Sexual Activity vs. Abstinence—Thirty-six percent (n = 49) of gay and bisexual men had sex in the past three months. In bivariate analyses, being sexually active was associated with younger age, having lived with HIV for fewer years, less cognitive impairment, and greater use of alcohol, marijuana, stimulants, and club drugs in the past 60 days. In the multivariate analysis, younger age, living with HIV for fewer years and greater marijuana and club drug use were significantly associated with engaging in sex. Please see Tables 3 and 4.

Condom Use during Sexual Activities—Among gay and bisexual men who had sex in the past three months, 37% (n = 18) reported irregular condom use. Younger age, being single, and being less knowledgeable about living with HIV were all significantly associated with having unprotected sex in bivariate analyses. In the multivariate model, persons with lower HIV knowledge, better cognitive functioning, and lower annual incomes were more likely to have unprotected sex. Please see Tables 5 and 6.

Heterosexual Men

Sexual Activity vs. Abstinence—Seventy-two percent (n = 41) of heterosexual men were sexually active in the past three months. No variables were significantly related to sexual activity in bivariate analyses. In the multivariate model, however, greater anxiety and cognitive functioning were significantly associated with being sexually active. See Tables 3 and 4.

Condom Use during Sexual Activities—Twenty-seven percent (n = 11) of the sexually active heterosexual men used condoms irregularly in the past three months. In bivariate analyses, greater use of alcohol in the past 60 days was associated with having unprotected sex. In the multivariate analysis, increased loneliness was significantly associated with a greater likelihood of having engaged in sex without a condom. See Tables 5 and 6.

Heterosexual Women

Sexual Activity vs. Abstinence—Twenty-one percent (n = 20) of women were sexually active in the past three months. In both bivariate and multivariate analyses, women who were

sexually active reported higher annual incomes, greater perceived physical well-being, and being in a relationship. See Tables 3 and 4.

Condom Use during Sexual Activities—Of the 20 women who reported being sexually active in the past three months, 35% ($n = 7$) did not use condoms regularly. In bivariate analyses, irregular condom use was associated with being in a primary relationship and having less knowledge about living with HIV. In the multivariate analysis, only lower HIV knowledge was significantly associated with irregular condom use. See Tables 5 and 6.

Discussion

This study examined sexual behaviors in HIV-infected older adults who lived in three metropolitan areas of the Eastern and Midwestern United States. More than one-third of HIV-infected older adults in this sample were sexually active in the past three months with sexual activity being most common in heterosexual men, nearly three-fourths of whom reported engaging in sexual intercourse during this time span. A much lower percentage of gay/bisexual men (36%) and heterosexual women (21%) reported sexual activity. These differences in rates of sexual activity may be explained, in part, by the occurrence of sexual activity within primary relationships of study participants. Whereas 56% of gay/bisexual men and 60% of heterosexual women in primary relationships reported sexual abstinence in the past three months, only 26% of heterosexual men in relationships were not sexually active. One explanation is that within primary relationships of HIV infected older gay/bisexual men and heterosexual women, feelings of responsibility not to infect or reinfect one's sexual partner may result in a mutual agreement between partners to maintain sexual abstinence (Bogart et al. 2006; Siegel and Schrimshaw 2003). Another possible explanation for the discrepant rates of sexual activity observed across these subgroups is the use of libido-enhancing medications, primarily among heterosexual men. As adults age, hormonal changes may decrease sexual libido (e.g., erectile dysfunction [ED] in men and decreased vaginal lubrication in women that can make sexual intercourse more painful and less desirable; Hillman 2000). Medications such as Viagra®, Cialis®, and Levitra® have become popularized in the media as a means for older males to combat these age-related physiological changes. In the current study, the use of ED medications was associated with male sexual activity, with 26% of heterosexual men and a slightly lower 15% of gay/bisexual men reporting current use of ED medications.

A non-trivial proportion of sexually active persons (33%) engaged in unprotected intercourse with one or more partners. In the full sample, heterosexual women appeared to be the most protective, with only 7% reporting irregular condom use during sexual intercourse compared to 14% of gay/bisexual men and 20% of heterosexual men. However, among the sexually active participants, heterosexual men were the most frequent practitioners of safer sex; only one-fourth of sexually active heterosexual men used condoms irregularly compared to 37% of gay/bisexual men and 35% of heterosexual women. Acceptance of traditional gender roles, which may be particularly salient in older cohorts, and an imbalance of sexual power within relationships that favors heterosexual males may help to explain these differences (e.g., Dancy 1996; Gomez and Van Oss Marin 1996).

Pulerwitz et al. (2002) measured the association between heterosexual women's sexual power —i.e., their ability to negotiate the occurrence of sexual acts and use of condoms during sex —and condom use and found that lower sexual power was related to irregular condom use even after controlling for demographic variables, knowledge of sexually transmitted infections, condom attitudes, peer support, and condom self-efficacy. Longshore et al. (2006) noted that sexual self-efficacy is a predictor of intentions to engage in safe sex for heterosexual women but not men, further supporting the hypothesis that the acquisition of sexual power by women in heterosexual relationships may facilitate safer sex practices, but heterosexual men need not

feel self-efficacious to initiate condom use because they already possess the sexual power. Moreover, it has been found that the occurrence of physical and sexual abuse within close relationships may increase the likelihood that the victim (i.e., the powerless) will engage in unprotected intercourse with the abuser (i.e., the powerful; Bogart et al. 2005). Though fewer studies have examined sexual power-differentials in relationships of men who have sex with men (MSM), Kippax and Smith (2001) note that within western societies, these power dynamics do exist, with insertive acts viewed as assertions of dominance and receptive acts emblematic of submission. Murray and Adam (2001) have also pointed out that HIV-infected older MSM desire youth and intimacy but lack assertiveness in sexual relationships. As a result, they are willing to acquiesce to partners' requests to engage in unprotected sex for fear of losing their partners and remaining single and celibate. Because participants in the current study were not asked about perceived sexual power in relationships, nor were gay/bisexual participants instructed to discriminate between occasions of receptive or insertive anal intercourse, data are unavailable to corroborate these hypotheses. Future studies of sexual behavior in HIV-infected older adults should measure relationship power as well as sexual relationship dynamics.

It is difficult to compare rates of sexual activity and condom use in the current study to those observed in other studies of HIV-infected older adults because retrospective recall periods for, and definitions of, sexual behavior differ across studies. For example, Cooperman et al. (2007) found that 72% of HIV-infected older men (both heterosexual and MSM) engaged in sexual intercourse—anal, *oral*, or vaginal—with at least one partner in the *previous six months*. Forty-two percent of these sexually active persons engaged in sex without a condom during this same time span. In a study by Schable et al. (1996), 45% of HIV-infected older women had engaged in sex in the *previous year*. While the proportions of persons engaging in sexual activity and failing to use condoms regularly in the Cooperman et al. and Schable et al. studies exceed those observed in the current study, this may be related to the longer recall periods implemented in these studies (i.e., 6 months and 1 year compared to 3 months in the current study). Moreover, the expanded definition of sexual intercourse in Cooperman et al., which included oral sex, likely contributes to the higher rates of sexual activity and irregular condom use observed in their study. The field could benefit from more uniform definitions of sexual behaviors that would help to facilitate careful cross-study comparisons of rates and correlates of sexual activity and condom use behavior.

In general, sexually active persons in the current study tended to have greater perceived health and/or cognitive functioning, though relatively small effect sizes render the clinical implications of these findings somewhat tenuous. Furthermore, because a global measure of cognitive functioning was used, it is likely that constructs considered to be proxy measures of physical health (e.g., psychomotor processing, motor functioning, and memory) were assessed. It is possible that healthier individuals have more "opportunities" to engage in sex, whereas less healthy persons, depending on the extent of their poor health, may face physical or cognitive challenges that render them less likely to have sex, diminish their sexual libidos, and/or make them less "desirable" to prospective sexual partners. An alternative interpretation is that healthier individuals perceive themselves to be less infectious, particularly if their viral load levels are "undetectable," in which case they may believe that they are less likely to transmit HIV to their sexual partners (Crepaz and Marks 2002; Stolte et al. 2004).

Approximately 45% of participants in the current study consumed alcohol and 34% used illicit drugs on at least one occasion in the past 60 days. Rates of substance use, however, differed across subgroups of participants. Sixty-three percent of gay/bisexual men consumed at least some alcohol in the past two months (Mean days = 10.7) compared to 46% of heterosexual men (Mean days = 7.0) and 19% of heterosexual women (Mean days = 1.4). In addition, 45% of gay/bisexual men used illicit drugs in the past two months compared to 39% of heterosexual men and 16% of heterosexual women. Alcohol and/or drug use was also related to sexual

activity in male, but not female, participants. Specifically, marijuana and club drug use was greater in sexually active gay/bisexual men compared to their sexually abstinent counterparts, while alcohol use was associated with sexual activity in heterosexual men. A number of reasons could explain the lack of association between substance use and sexual activity in female participants. First, whereas substance use may lead to risky sexual behavior in heterosexual men, females' sexual risk may be associated with the substance use of their male partners (Kalichman et al. 2007), providing further evidence of the sexual power differential in some heterosexual relationships. Vanable et al. (2004) also found that the association between alcohol use and unprotected sex may only be present in non-primary relationships. In the current study, sexual activity and irregular condom use occurred more frequently within female participants' primary relationships. It is thus possible that alcohol or other substances played less of a factor during sexual intimacy for women in this study. Finally, quantity of substance use may be a better predictor of sexual behaviors than frequency of use (Kalichman et al. 2007). Women in this cohort may have "aged" out of activities such as binge drinking to a greater extent than male participants (Stall 1987), which may also explain the low rates and frequencies of alcohol and drug use reported by females.

Among sexually active participants, irregular condom use was related to having less knowledge about living with HIV/AIDS, particularly in gay/bisexual men and women. This finding is consistent with past research that reported associations between AIDS misconceptions and unsafe sexual practices in samples of HIV-positive younger adults and HIV-negative older adults (Kalichman et al. 2006; Maes and Louis 2003). These findings point to the need for continued secondary intervention and HIV education directed toward older infected adults.

Correlates of sexual activity and condom use behavior also differed by participant gender and sexual orientation, underscoring the importance of not treating HIV-infected older adults as one large homogeneous group. For example, whereas gay/bisexual men were more likely to have unprotected sex if they were not in a primary relationship, heterosexual women who were in primary relationships were more likely to engage in unprotected sex. Risk-reduction interventions for HIV-infected older adults should consider these differences when targeting an audience. For example, interventions with HIV-infected gay/bisexual men should consider placing greater emphasis on reducing risky behaviors with casual sexual partners, whereas interventions for HIV-infected older heterosexual women should place greater emphasis on factors within the context of primary relationships (e.g., condom use self-efficacy and improving risk reduction negotiation skills). The promotion of coping strategies for heterosexual men with psychological discord—particularly feelings of anxiety and loneliness—may also be a salient intervention topic. Counseling around the use of marijuana and club drugs for gay/bisexual men and alcohol for heterosexual men, particularly as it relates to risk taking behaviors, could be useful to HIV-infected older males. Finally, all HIV-infected older adults may benefit from improved HIV education to correct misinformation about infectivity and the risk of transmission to one's sexual partners.

This study had several limitations in addition to those noted previously. Because participants were sampled from three cities in the Eastern and Midwestern United States, the extent to which findings generalize to other geographic regions (or non-metropolitan areas) of the U.S. is unknown. Moreover, an overwhelming majority of participants (including 64% of gay/bisexual men, 82% of heterosexual men, and 94% of heterosexual women) were from New York City. It is also notable that heterosexual men and women were almost exclusively members of racial/ethnic minority groups (most notably African-American), further reflecting the between-site differences. Though we controlled for study site in multivariate analyses, findings may more accurately portray the unique characteristics and experiences of HIV-infected older adults who live in an urban HIV epicenter of the U.S., and this is particularly true for heterosexual men and women. Additionally, this sample included HIV-infected older adults who reported at least

some depressive symptoms and had reasonably intact cognitive functioning, which may further limit the generalizability of findings. Future studies of sexual behaviors in HIV-infected older adults should use larger and more inclusive samples of all older adults living with HIV/AIDS (e.g., individuals who more accurately represent the characteristic profiles of this population).

A second limitation is that all data were collected through self-report measures. It is possible that some participants under-reported socially-stigmatizing behaviors such as alcohol/drug use and unprotected sexual activities. However, all possible precautions were taken to ensure participant privacy and confidentiality when completing questionnaires (e.g., use of A-CASI technology and provision of private rooms to complete questionnaires), thus attenuating effects associated with social desirability.

A third limitation is that some subgroup analyses may have lacked adequate statistical power to detect differences, a limitation noted in previous studies that have been conducted with HIV-infected older adults (e.g., Schable et al. 1996; Siegel et al. 2004). For example, only 20 heterosexual women were sexually active, seven of whom engaged in unprotected sexual intercourse. As a result, associations, or lack of, between variables of interest and condom use behavior should be interpreted judiciously and caution taken when generalizing to the greater population of HIV-infected older heterosexual women.

A fourth limitation is the lack of specificity for key predictor variables such as cognitive functioning and substance use. Because this study was part of a larger clinical trial focusing on the amelioration of depressive symptomatology in HIV-infected older adults, rather than on sexual behaviors specifically, only gross measures of cognitive functioning and substance use were utilized, thus precluding more sophisticated interpretations of the findings. Future studies should more carefully examine cognitive functioning as it relates to sexual behaviors in HIV-infected older adults. Specifically, the use of cognitive tasks that are sensitive enough to discriminate between mildly demented and non-impaired persons and that measure executive functioning and decision making could shed additional light on the relationships of neural deficits and risky sexual behavior. Data on substance use in this population should more precisely detail the function these substances serve in sexual activity as well as delineating the quantity, in addition to frequency, of consumption. For example, are substances being taken for the purpose of increasing libido or disinhibiting oneself in order to engage in sexual activity, or is sexual activity and risky behavior a consequence of intoxication?

Future studies of sexual behaviors in HIV-infected older adults should also use greater specificity on key outcome measures, namely, sexual risk behaviors. In particular, future studies would benefit from the collection of data that will allow them to analytically differentiate between receptive and insertive anal sex acts among gay/bisexual participants, given the potential power dynamics associated with these sexual practices.

Finally, because of the study's cross-sectional design, no cause-effect inferences can be made. Future studies of this topic should utilize longitudinal designs and asses a greater array of psychosocial and physiologic factors associated with sexual activity in this population (e.g., factors specific to condom use attitudes and safer sex peer norms). These longitudinal studies should also explore in greater detail the temporal order of psychosocial and physiologic factors and sexual activity in this population (e.g., Does greater perceived physical health increase one's likelihood of engaging in sex, or do individuals who are sexually active believe that they are in better health?).

In spite of these limitations, this study provides preliminary data on rates and correlates of sexual behavior in HIV-infected older adults. As the population of middle-aged and older adults living with HIV/AIDS in the United States continues to rise, secondary risk-reduction interventions for HIV-infected older persons are urgently needed to help mitigate the spread

of HIV. Findings from this study suggest that not only should these interventions be age-appropriate, but they should also be tailored to one's gender and sexual orientation if they are to effectively reduce risky sexual behavior in the increasingly vulnerable and growing population of older adults living with HIV/AIDS.

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Table 1

Bivariate correlations among variables entered into logistic regression models[a]

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Age	1																
2. Education	.07	1															
3. Annual income	.16**	.14*	1														
4. Relationship status	−.05	.06	.09	1													
5. Years positive	.03	.00	.02	.04	1												
6. Depression	−.06	.08	−.09	.01	−.06	1											
7. Anxiety	.04	−.08	−.03	−.02	−.05	.53**	1										
8. Loneliness	−.02	.09	−.10	−.10	−.04	.62**	.31**	1									
9. Physical well-being	−.02	−.03	.06	−.01	.03	−.59**	−.71**	−.44**	1								
10. Cognitive functioning	−.04	.40**	.08	.04	.06	.06	−.14*	.03	.03	1							
11. Alcohol use	−.01	.09	.10	.14*	.09	.01	−.14*	.03	.10	.22**	1						
12. Marijuana use	−.08	.08	.11	.05	−.08	.16**	.06	.14*	−.08	.17**	.19**	1					
13. Stimulant use	−.11	.03	−.09	.08	−.15*	.05	−.06	.01	.06	.01	.19**	.24**	1				
14. Club drug use	−.03	.08	.13*	.02	−.12*	.01	−.09	.08	.08	.05	.19**	.14*	.07	1			
15. Injection drug use	.02	−.03	.07	.06	.03	−.01	.02	−.03	.02	−.02	.15**	.03	.05	.36**	1		
16. ED medication	−.01	.08	.10	.02	.00	.01	−.03	.01	−.02	.02	−.01	.08	−.05	.08	−.01	1	
17. HIV knowledge	.01	.10	.07	.11	.15*	.02	−.01	−.13*	−.07	.25**	.03	.04	−.11	.01	.03	−.05	1

[a] Race/ethnicity was excluded in the correlation matrix because it was defined as a three-category nominal variable

* $P < .05$,

** $P < .01$

Table 2

Sexual behavior in the full sample and by gender/sexual orientation subgroups

	Abstinent ***n* (%)**	**Regular condom use** ***n* (%)**	**Irregular condom use, seroconcordant partner(s)** ***n* (%)**	**Irregular condom use, serodiscordant partner(s)** ***n* (%)**
Full sample (n = 290)[a]	180 (62%)	74 (26%)	19 (7%)	17 (6%)
Gay/bisexual men (n = 136)[a]	87 (64%)	31 (23%)	9 (7%)	9 (7%)
Heterosexual men (n = 57)[a]	16 (28%)	30 (53%)	6 (11%)	5 (9%)
Heterosexual women (n = 97)[a]	77 (79%)	13 (13%)	4 (4%)	3 (3%)

[a] Percentages do not sum to 100% due to rounding error

Omnibus χ^2 (6, n = 290) = 42.25, P<.01

Table 3

Characteristics of sexually active versus abstinent participants

Variable	Full sample		Gay/bisexual men		Heterosexual men		Heterosexual women	
	n = 290		*n* = 136		*n* = 57		*n* = 97	
	No sex = 180[a]	Sex = 110[a]	No sex = 87[a]	Sex = 49[a]	No sex = 16[a]	Sex = 41[a]	No sex = 77[a]	Sex = 20[a]
Socio-demographic								
Age[b]	57.1 (5.6)*	55.1 (3.1)	58.0 (6.1)*	55.0 (3.1)	55.0 (3.3)	55.4 (3.2)	56.6 (5.2)	54.5 (2.8)
Race/ethnicity								
White, non-hispanic	64% (56)	36% (31)	65% (52)	35% (28)	60% (3)	40% (2)	50% (1)	50% (1)
African-American	58% (84)	42% (61)	62% (21)	38% (13)	25% (11)	75% (33)	78% (52)	22% (15)
Other	69% (40)	31% (18)	64% (14)	36% (18)	25% (2)	75% (6)	86% (24)	14% (4)
Education								
<High school	63% (44)	37% (26)	64% (7)	36% (4)	29% (6)	71% (15)	82% (31)	18% (7)
≥High school	62% (136)	38% (84)	64% (80)	36% (45)	28% (10)	72% (26)	78% (46)	22% (13)
Annual household income								
≤$20,000	64% (161)	36% (92)	65% (73)	35% (39)	28% (14)	72% (37)	82% (74)*	18% (16)
>$20,000	53% (19)	47% (17)	58% (14)	42% (10)	40% (2)	60% (3)	43% (3)	57% (4)
Relationship status								
Not in a relationship	67% (143)**	33% (72)	67% (67)	33% (33)	29% (11)	71% (27)	84% (65)*	16% (12)
Currently in a relationship	49% (37)	51% (38)	56% (20)	44% (16)	26% (5)	74% (14)	60% (12)	40% (8)
Years positive	13.6 (5.2)	12.9 (5.5)	15.2 (5.2)*	13.1 (6.6)	13.4 (4.9)	12.8 (4.5)	11.9 (4.9)	12.4 (4.6)
Social-psychological/health/cognitive								
Depression score	12.7 (8.0)	12.2 (8.0)	14.7 (8.2)	13.2 (8.1)	11.9 (7.6)	11.5 (7.8)	10.6 (7.4)	11.0 (8.4)
Anxiety score	18.4 (11.8)	16.3 (10.3)	17.1 (10.5)	15.9 (9.0)	14.0 (12.0)	16.6 (11.3)	21.0 (12.6)	17.1 (11.7)
Loneliness score	11.9 (5.8)	10.6 (6.2)	13.1 (6.3)	11.9 (6.4)	11.1 (5.8)	9.8 (6.0)	10.7 (5.1)	8.9 (5.8)
Perceived physical well-being	2.6 (.8)**	2.9 (.7)	2.6 (.8)	2.8 (.7)	2.9 (.7)	2.9 (.7)	2.6 (.8)*	3.1 (.6)
Cognitive functioning[b]	92.7 (5.3)*	94.0 (5.2)	94.6 (4.3)*	95.8 (4.1)	90.3 (6.4)	93.1 (5.2)	90.1 (5.4)	91.1 (6.3)
Behavioral/HIV knowledge								
Substance use in the past 2 months[b]								
Alcohol	4.7 (12.2)**	9.7 (16.7)	8.0 (15.6)*	13.8 (20.3)	2.1 (6.0)	8.9 (14.5)	1.4 (6.5)	1.5 (3.3)
Marijuana	2.5 (9.6)**	8.8 (17.8)	3.9 (11.9)**	13.6 (21.1)	1.8 (5.0)	6.9 (16.3)	1.0 (6.9)	.7 (1.7)
Stimulants	1.2 (5.3)**	2.8 (8.5)	.8 (3.2)*	1.5 (4.4)	1.7 (6.0)	4.3 (10.6)	1.5 (6.9)	3.1 (11.2)
Club drugs	.3 (1.4)**	1.4 (4.2)	.6 (2.0)**	2.4 (5.1)	.0 (.0)	.9 (3.9)	.0 (.0)	.0 (.0)
Injection drugs	.0 (.6)*	.2 (1.1)	.0 (.0)	.2 (1.1)	.0 (.0)	.3 (1.4)	.1 (.9)	.0 (.0)
Current ED medication user[c]								
No	57% (89)**	43% (67)	66% (75)	34% (39)	33% (14)	67% (28)	n/a	n/a
Yes	36% (13)	64% (23)	52% (11)	48% (10)	13% (2)	87% (13)	n/a	n/a
HIV knowledge score	14.0 (2.8)	14.0 (3.3)	14.5 (2.7)	14.5 (2.8)	13.3 (2.4)	13.5 (3.3)	13.5 (2.9)	13.7 (4.2)

[a] Data presented as M(SD) for continuous variables and %(n) for categorical variables

[b] Used Wilcoxon Rank-Sum Test

[c] Full sample percentages exclude female respondents

* $P < .05$,

** $P < .01$

Table 4

Final model statistics for backward stepwise regressions modeling sexual activity vs. abstinence (dependent variable: sex = 1, no sex = 0)

Variable	Wald's χ^2 (*df*)	Odds ratio	95% CI
Full sample (*n* = 267)[a,b]			
Age	6.70 (1)	.92	.86, .98
Relationship status (Single = 0, married or partnered = 1)	6.42 (1)	2.21	1.20, 4.08
Physical well-being	7.52 (1)	1.74	1.17, 2.59
Marijuana use	10.20 (1)	1.04	1.02, 1.07
Club drug use	6.25 (1)	1.17	1.04, 1.32
Gay/bisexual men (*n* = 130)[a,c]			
Age	6.62 (1)	.88	.79, .97
Years positive	4.16 (1)	.92	.86, .99
Marijuana use	6.17 (1)	1.04	1.01, 1.06
Club drug use	4.33 (1)	1.17	1.01, 1.35
Heterosexual men (*n* = 53)[a,d]			
Anxiety	4.27 (1)	1.08	1.00, 1.17
Cognitive functioning	4.58 (1)	1.16	1.01, 1.33
Women (*n* = 84)[a,e]			
Annual income (≤$20,000 = 0, >$20,000 = 1)	4.78 (1)	9.07	1.26, 65.44
Relationship status (single = 0, married or partnered = 1)	4.22 (1)	4.36	1.07, 17.74
Physical well-being	5.17 (1)	4.56	1.23, 16.85

[a] Reduced sample size due to missing data

[b] Model variables significant at the *P* <.10 level included: Years Positive, OR(95%CI) = .95(.90, 1.01); Cognitive Functioning, OR(95%CI) = 1.06(.99, 1.12)

[c] Model variables significant at the *P*<.10 level included: Loneliness, OR(95%CI) = .95(.88, 1.01); Cognitive Functioning, OR(95%CI) = 1.10(.99, 1.22)

[d] Model variables significant at the *P* < .10 level included: Alcohol Use, OR(95%CI) = 1.10(.99, 1.22); Erectile Dysfunction Medication Use (no = 0, yes = 1), OR(95%CI) = 4.32(.74, 25.44)

[e] Model variables significant at the *P*<.10 level included: Depression, OR(95%CI) = 1.11 (.99, 1.24)

Table 5

Characteristics of participants who reported regular versus irregular condom use

Variable	Full sample		Gay/bisexual men		Heterosexual men		Heterosexual women	
	n = 110		*n* = 49		*n* = 41		*n* = 20	
	Regular = 74[a]	Irregular = 36[a]	Regular = 31[a]	Irregular = 18[a]	Regular = 30[a]	Irregular = 11[a]	Regular = 13[a]	Irregular = 7[a]
Sociodemographic								
Age[b]	55.3 (3.2)	54.6 (2.9)	55.7 (3.4)*	53.8 (2.3)	55.1 (3.2)	56.3 (3.2)	54.5 (2.8)	54.3 (2.9)
Race/ethnicity								
White, non-hispanic	65% (20)	35% (11)	64% (18)	36% (10)	100% (2)	0% (0)	0% (0)	100% (1)
African-American	64% (39)	36% (22)	54% (7)	46% (6)	67% (22)	33% (11)	67% (10)	33% (5)
Other	83% (15)	17% (3)	75% (6)	25% (2)	100% (6)	0% (0)	75% (3)	25% (1)
Education								
<High school	62% (16)	38% (10)	50% (2)	50% (2)	67% (10)	33% (5)	57% (4)	43% (3)
≥High school	69% (58)	31% (26)	64% (29)	36% (16)	77% (20)	23% (6)	69% (9)	31% (4)
Annual household income								
≤$20,000	64% (59)	36% (33)	59% (23)	41% (16)	70% (26)	30% (11)	63% (10)	37% (6)
>$20,000	82% (14)	18% (3)	80% (8)	20% (2)	100% (3)	0% (0)	75% (3)	25% (1)
Relationship status								
Not in a relationship	64% (46)	36% (26)	52% (17)*	48% (16)	70% (19)	30% (8)	83% (10)*	17% (2)
Currently in a relationship	74% (28)	26% (10)	88% (14)	12% (2)	79% (11)	21% (3)	38% (3)	62% (5)
Years Positive	13.1 (5.4)	12.5 (5.9)	14.0 (6.6)	11.6 (6.5)	12.4 (4.6)	14.2 (3.8)	12.5 (3.5)	12.3 (6.8)
Social-psychological/health/cognitive								
Depression score	11.4 (8.1)	13.8 (7.9)	12.6 (8.3)	14.4 (7.9)	11.0 (7.9)	12.9 (7.9)	9.4 (8.1)	13.6 (8.8)
Anxiety score	15.4 (10.2)	18.3 (10.5)	14.0 (8.0)	19.0 (9.8)	15.8 (11.1)	18.7 (12.0)	17.9 (12.5)	15.3 (10.7)
Loneliness score	9.6 (6.2)*	12.6 (5.7)	10.9 (6.4)	13.6 (6.1)	8.8 (6.4)	12.5 (3.9)	8.3 (5.3)	9.9 (7.0)
Perceived physical well-being	3.0 (.7)	2.8 (.6)	2.9 (.7)	2.7 (.7)	2.9 (.7)	2.9 (.6)	3.1 (.8)	3.2 (.2)
Cognitive functioning[b]	94.3 (4.5)	93.4 (6.5)	95.5 (3.8)	96.4 (4.6)	93.9 (4.3)	91.1 (7.0)	92.1 (6.0)	89.4 (6.8)
Behavioral/HIV knowledge								
Substance use in the past 2 months[b]								
Alcohol	9.2 (16.8)	10.8 (16.8)	14.4 (20.2)	12.7 (20.7)	7.2 (14.7)*	13.7 (13.4)	1.5 (3.2)	1.4 (3.8)
Marijuana	6.3 (14.5)*	13.9 (22.7)	10.1 (17.6)	19.7 (25.6)	4.8 (13.2)	12.6 (22.5)	.5 (1.5)	1.0 (2.2)
Stimulants	1.6 (5.8)*	5.4 (12.2)	.9 (3.6)	2.5 (5.4)	2.9 (8.1)	8.2 (15.2)	.3 (1.1)	8.3 (18.6)
Club Drugs	.7 (2.5)	2.8 (6.3)	1.7 (3.6)	3.7 (6.8)	.0 (.2)	3.2 (7.2)	.0 (.0)	.0 (.0)
Injection Drugs	.2 (1.0)	.2 (1.3)	.3 (1.4)	.0 (.0)	.2 (.8)	.7 (2.4)	.0 (.0)	.0 (.0)
Current ED medication user[c]								
No	70% (47)	30% (20)	69% (27)	31% (12)	71% (20)	29% (8)	n/a	n/a
Yes	61% (14)	39% (9)	40% (4)	60% (6)	77% (10)	23% (3)	n/a	n/a
HIV knowledge score	14.6 (2.8)**	12.5 (3.8)	15.6 (1.9)**	12.8 (3.1)	13.5 (3.4)	13.3 (3.4)	14.9 (2.5)*	10.7 (5.9)

[a] Data presented as M(SD) for continuous variables and %(n) for categorical variables

[b] Used Wilcoxon Rank-Sum Test

[c] Full sample percentages exclude female respondents

* $P < .05$,

** $P < .01$

Table 6

Final model statistics for forward stepwise regressions modeling condom use behavior (dependent variable: irregular condom use = 1, regular condom use = 0)

Variable	Wald's χ^2 (*df*)	Odds ratio	95% CI
Full sample (*n* = 109)[a,b]			
HIV knowledge	5.30 (1)	.84	.73, .98
Club drug use	4.83 (1)	1.20	1.02, 1.41
Gay/bisexual men (*n* = 48)[a,c]			
Annual income (≤$20,000 = 0, >$20,000 = 1)	4.19 (1)	.02	.01, .85
HIV knowledge	8.46 (1)	.39	.20, .73
Cognitive functioning	6.27 (1)	1.44	1.08, 1.92
Heterosexual men (*n* = 41)			
Loneliness	4.28 (1)	1.20	1.01, 1.43
Women (*n* = 20)[d]			
HIV knowledge	3.92 (1)	.74	.55, .99

[a] Reduced sample size due to missing data

[b] Model variables significant at the *P* < .10 level included: Income (≤$20,000 = 0, >$20,000 = 1), OR(95%CI) = .18(.03, 1.06); Marijuana Use, OR(95% CI) = 1.03(.99, 1.05)

[c] Model variables significant at the *P*<.10 level included: Age, OR(95%CI) = .77(.56, 1.06)

[d] Model variables significant at the *P*<.10 level included: Relationship Status (single = 0, married or partnered = 1), OR(95%CI) = 14.87(.96, 229.18)