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Changes in sexual behavior of HIV-infected older adults enrolled in a clinical trial of standalone group psychotherapies targeting depression

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Abstract

By 2015, one-half of all HIV-positive persons in the U.S. will be 50-plus years of age, and as many as 30% of older adults living with HIV/AIDS continue to engage in unprotected sexual intercourse. Contemporary positive prevention models often include mental health treatment as a key component of HIV prevention interventions. This secondary data analysis characterized longitudinal patterns of sexual behavior in HIV-positive older adults enrolled in a randomized controlled trial of group mental health interventions and assessed the efficacy of psychosocial treatments that targeted depression to reduce sexual risk behavior. Participants were 295 HIV-positive adults 50 years of age experiencing mild to severe depressive symptoms, randomized to one of three study conditions: a 12-session coping improvement group intervention, a 12-session interpersonal support group intervention, or individual therapy upon request. Approximately one-fifth of participants reported one or more occasions of unprotected anal or vaginal intercourse with HIV-negative sexual partners or persons of unknown HIV serostatus over the study period. Changes in sexual behavior did not vary by intervention condition, indicating that standalone treatments that target and reduce depression may be insufficient to reduce sexual risk behavior in depressed HIV-positive older adults.

Keywords

HIV/AIDS; Aging; Depression; Clinical Trial; Unprotected Sex

Introduction

By 2015, one-half of all HIV-positive persons in the U.S. will be 50-plus years of age [1]. Prior research utilizing convenience samples of community-dwelling HIV-positive older

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adults found that 13% to 30% continue to engage in unprotected anal and/or vaginal sex [2-5]. These patterns of continued risky sex can transmit HIV to HIV-seronegative sex partners and/or result in HIV-positive older adults acquiring other sexually transmitted infections, which can complicate medical care and increase HIV infectiousness [6,7].

Contemporary positive prevention models posit that efficacious mental health treatments, and subsequent psychological symptom reductions, may reduce new HIV infections through two pathways: (i) reductions in sexual risk behavior, and (ii) improved HIV medication adherence, leading to reductions in HIV viral load and decreased HIV infectiousness [8-10]. Several cross-sectional studies examining rates of sexual risk behavior in HIV-positive older adults [2-5,11-15] found that heightened levels of negative mood states, such as depression and loneliness, are associated with increased sexual risk taking [3,4,14]. These studies raise the possibility that efficacious depression treatments may lead to subsequent reductions in sexual risk behavior. However, due to the cross-sectional nature of their designs, these published studies could not investigate this hypothesis.

Recently, Tsai and colleagues [16] examined the efficacy of a standalone psychopharmacological treatment for depression (i.e., fluoxetine) to reduce sexual risk behavior in homeless and marginally housed HIV-positive middle-aged adults. This trial demonstrated the superiority of fluoxetine to community mental health referral in reducing depressive symptoms over nine months of follow-up [17]. Secondary analyses, however, found no differential changes in sexual risk behavior between the two conditions [16].

The extant literature contains few longitudinal studies of sexual behavior in HIV-positive older adults, and no study has examined the efficacy of standalone *psychosocial* treatments for depression to reduce sexual risk behavior in this population. The current study sought to fill these gaps by examining longitudinal changes in sexual behavior in a sample of 295 HIV-positive older adults enrolled in a randomized controlled trial that tested if a coping improvement group intervention, an interpersonal support group intervention, or individual therapy upon request reduced depressive symptoms in HIV-positive persons 50 years of age or older [18]. Intervention outcome analyses in the parent study found that the coping improvement and interpersonal support group interventions produced greater reductions in depressive symptoms compared to individual therapy upon request over 12 months of follow-up, with effect sizes ranging from small to medium based on Cohen's "d." The coping improvement and interpersonal support group interventions were statistically comparable in depressive symptom severity at all follow-up assessments. The current study characterized rates of sexual behavior over time in participants in the clinical trial and evaluated the efficacy of standalone psychosocial treatments for depression to reduce sexual risk behavior in HIV-positive older adults.

Methods

Participants and Procedures

Participants in this three-arm randomized controlled trial were recruited through AIDS service, gerontological, and health-care organizations in New York City, Cincinnati, and Columbus, OH. Interested participants completed an in-person mental health and cognitive

screening that included the Beck Depression Inventory-II (BDI-II) [19] and a global cognitive screening measure (Modified Mini-Mental State Examination [3MS]) [20]. Eligible participants satisfied the following study inclusion criteria: (i) 50 years of age, (ii) living with HIV/AIDS, (iii) a BDI-II score ≤ 10 at screening, and (iv) a 3MS score ≥ 75 at screening. BDI-II and 3MS criteria ensured that participants had at least a minimal number of depressive symptoms that could respond to treatment and adequate cognitive abilities to complete study assessments and, if applicable, participate in group intervention activities. A total of 405 persons completed eligibility screenings, 295 of whom satisfied eligibility requirements and were randomized to one of three study conditions. The study protocol was approved by each study site's IRB. Additional methodological details have been published elsewhere [4,18].

Intervention Conditions

Participants were recruited in blocks of 30 (e.g., 30 men who have sex with men, 30 heterosexual men, or 30 women) and were then randomized to one of three intervention conditions: coping improvement group intervention ($n = 104$), interpersonal support group intervention ($n = 105$), or individual therapy upon request (ITUR; $n = 86$). Our previous formative research indicated that HIV-positive older adults were hesitant to participate in mental health group interventions if groups were heterogeneous in sexual orientation [21]. The final two waves of recruitment obtained 20 participants per block who were randomized to one of the two active group interventions, resulting in fewer ITUR participants. Both group interventions (described below) consisted of 12 weekly intervention sessions led by two facilitators with Master's-level training in psychology or social work. Intervention sessions lasted 90 minutes and were held in AIDS service organizations located in participants' communities.

Coping Improvement Group Intervention—The 12-session, coping improvement group intervention was based on the Lazarus and Folkman Transactional Model of Stress and Coping [22]. The intervention's 12 sessions addressed the following topics: participant-facilitator introductions and participants' sharing of personal histories (Sessions 1 and 2); appraisal and changeability of stressors related to one's HIV infection (e.g., treatment side effects) and stressors related to normal aging (e.g., comorbid health conditions; Sessions 3 and 4); developing and implementing adaptive problem- and emotion-focused coping skills (Sessions 5 through 9); optimizing coping efforts through the use of interpersonal supports (Sessions 10 and 11); and termination issues and the voluntary sharing of personal contact information (e.g., e-mail addresses, telephone numbers; Session 12). Although sexual safety was not a pre-determined topic of the curriculum, participants could identify sexual safety, or lack thereof, as a stressor for discussion within the group. Notably, only four of the 104 coping improvement group intervention participants (3.8%) endorsed sexual safety as a “major” or “most serious” stressor on the baseline assessment, suggesting that few participants viewed sexual safety as a significant concern.

Interpersonal Support Group Intervention—Individuals in this condition participated in a 12-session, interpersonal support group intervention. Similar to the coping intervention, each 90-minute group was conducted separately for MSM, heterosexual men, and women

and was co-facilitated by two Masters-level clinicians. For each session, the first 45 minutes focused on a topic assigned by the co-facilitators (e.g., HIV-related nutrition, treatment adherence, sexual risk reduction). During this time, participants viewed a brief, commercially available videotape on the assigned topic and discussed how the videotape required adaptation to be relevant for HIV-infected older adults. For the final 45 minutes, participants discussed how the session's topic pertained to their personal lives. One of the 12 session topics focused on sexual safety for HIV-infected adults. Similar to the coping intervention, all participants were encouraged to share personal contact information at the end of the final session to facilitate communication among participants upon intervention termination.

Individual Therapy Upon Request—Individual therapy upon request participants did not receive an active intervention but were encouraged to seek supportive services within their community. Participants in this latter condition experiencing acute distress were encouraged to contact the study team to request up to 12 sessions of time-limited individual therapy. Twenty-five participants in this condition (29%) requested and received individual therapy (mean number of sessions = 6).

Study Measures

Participants completed comprehensive psychosocial assessments at baseline, post-intervention (approximately four months following the baseline assessment), and eight and 12 months post-baseline. Assessments lasted approximately 90 minutes and took place in a private location within a local community-based setting using audio-computer assisted self-interviews (A-CASI). In addition to sociodemographic characteristics, measures used in the current study assessed depression and sexual behavior.

Depression was assessed with the Geriatric Depression Scale (GDS) [23] because it excluded physical symptoms of depression that may have mimicked HIV disease manifestation, age-related senescence, and/or side effects of HIV or other medications (e.g., fatigue, appetite disturbance). The GDS is a well-validated 30-item measure that employs a “yes/no” response format. Scores range from 0-30 with higher scores indicating greater depressive symptom severity.

A series of questions assessed participants' sexual behavior over the past three months. Specifically, participants reported condom use consistency for anal and vaginal intercourse and the HIV serostatus of each sexual partner (i.e., HIV-positive, HIV-negative, or unknown HIV serostatus). We did not assess frequency of unprotected sexual acts. Follow-up retention rates for the combined conditions were 83% at 4 months, 83% at 8 months, and 79% at 12 months.

Statistical Analyses

We first compared participants in each of the three intervention conditions on baseline demographic, sexual behavior, and depression variables using chi-square tests of association for categorical variables and one-way ANOVA for continuous variables. We next utilized all available data and examined aggregate changes in sexual behavior longitudinally using

generalized estimating equations (GEEs) to account for non-independence of observations due to repeated measurement. We specified model-based variance estimation, unstructured correlation matrices, and a binomial distribution with a logit link function. The three binary sexual behavior outcome variables of interest assessed (i) engagement in any anal or vaginal sex (i.e., “sexual activity”), (ii) any unprotected anal or vaginal sex regardless of partners’ HIV serostatus, and (iii) any unprotected anal or vaginal sex with HIV-negative or unknown HIV serostatus partners. All models included intervention condition as a covariate to control for differential changes in sexual behavior over time due to the type of psychosocial intervention received. This analytic strategy is consistent with prior research that examined longitudinal changes in sexual risk behavior of HIV-positive younger and middle-aged men who have sex with men enrolled in a sexual risk reduction trial [24].

We next used GEEs and intent-to-treat procedures to examine the “Time $\times$ Intervention Condition” interaction for each of the three binary sexual behavior variables. Three-way “Time $\times$ Intervention Condition $\times$ Moderator” interactions were explored for dependent variables using each of three candidate moderators (i.e., nine total three-way interactions): participant age, race, and sexual orientation. To examine the relationship between reductions in depressive symptoms and changes in sexual behavior, we created a binary variable that identified participants who reported reductions in depressive symptoms of at least 50% from baseline to 12-month follow-up (i.e., longer-term treatment responders). A reduction in depressive symptoms of at least 50% has been used to identify HIV-positive older adults who respond “favorably” to psychological intervention [18,25]. To examine the sensitivity of the models to our operational definition of changes in depressive symptoms, we conducted parallel analyses treating changes in depressive symptoms as a continuous variable. Models controlled for intervention condition and examined the “Time $\times$ Depression Change” interaction. Finally, we identified participants who (i) reported sexual abstinence or condom-protected sex only at baseline and who went on to engage in unprotected sex with any partners over follow-up and (ii) did not engage in unprotected sex with HIV-negative/unknown serostatus partners at baseline but engaged in this HIV transmission risk behavior over follow-up. Logistic regression assessed adoption of these riskier sexual practices by intervention condition and by changes in depressive symptoms from baseline to 12-month follow-up. These latter analyses determined if intervention condition or favorable reductions in depressive symptoms served as protective factors against *adoption* of riskier sexual behaviors. All inferential analyses employed two-tailed tests of significance and $\alpha = 0.05$.

Results

Baseline characteristics for the full analytic sample and stratified by intervention condition are presented in Table I. Participants in the individual therapy upon request condition were more highly educated compared to participants in the coping and interpersonal support group interventions ($\chi^2[2] = 5.95, p = 0.05$). Participants also differed on baseline depression scores as measured by the GDS, $F(2, 290) = 4.06, p = 0.02$. Coping intervention participants had significantly greater baseline GDS scores than interpersonal support intervention participants, $t(207) = 2.05, p = 0.04$, and ITUR participants, $t(188) = 2.60, p = 0.01$. There were no differences across intervention condition on any other demographic variable or

sexual behavior variables assessed at baseline. To control for differences observed at baseline, we subsequently included baseline education and GDS values as additional covariates in all models.

Longitudinal Changes in Sexual Behavior

At baseline, 61% of participants ($n = 174$) had *not* engaged in anal or vaginal intercourse in the past three months, 26% ($n = 74$) reported condom-protected sexual activity only, 7% ($n = 19$) engaged in unprotected sex with HIV-positive partners only, and 7% ($n = 19$) engaged in unprotected sex with HIV-negative or unknown HIV serostatus partners. After controlling for intervention condition, baseline education, and baseline depression, the overall time effect was non-significant for all sexual behavior outcome variables, indicating that sexual behaviors did not, on average, change across the 12-month study period: sexual activity ($Wald \chi^2 [3] = 7.35, p = 0.06$), unprotected sex with any partners ($Wald \chi^2 [3] = 2.96, p = 0.40$), and unprotected sex with HIV-negative/unknown partners ($Wald \chi^2 [3] = 4.21, p = 0.24$). Figure 1 further illustrates that the proportion of participants who engaged in various sexual acts remained relatively constant over time.

Intervention Effects on Sexual Behavior

Changes in the proportion of participants who reported sexual activity, non-condom protected sex with any partners, and non-condom protected sex with HIV-negative/unknown partners did not differ by intervention condition over time, indicating that sexual behavior trajectories were independent of intervention condition: sexual activity ($Wald \chi^2 [6] = 10.62, p = 0.10$), unprotected sex with any partners ($Wald \chi^2 [6] = 10.45, p = 0.11$), unprotected sex with HIV-negative/unknown partners ($Wald \chi^2 [6] = 6.29, p = 0.39$). Non-significant three-way moderation analyses (all p 's > 0.10) indicated that neither participant age, race, nor sexual orientation moderated the Time $\times$ Intervention Condition interactions.

The Effect of Reductions in Depressive Symptoms on Sexual Behavior

We next examined changes in depressive symptoms as a predictor of changes in sexual behavior. Thirty percent of participants reported reductions in depressive symptoms 50% from baseline through 12-month follow-up. Participants in the coping and interpersonal support group interventions were more than twice as likely as ITUR participants to respond favorably to treatment (OR = 2.24, 95% CI = 1.05 to 4.77 and OR = 2.25, 95% CI = 1.04 to 4.89, respectively). After controlling for intervention condition to which participants were assigned, baseline education, and baseline GDS values, no significant "Time $\times$ Depression Change" interactions emerged: sexual activity ($Wald \chi^2 [3] = 3.11, p = 0.38$), unprotected sex with any partners ($Wald \chi^2 [3] = 5.43, p = 0.14$), and unprotected sex with HIV-negative/unknown partners ($Wald \chi^2 [3] = 0.91, p = 0.64$). Results were unchanged when treating changes in depression from baseline to 12-month follow-up as a continuous variable. These null findings indicate that longitudinal changes in sexual behavior did not vary as a function of reductions in depressive symptoms.

Adoption of Riskier Sexual Behaviors

Thirteen percent of participants who reported sexual abstinence or condom-protected sex only at baseline (31/248) engaged in unprotected sex with an HIV seroconcordant, serodiscordant, or unknown serostatus partner at one or more follow-up assessment. Adoption of unprotected sexual behavior with any partners was unrelated to intervention condition ($Wald \chi^2 [2] = 2.97, p = 0.23$), reductions in GDS scores of at least 50% ($Wald \chi^2 [1] = 1.20, p = 0.27$), or changes in depressive symptomatology when analyzing depression change scores as a continuous variable ($Wald \chi^2 [1] = 0.05, p = 0.83$). Thirteen percent of participants who did not engage in unprotected sex with HIV-negative/unknown serostatus partners at baseline (35/267) engaged in this HIV transmission risk behavior at one or more follow-up assessment. Adoption of HIV sexual transmission risk behavior was unrelated to intervention condition ($Wald \chi^2 [2] = 0.78, p = 0.68$), reductions in GDS scores of at least 50% ($Wald \chi^2 [1] = 0.78, p = 0.38$), or changes in depressive symptomatology when analyzing depression change scores as a continuous variable ($Wald \chi^2 [1] = 0.01, p = 0.96$). To examine the sensitivity of our models to covariates, all multivariate analyses were conducted excluding covariates and results were unchanged.

Discussion

This is the first study to examine longitudinal sexual behavior patterns in adults aging with HIV and if reductions in depressive symptoms resulting from standalone group psychotherapies produced concomitant or subsequent reductions in sexual risk behaviors in this group. Overall rates of sexual behavior remained relatively constant over the study period. However, sexual behavior did change over time for some participants. Approximately 13% of participants who refrained from engaging in HIV sexual transmission risk behavior at baseline reported engaging in unprotected anal or vaginal sex with HIV-negative or unknown HIV serostatus partners by the conclusion of the study. These findings highlight the dynamic nature of sexual behavior in persons aging with HIV and the need for health care providers and allied social service providers to assess sexual behaviors in HIV-positive older adults over time and administer risk reduction interventions when appropriate, even for those who initially report sexual abstinence or low HIV transmission risk behavior.

Efficacious psychosocial group interventions for depression did not reduce participants' sexual behaviors over time or protect against adoption of riskier sexual practices. Furthermore, changes in sexual behaviors were no different for participants who reported reductions in depressive symptoms of 50% or greater compared to those who reported only modest or no depressive symptom relief. These findings come with the caveats that engagement in risky sexual behavior was not a criterion for inclusion in this study and that rates of reported risky sexual behaviors were initially low with little room for improvement. In addition, although primary outcome analyses [18] demonstrated that coping and supportive group interventions reduced depression to a greater extent than individual therapy upon request, effect sizes for these reductions were in the small to medium range. It is possible that efficacious psychosocial interventions for depression require large effects to produce changes in sexual risk behavior.

Consistent with the current study, Tsai and colleagues [16] identified no differential reductions in sexual risk behavior by treatment condition in a randomized controlled trial of fluoxetine versus community mental health referral for HIV-positive homeless and marginally housed middle-aged adults in San Francisco, despite fluoxetine demonstrating superiority to community mental health referral in reducing depressive symptoms, with large treatment effects. Participants in this trial, however, also reported low rates of sexual risk behavior at baseline. Although neither the current study nor the study by Tsai and colleagues were powered a priori to detect intervention effects on sexual behavior outcomes, findings from these studies together provide preliminary evidence that efficacious standalone psychosocial and pharmacological interventions for the treatment of depression may not be sufficient to reduce or prevent the adoption of sexual risk behaviors in persons living with HIV/AIDS.

It is possible that among depressed HIV-positive persons who engage in risky sex, amelioration of depressive symptoms is a necessary, albeit insufficient, condition to promote safer sex and that sexual risk reduction components combined with treatments for depression may yield positive outcomes in both mental health and sexual behavior indices [16]. Somewhat contrary to this hypothesis are findings from a standalone sexual risk reduction intervention for HIV-positive men who have sex with men that was efficacious only for participants who met criteria for clinical depression at baseline [26], suggesting that integrating depression treatment with risk reduction interventions may not be necessary to achieve desired sexual behavior outcomes. That study [26], however, was not powered a priori to examine depression as a moderator of treatment efficacy, nor is it clear if depressed participants received, and responded positively to, treatment for depression outside the context of the study. Adequately powered trials of integrated versus standalone depression and HIV risk reduction treatments would elucidate the role of depression treatment in reducing sexual risk behavior. That said, from a practical standpoint, efficacious treatments for depression have inherent value regardless of their impact on sexual risk behavior outcomes and are clearly necessary components of an integrated care plan for HIV-positive persons experiencing depression.

An alternative explanation for the null treatment findings in the current study is that depression does not lead to sexual risk behavior and that reverse causation explains cross-sectional associations between depression and sexual risk behavior such that reductions in risky sexual behavior lead to subsequent improvements in mental health functioning [27]. Most HIV-positive persons reduce HIV transmission risk behavior once made aware of their HIV status, and persons who continue to engage in HIV transmission risk behavior may perceive themselves as placing others at risk of HIV infection [28]. This could lead to feelings of guilt, shame, and other negative affective states including depression [27]. In preliminary support for this reverse causal hypothesis, a standalone sexual risk reduction intervention for HIV-positive late middle-aged and older adults reduced risky sex by 3-month follow-up, but reductions in depression, anxiety, and stress were not realized until 6-month follow-up [29]. Reductions in sexual risk behavior temporally preceded reductions in negative affect. This trial was limited, however, to a sample with predominantly subclinical mental health symptoms. Adequately powered studies are needed to further clarify the

directional relationship between depression and sexual risk behavior in HIV-positive persons.

This study has several limitations that qualify its findings. First, this study assembled a convenience sample of HIV-positive older adults from three Eastern and Midwestern metropolitan areas. Accordingly, results may not generalize to HIV-positive younger adults or those living in rural areas or metropolitan areas in other regions of the United States. Our null treatment findings do, however, converge with those of Tsai and colleagues [16] who enrolled a sample that is demographically and geographically distinct from participants in the current study. Second, as noted previously, this was not a sexual risk reduction trial, and these secondary data analyses were not powered to detect treatment effects on sexual behavior outcomes. Low baseline rates of HIV sexual transmission risk behavior may have also created a “floor effect,” insofar as the interventions had little room to reduce rates of risky sexual behavior. In addition, data on sexual behavior and related contextual factors were limited. For example, we did not measure the frequency of unprotected sex acts, and some participants may have reduced the number of occasions in which they engaged in this sexual risk behavior over the course of the study, despite not eliminating sexual risk taking entirely. Our data did not capture objective viral load, and it is possible that participants with undetectable viral loads did not perceive their behaviors to be risky. Furthermore, we did not measure the stability of sexual partnerships, and long-standing sexual risk behaviors may be less responsive to an intervention that does not target the specific risk behavior. Finally, all data were self-report. Although the clinical trial attempted to reduce socially desirable responses through the use of audio-computer assisted self-interviews, participants may have underreported behaviors that carry social stigma, such as unprotected sex with HIV-negative and unknown HIV serostatus sex partners. Rates of reported non-condom protected anal and vaginal sex in the current study were, however, commensurate with studies that also evaluated sexual behaviors over the prior three months [3,5] but lower than rates characterized in other samples of urban-dwelling HIV-positive older adults that evaluated sexual behaviors over 6- to 12-month retrospective recall periods [2,12-15].

In spite of these limitations, findings from this study have important implications for the design of secondary risk reduction trials that target sexually risky HIV-positive persons who experience depression. Standalone psychosocial treatments shown to be efficacious in the reduction of depressive symptoms did not reduce sexual risk behaviors in HIV-positive older adults, and treatments that specifically target risky sexual behaviors may be a necessary component of efforts to reduce sexual risk behavior and curb the spread of HIV in depressed persons living and aging with HIV/AIDS.

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Figure 1.
Proportion of participants reporting sexual activity, unprotected sex with any partners, and unprotected sex with HIV-negative/unknown partners over time.

Table 1

Baseline sociodemographic, depression, and sexual behavior characteristics.

Variable	Total (n = 295)	Coping Intervention (n = 104)	Support Intervention (n = 105)	Individual Therapy (n = 86)
	% (n)	% (n)	% (n)	% (n)
Age ^a	55.6 + 4.8	55.6 + 4.6	55.6 + 4.9	55.5 + 5.0
Years Living with HIV ^a	12.4 + 5.4	12.7 + 5.4	12.2 + 5.3	12.4 + 5.4
Sexual Orientation				
Men Who Have Sex With Men	46.1 (136)	45.2 (47)	45.7 (48)	47.7 (41)
Heterosexual Men	21.0 (62)	21.2 (22)	21.0 (22)	20.9 (18)
Women	32.9 (97)	33.7 (35)	33.3 (35)	31.4 (27)
Race				
Caucasian	29.4 (86)	30.8 (32)	30.5 (32)	26.2 (22)
African-American	58.0 (170)	58.7 (61)	54.3 (57)	61.9 (52)
Latino/Latina	7.5 (22)	4.8 (5)	12.4 (13)	4.8 (4)
Other/Multi-racial	5.1 (15)	5.8 (6)	2.9 (3)	7.1 (6)
High School Education or Less	49.8 (147)	51.0 (53)	57.1 (60)	39.5 (34)
Geriatric Depression Scale Score ^a	12.3 + 7.9	14.0 + 8.6	11.8 + 7.3	10.9 + 7.5
Sexually Active	39.2 (112)	32.7 (34)	42.6 (43)	43.2 (35)
Unprotected Sex with any Partners	13.3 (38)	9.6 (10)	15.8 (16)	14.8 (12)
Unprotected Sex with HIV-Negative or Unknown HIV Serostatus Partners	6.6 (19)	3.8 (4)	7.9 (8)	8.6 (7)

^a Denotes mean ± standard deviation