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DEPRESSION AND SEXUAL RISK BEHAVIOR AMONG CLIENTS ABOUT TO START HIV ANTIRETROVIRAL THERAPY IN UGANDA

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Abstract

Objective—We investigated depression in relationship to sexual risk behavior with primary partners among HIV clients in Uganda.

Methods—Baseline data were analyzed from a cohort of clients starting ART. The Patient Health Questionnaire (PHQ-9) was used to classify depressive severity (none, minor and major depression) and symptom type (cognitive and somatic). Condom use was assessed over the past 6 months and during the last episode of sexual intercourse.

Results—386 participants had a primary sex partner, with whom 41.6% always used condoms during sex over the past 6 months, and 62.4% during last sex. Use of a condom during last sex was associated with having no depression and lower PHQ-9 total and cognitive and somatic subscale scores in bivariate analyses; most of these relationships were marginally significant for sex over the past 6 months. Controlling for demographics, HIV disclosure and partner HIV status, only minor depression was associated with unprotected sex.

Conclusion—Depressive symptoms, even if not a clinical disorder, warrant early detection and treatment for promoting HIV prevention among HIV-affected couples.

Keywords

depression; HIV; Uganda; sexual risk behavior; condom use

INTRODUCTION

High rates of depression have been found amongst people living with HIV/AIDS (PLWHA),^{1, 2} including in Africa,^{3–6} with the prevalence of major depression ranging from 10–20%, and elevated depressive symptoms in an additional 30–40%.^{3, 7–9} Most studies have focused on the role of depression in patient quality of life and functioning,^{10, 11} and relationship to advanced disease and poor HIV clinical outcomes.^{12–15} Research has examined the association between depression and HIV sexual risk behaviors,^{16–19} but few studies have been done in sub-Saharan Africa, where most of the world's HIV population resides.²⁰

There are a number of mechanisms by which depression can influence sexual behavior and use of condoms. Depression may cause people to be less inclined or motivated to use protection when having sex.⁷ Sexual dysfunction can be a symptom of depression, which can serve to lower the chances of having sex as well as lead one not to use a condom in an attempt to improve sexual functioning.²¹ Moreover, the feelings of loneliness associated with depressive mood could make one seek company and comfort in sex with less likelihood of caring whether it's safe or not.²² Also depression may lead people to use alcohol as self-medication to alleviate depressive symptoms,⁶ and substance use has been associated with unsafe sex.²³

Studies that have examined the relationship between depression and sexual risk behaviors among PLWHA have resulted in mixed findings,^{3, 16, 17} although depression is generally considered to contribute to HIV risk behavior.³ Most studies have been cross-sectional, but one longitudinal study found that both positive and negative mood states can be associated with condom use, and that depression and sexual risk behavior tend to change in tandem.¹⁸ Most of these studies have been done in the U.S. Our prior research in Uganda with individuals entering HIV care suggests that depression is associated with unprotected sex and that reduced depression over time is associated with increased condom use.^{7, 24} This literature has focused primarily on global measures of depression and its relationship to sexual risk behaviors, not particular aspects of depression, such as depressive severity or symptom type. A better understanding of the relationship between depression and condom use among PLWHA will inform HIV prevention interventions and the need for mental health support services to be incorporated into HIV care and prevention services.

We report here on a study that investigated the relationship between depression and condom use with primary sex partners among HIV clients starting HIV antiretroviral therapy (ART) in Uganda. In particular, we examined whether severity of depression (none, mild or major depression) and type of depressive symptom (cognitive or somatic) were differentially related to condom use.

METHODS

Study Design

We used a prospective cohort study design to examine the effects of depression and antidepressant treatment on multiple health outcomes of ART. Participants completed assessments at baseline (start of ART) and 6 and 12 months later. However, only baseline data were used in the analysis for this paper. Depression was assessed at each of the mentioned time points and antidepressants were prescribed to those who were clinically depressed. We consecutively recruited patients between September 2010 and February 2011. Eligibility criteria included being age 18 years or older and about to start ART as prescribed by their primary care provider. The primary eligibility criterion for ART eligibility was a CD4 count of ≥ 250 cells/mm³ or WHO HIV disease stage III or IV (AIDS diagnosis). All participants provided written informed consent. The study protocol was approved by Institutional Review Boards at the RAND and Makerere University.

Study Setting

This study took place in four HIV clinics affiliated with Mildmay Uganda, a non-governmental organization that specializes in the care of people infected and affected with HIV/AIDS. The sites included Mildmay Center in Lweza, just outside Kampala, which is fully operated by Mildmay, and clinics in the rural towns of Mityana, Naggalama and Mukono, all of which are public health clinics operated by the Ministry of Health and in which Mildmay provides technical assistance and support. While Mildmay Center has

greater resources and facilities available, standard of care HIV treatment is similarly provided across all study sites. Each of the clinics serve patients of low and middle socioeconomic status.

Measures

All measures were translated into Luganda, the dominant local language, using standard translation and back-translation methodology, and were interviewer-administered by Masters level psychologists.

Socio-demographic and background characteristics—These included age, sex, education level (a binary indicator of any secondary education), and work status (engaged in any activity to earn income or food in the past 7 days).

Relationship status and sexual partners—Participants were asked to self-report their relationship status as single, married, not married but in a committed relationship, divorced/separated, or widowed. Those who were not married or in a committed relationship were then asked if they had a regular main sexual partner over the past 6 months. The HIV status of the respondent's primary or main sexual partner was assessed, as well as whether the respondent had disclosed their HIV status to their primary partner. In addition, each participant was asked whether they had any other (non-main or primary) sex partners in the past 6 months, and if so, how many. These other sex partners are referred to as casual partners in this paper.

Condom use—Condom use during sexual intercourse over the past 6 months was measured using a 5-point rating scale from “never” to “always”, which was converted to a dichotomous variable to represent whether condoms were always used (consistent condom use). This question was asked separately for sexual intercourse with one's primary partner and sex with casual partners. In addition, we asked whether or not a condom was used in the last sexual intercourse encounter with the primary partner, as well as last encounter with a casual partner.

Depression—The 9-item Patient Health Questionnaire (PHQ-9)²⁵ was used to measure the presence of depressive symptoms over the past 2 weeks. Each of the 9 items corresponds to the symptoms used to diagnose depression according to DSM-IV (Diagnostic and Statistics Manual of Mental Disorders)²⁶ criteria. Responses to each item range from 0 ‘not at all’ to 3 ‘nearly every day’. Items scores are summed up (possible range of 0–27) and scores of 0–4 represent no depression, scores of 5–9 represent mild depression, and scores of >9 signify clinical depression and correspond highly to DSM-IV major depression.²⁵ For our analysis, we divided the items into two subscales: the somatic (fatigue, difficulty sleeping, poor appetite) and cognitive (depressed mood, loss of interest) symptoms of depression in order to create somatic and cognitive subscales, with each subscale being the sum of the included items. The PHQ-9 has been used successfully with HIV-infected individuals in other studies within sub-Saharan Africa.²⁷

Alcohol use—We measured alcohol intake using the Alcohol Use Disorders Identification Test (AUDIT).²⁸ Three items were used to assess alcohol use: the frequency of alcohol use over the past 30 days, how many drinks are taken in a typical day in which alcohol is used, and how often 6 or more drinks are taken in a single occasion of alcohol use.

Data Analysis

Bivariate statistics (ANOVA, independent two-tailed t-tests, Chi Square tests) were used to examine whether sample characteristics and depression measures [3-level categorical

depression variable (no, mild and major depression) and the continuous PHQ-9 variables (total score; somatic and cognitive subscale scores) were associated with sexual partnerships and condom use variables. In separate multivariate logistic regression analyses, we examined correlates of unprotected sex with primary partner over the past 6 months, and in the last encounter of sexual intercourse. For each of the binary condom use variables, separate models were conducted for inclusion of the three-level categorical depression variable (no depression, mild depression, major depression, with no depression being the referent), a binary indicator of any depression (none versus mild or major depression), and a model with both the cognitive and somatic subscales of the PHQ-9. In all models, covariates consisted of demographics (age, gender, any secondary education, work status), relationship characteristics [binary indicator of whether patient was married or in a committed relationship versus being single, HIV disclosure to primary partner, HIV status of primary partner (positive, negative, and unknown/untested, with positive being the referent)], CD4 count, any alcohol use, and a 4-level site variable (site 1 being the referent).

RESULTS

The sample was comprised of 798 participants. Almost half of the sample (386, 48.4%) had a primary sex partner with 341 (42.7%) being married or in a committed relationship, plus 45 (5.6%) being single but having a regular sex partner. An additional 26 (3.3%) participants reported having casual sex partners but no primary partner during the 6 months prior to baseline. Thus a total of 412 (51.6%) participants had any sex partners at baseline. Neither the presence of depression (either minor or major depression) nor depressive symptoms (PHQ-9 total score, and cognitive and somatic subscale) were associated with whether or not the participant had any sex partners in the past 6 months. However, having a primary sex partner was significantly associated with having a lower score on the PHQ-9 total score (mean=3.68 vs. 4.30; $p=.05$) and somatic subscale (mean=2.16 vs. 2.54; $p=.03$), compared to participants without a primary sex partner. With so few participants reporting only casual sex partners, the remaining analyses for this paper focused on condom use in the subgroup of participants who had a primary sex partner.

Sample characteristics of participants with a primary sex partner

Table 1 lists the characteristics of the 386 participants who comprised the subgroup with a primary sex partner, as well as the breakdown of this subgroup according to whether or not condoms were always used with the primary partner in the past 6 months, and during the last encounter of sexual intercourse. Over half of the 386 participants (58.3%) was female, mean age was 35.7 years ($SD=8.7$; range: 20 to 68), and the majority had none or only a primary education (83.5%). Although all 386 participants were starting ART, only 16.1% had a WHO disease stage of III or IV, but 87.3% had a CD4 count < 250 cells/mm³ and the mean CD4 count was 163 ($SD=86$) cells/mm³. Half of the participants had primary partners who were HIV-positive (50.4%) and the rest had partners who were either HIV-negative (18.7%) or of unknown HIV status (30.9%). The vast majority of the participants (85.6%) had disclosed their HIV status to their primary partner. In terms of depression, the mean PHQ-9 score was 3.68 ($SD=4.24$; range: 0 to 22), with 70.0% showing no signs of depression (scored 0–4), 19.2% with minor depression (scored 5–9), and 10.9% having major depression (scored > 9).

Prevalence and bivariate correlates of condom use with primary partner

Less than half (41.6%) of the respondents reported always using condoms during sexual intercourse with their primary partner over the past 6 months and nearly two-thirds (62.4%) used a condom during their last sexual intercourse with their primary partner.

Demographic and background characteristics and condom use—A number of demographic characteristics differed across the subgroups defined by condom use (see Table 1). The patients who reported always using condoms with their primary partner in the past 6 months, as well as the last sexual encounter, were older on average compared to those who reported unprotected sex. Also, those participants who reported using a condom during the last sexual intercourse were more likely to be male and to attend the urban (Kampala) clinic, compared to those who did not use a condom. Education level, work status, CD4 count and having an AIDS diagnosis did not vary across these subgroups defined by condom use.

Relationship characteristics and condom use—With regard to relationship characteristics, participants who reported always using condoms with their primary partner in the past 6 months, as well as the last sexual encounter, were more likely to have disclosed their HIV status to their primary partner, and to know the HIV status of their primary partner (including being more likely to have an HIV-negative partner), compared to participants who reported unprotected sex (see Table 1).

Depression and condom use—Participants who reported using a condom with their primary partner during the last sexual intercourse were less likely to be depressed (i.e., no minor or major depression), and had lower depressive symptoms as measured by the PHQ-9 total score and both the cognitive and somatic subscales, in comparison to those who did not use a condom. The same relationships were found with regard to condom use over the past 6 months with the primary partner, except all relationships were only marginally significant and there was no relationship to cognitive depressive symptoms (see Table 1).

Multivariate analysis of the relationship between depression and condom use with primary partner

To further examine the relationship between depression and condom use with primary partners, we performed logistic multiple regression analyses to assess correlates of always using condoms with primary partners during the last 6 months, and use of a condom during the last sexual intercourse with the primary partner. Regarding condom use during sex over the past 6 months (see Table 2), having mild depression was significantly associated (OR=0.47, 95% CI=0.24–0.93), and having any depression (mild or major) was marginally associated (OR=0.59, 95% CI=0.34–1.03) with greater odds of not always using condoms, in their respective models; levels of cognitive and somatic symptoms were not associated with condom use (OR=1.02, 95% CI=0.90–1.16 and OR=0.90, 95% CI=0.79–1.02 respectively). In all models, having an HIV-negative partner and attending the rural Mukono clinic (site 3) were significantly associated with greater odds of always using condoms, and older age was significantly associated with greater odds of condom use in one model and marginally significant in the other two.

In the models examining correlates of condom use during the last sexual intercourse (see Table 3), minor depression and having any depression (mild or major) were marginally associated with condom use (OR=0.53, 95% CI=0.28–1.03 and OR=0.61, 95% CI=0.35–1.08 respectively), as were somatic depressive symptoms (OR=0.90, 95% CI=0.79–1.04). As with condom use during sex over the past 6 months, having an HIV-negative partner was significantly associated with greater odds of having used a condom during the last sexual intercourse in each of the models. Attending the rural Naggalama clinic (site 2) was significantly associated with lower odds of using a condom in each model.

DISCUSSION

With new infections in sub-Saharan Africa often occurring in the context of stable or recurrent sexual partnerships,²⁹ a better understanding of the factors influencing condom use in this context is needed. We are unaware of previous studies of the influence of depression on sexual risk behavior within primary partnerships in Uganda. Furthermore, this is one of the first studies to examine the relationship between depression and sexual risk behavior that goes beyond the examination of global depression by examining severity of depression (minor and major depression) and type of depressive symptoms (somatic and cognitive).

In our sample of HIV clients starting ART, we found low rates of consistent condom use with primary sex partners, even though half had partners whose HIV status was negative or unknown. In our bivariate analysis, participants with minor or major depression were both equally more likely not to use condoms with primary sex partners in comparison to non-depressed patients. Our multivariate findings were mixed, but suggestive of minor depression being associated with greater odds of not using condoms, not major depression. The lack of a relationship to major depression may be explained in part by the low statistical power associated with relatively few participants having major depression. It's worth noting that the Odds Ratios for major depression were in the direction of impeding condom use in both multivariate models.

Both somatic and cognitive depressive symptoms were associated with not always using condoms in bivariate analysis. There were some indications that somatic symptoms may be slightly more influential, as somatic symptoms, not cognitive, were marginally associated with lack of condom use in the regression analysis. Further research with larger sample sizes is needed to further explore this differential influence of type of depressive symptom on condom use. Both types of depressive symptoms (cognitive symptoms such as depressed mood and loss of interest; and somatic symptoms such as fatigue) may negatively impact sexual functioning, leading some to choose not to use condoms as a way to improve their sexual functioning and pleasure. Cognitive depressive symptoms can also lower motivation for healthy sexual behavior, and increase willingness to take risks and be less concerned about safety or the consequences of unprotected sex.³⁰

Our multivariate models controlled for several demographic and relationship characteristics, some of which were strongly associated with condom use, including partner HIV status, age and clinic location. Depression may not only influence condom use directly, but also indirectly through its influence on factors such as HIV testing and disclosure. Depression may inhibit individuals from disclosing their HIV status³¹ or getting HIV tested,³² and not knowing the HIV status of one's partner was associated with unprotected sex in this study. Older age was associated with a greater likelihood of condom use, as has been found in some other studies,³³ and could be a reflection of maturity and greater life experience. The differences seen across study clinics with regard to condom use were not consistent, with one rural site associated with higher odds of condom use over the past 6 months, and another rural site associated with lower odds of condom use during the last sexual encounter. With both of these sites being rural, and no clear differences in the rural sites regarding structural factors that could affect condom use, it is not readily apparent what could explain these findings. Free condoms are often, but not always available at these clinics.

The cross-sectional nature of our analysis does not enable us to make any causal statements about the relationship between depression and condom use. The relationship between depression and condom use may be bidirectional, as depressive symptoms could contribute to greater risk taking such as unprotected sex, and greater risk taking could in turn result in depression and anxiety. Analysis of our longitudinal data may enable us to bring some

clarity to the temporal relationship between these variables. Furthermore, the relatively small sample size hampered our ability to detect some relationships more reliably, for example whether or not major depression could also be related to lack of condom use. Lastly, our findings are only applicable to patients in HIV care, and not all persons living with HIV, including those not in care. It is possible that seeking care is associated with characteristics such as greater motivation and assertiveness regarding health behavior, which could be associated with a higher likelihood of using condoms.

In conclusion, our study findings revealed that depression, and especially minor depression, may play an influential role in condom use with primary sex partners. This suggests that depressive symptoms, even if not reaching the threshold of a clinical disorder, warrant being addressed for early detection and treatment for the sake of HIV prevention as well as quality of life and mental health of HIV-positive patients and their partners. This adds further evidence to the need to integrate mental health services into HIV care and prevention within Uganda and sub-Saharan Africa in general.

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References

1. Lyketsos CG, Federman EB. Psychiatric disorders and HIV infection: impact on one another. *Epidemiol Rev.* 1995; 17(1):152–164. [PubMed: 8521933]
2. Ciesla JA, Roberts JE. Meta-analysis of the relationship between HIV infection and risk for depressive disorders. *Am J Psychiatry.* May; 2001 158(5):725–730. [PubMed: 11329393]
3. Collins PY, Holman AR, Freeman MC, Patel V. What is the relevance of mental health to HIV/AIDS care and treatment programs in developing countries? A systematic review. *AIDS.* 2006; 20(12):1571–1582. [PubMed: 16868437]
4. Akena DH, Musisi S, Kinyanda E. A comparison of the clinical features of depression in HIV-positive and HIV-negative patients in Uganda. *Afr J Psychiatry.* 2010; 13(1):43–51.
5. Nakasujja N, Skolasky RL, Musisi S, et al. Depression symptoms and cognitive function among individuals with advanced HIV infection initiating HAART in Uganda. *BMC psychiatry.* 2010; 10:44. [PubMed: 20537129]
6. Nakimuli-Mpungu E, Bass JK, Alexandre P, et al. Depression, alcohol use and adherence to antiretroviral therapy in sub-Saharan Africa: a systematic review. *AIDS Behav.* 2012; 16(8):2101–2118. [PubMed: 22116638]
7. Wagner GJ, Ghosh-Dastidar B, Holloway IW, Kityo C, Mugenyi P. Depression in the pathway of HIV antiretroviral effects on sexual risk behavior among patients in Uganda. *AIDS Behav.* 2012; 16(7):1862–1869. [PubMed: 21986868]
8. Brandt R. The mental health of people living with HIV/AIDS in Africa: a systematic review. *Afr J of AIDS Res.* 2009; 8(2):123–133.
9. Bolton P, Wilk CM, Ndogoni L. Assessment of depression prevalence in rural Uganda using symptom and function criteria. *Soc Psychiatry Psychiatr Epidemiol.* Jun; 2004 39(6):442–447. [PubMed: 15205728]
10. Briongos-Figuero LS, Bachiller-Luque P, Palacios-Martin T, De Luis-Roman D, Eiros-Bouza JM. Depression and health related quality of life among HIV-infected people. *Eur Rev Med Pharmacol Sci.* Aug; 2011 15(8):855–862. [PubMed: 21845794]
11. Patel R, Kassaye S, Gore-Felton C, et al. Quality of life, psychosocial health, and antiretroviral therapy among HIV-positive women in Zimbabwe. *AIDS Care.* 2009; 21(12):1517–1527. [PubMed: 20024731]

12. Cook JA, Grey D, Burke J, et al. Depressive symptoms and AIDS-related mortality among a multisite cohort of HIV-positive women. *Am J Public Health*. Jul; 2004 94(7):1133–1140. [PubMed: 15226133]
13. Pence BW, Miller WC, Gaynes BN, Eron JJ Jr. Psychiatric illness and virologic response in patients initiating highly active antiretroviral therapy. *J Acquir Immune Defic Syndr*. Feb 1; 2007 44(2):159–166. [PubMed: 17146374]
14. Ickovics JR, Hamburger ME, Vlahov D, et al. Mortality, CD4 cell count decline, and depressive symptoms among HIV-seropositive women: longitudinal analysis from the HIV Epidemiology Research Study. *JAMA*. 2001; 285(11):1466–1474. [PubMed: 11255423]
15. Evans DL, Ten Have TR, Douglas SD, et al. Association of depression with viral load, CD8 T lymphocytes, and natural killer cells in women with HIV infection. *Am J Psychiatry*. 2002; 159(10):1752–1759. [PubMed: 12359683]
16. Crepaz N, Marks G. Towards an understanding of sexual risk behavior in people living with HIV: a review of social, psychological, and medical findings. *AIDS*. 2002; 16(2):135–149. [PubMed: 11807297]
17. Kalichman SC. HIV Transmission Risk Behaviors of Men and Women Living With HIV-AIDS: Prevalence, Predictors, and Emerging Clinical Interventions. *Clin Psychol-Sci Pr*. 2000; 7(1):32–47.
18. Comulada WS, Rotheram-Borus MJ, Pequegnat W, et al. Relationships over time between mental health symptoms and transmission risk among persons living with HIV. *Psychol Addict Behav*. 2010; 24(1):109–118. [PubMed: 20307117]
19. Kennedy CA, Skurnick J, Wan JY, et al. Psychological distress, drug and alcohol use as correlates of condom use in HIV-serodiscordant heterosexual couples. *AIDS*. 1993; 7(11):1493–1499. [PubMed: 8280417]
20. Global Report: UNAIDS Report on the Global AIDS Epidemic. United Nations Programme on HIV/AIDS (UNAIDS); 2012.
21. Bancroft J, Janssen E, Carnes L, Goodrich D, Strong D, Long JS. Sexual activity and risk taking in young heterosexual men: The relevance of sexual arousability, mood, and sensation seeking. *J Sex Res*. 2004; 41(2):181–192. [PubMed: 15326543]
22. Ramrakha S, Caspi A, Dickson N, Moffitt TE, Paul C. Psychiatric disorders and risky sexual behaviour in young adulthood: cross sectional study in birth cohort. *BMJ*. 2000; 321(7256):263–266. [PubMed: 10915126]
23. Kalichman S, Simbayi L, Kaufman M, Cain D, Jooste S. Alcohol Use and Sexual Risks for HIV/AIDS in Sub-Saharan Africa: Systematic Review of Empirical Findings. *Prev Sci*. 2007; 8(2):141–151. [PubMed: 17265194]
24. Wagner GJ, Holloway I, Ghosh-Dastidar B, Kityo C, Mugenyi P. Understanding the influence of depression on self-efficacy, work status and condom use among HIV clients in Uganda. *J Psychosom Res*. 2011; 70(5):440–448. [PubMed: 21511074]
25. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med*. 2001; 16(9):606–613. [PubMed: 11556941]
26. Association AP. Diagnostic statistical manual of mental disorders. 4. Washington, DC: American Psychiatric Association; 1994.
27. Monahan PO, Shacham E, Reece M, et al. Validity/reliability of PHQ-9 and PHQ-2 depression scales among adults living with HIV/AIDS in western Kenya. *J Gen Intern Med*. 2009; 24(2):189–197. [PubMed: 19031037]
28. Babor, T.; Higgins-Biddle, J.; Saunders, J.; Monteiro, M. The Alcohol Use Disorders Identification Test: Guidelines for use in primary health care. Geneva, Switzerland: World Health Organization; 2002.
29. Dunkle KL, Stephenson R, Karita E, et al. New heterosexually transmitted HIV infections in married or cohabiting couples in urban Zambia and Rwanda: an analysis of survey and clinical data. *Lancet*. 2008; 371(9631):2183–2191. [PubMed: 18586173]
30. Wagner G, Holloway I, Ghosh-Dastidar B, Ryan G, Kityo C, Mugenyi P. Factors Associated with Condom Use Among HIV Clients in Stable Relationships with Partners at Varying Risk for HIV in Uganda. *AIDS Behav*. 2010; 14(5):1055–1065. [PubMed: 20180008]

31. Kalichman S, DiMarco M, Austin J, Luke W, DiFonzo K. Stress, Social Support, and HIV-Status Disclosure to Family and Friends Among HIV-Positive Men and Women. *J Behav Med.* 2003; 26(4):315–332. [PubMed: 12921006]
32. Renner, J.; Baxter, J.; Suzuki, J.; Ciraulo, D. Substance Abuse and Depression. In: Ciraulo, DA.; Shader, RI., editors. *Pharmacother Dep.* Humana Press; 2011. p. 239-274.
33. Lurie M, Pronyk P, DeMoor E, Heyer A, de Bruyn G, Struthers H, et al. Sexual behaviour and reproductive health among HIV-infected patients in urban and rural South Africa. *J Acquir Immune Defic Syndr.* 2008; 47(4):484–493. [PubMed: 18209685]

Table 1
Sample Characteristics of Participants with Primary Sex Partner, and by Reported Condom Use

Variable	Total Sample (N=386)	Consistent use during last 6 months		Used during last intercourse	
		Condom not used	Used condom	Condom not used	Used condom
Demographics					
Age [Mean years (SD)]	35.7 (8.7)	34.3 ^c (8.25)	37.2 ^c (8.72)	34.1 ^b (8.19)	36.5 ^b (8.68)
Male	41.7%	37.6%	45.3%	33.9% ^b	45.4% ^b
Secondary education	16.5%	16.4%	16%	19.4%	14.9%
Working (past 7 days)	72.5%	70.2%	75.8%	70.8%	74%
Married or in relationship	88.3%	86.3%	89.4%	85.4%	89.1%
Attending urban clinic	45.3%	46.3%	46.6%	38.5% ^b	50.4% ^b
Any alcohol use	26.2%	26.0%	26.3%	26.8%	26.0%
HIV disease characteristics					
CD4 [mean cells/cu.mm. (SD)]	163 (86)	165 (89)	162 (83)	152 (86) ^a	169 (86) ^a
AIDS diagnosis (WHO stage 3/4)	16.1%	15.6%	18%	13.9%	18.1%
Depression					
PHQ-9 total [mean (SD)]	3.68 (4.24)	4.1 (4.52) ^a	3.25 (3.98) ^a	4.55 (4.64) ^c	3.29 (4.03) ^c
PHQ-9 cognitive [mean (SD)]	1.51 (2.4)	1.72 (2.58)	1.32 (2.24)	1.92 (2.67) ^b	1.34 (2.28) ^b
PHQ-9 somatic [mean (SD)]	2.16 (2.36)	2.39 (2.44) ^a	1.93 (2.28) ^a	2.62 (2.53) ^b	1.95 (2.25) ^b
Category of depression (PHQ-9)					
None (0–4)	70%	64.4% ^a	75.8% ^a	59.2% ^c	74.8% ^c
Minor Depression (5–9)	19.2%	22.9% ^a	14.9% ^a	25.4% ^c	16.4% ^c
Major Depression (> 9)	10.9%	12.7% ^a	9.3% ^a	15.4% ^c	8.8% ^c
Disclosure to main partner	85.6%	81.4% ^c	91.9% ^c	76% ^d	90.8% ^d
HIV status of main partner:					
HIV positive	50.4%	52.7% ^d	48.5% ^d	46.2% ^d	52.5% ^d
HIV negative	18.7%	12.2% ^d	27.3% ^d	8.5% ^d	24.4% ^d
Unknown/untested	30.9%	35.1% ^d	24.2% ^d	45.4% ^d	23.1% ^d

Note:

$d = p < .001$
 $c = p < .01$
 $b = p < .05$
 $a = p < .10$

Multivariate Analysis of the Relationship Between Depression Measures and Consistent Condom Use with Primary Partner over the Past 6 Months

Table 2

	Any Depression		Cognitive & Somatic sub-scales		Minor vs. Major Depression	
	O.R.	95% C.I.	O.R.	95% C.I.	O.R.	95% C.I.
Any Depression (Binary)	0.59	0.34, 1.03	–	–	–	–
Cognitive sub-scale	–	–	1.02	0.90, 1.16	–	–
Somatic sub-scale	–	–	0.90	0.79, 1.02	–	–
Minor Depression	–	–	–	–	0.47	0.24, 0.93
Major Depression	–	–	–	–	0.84	0.38, 1.87
Partner Status: NEGATIVE	2.92	1.53, 5.56	2.9	1.52, 5.55	2.82	1.48, 5.39
Partner Status: UNKNOWN	1.35	0.67, 2.73	1.27	0.63, 2.56	1.40	0.69, 2.85
Disclosed HIV status to partner	1.55	0.64, 3.77	1.49	0.62, 3.63	1.65	0.67, 4.05
Age	1.03	1.00, 1.07	1.04	1.00, 1.07	1.03	1.00, 1.07
Male gender	0.93	0.54, 1.60	0.96	0.56, 1.65	0.92	0.54, 1.58
Any secondary education	1.01	0.52, 1.99	1.00	0.51, 1.96	1.00	0.51, 1.96
Working past 7 days	0.97	0.55, 1.71	1.02	0.58, 1.79	0.95	0.54, 1.67
Married or in relationship	1.53	0.69, 3.39	1.56	0.70, 3.47	1.56	0.71, 3.46
CD4 Count	1.00	0.996, 1.00	1.0	0.996, 1.00	1.00	0.996, 1.00
Any alcohol use	1.23	0.71, 2.13	1.25	0.72, 2.19	1.19	0.68, 2.07
Site 2	0.68	0.32, 1.49	0.65	0.30, 1.41	0.68	0.31, 1.48
Site 3	2.25	1.04, 4.87	2.26	1.04, 4.89	2.27	1.05, 4.91
Site 4	1.03	0.55, 1.90	0.98	0.53, 1.82	1.00	0.54, 1.86

Table 3

Multivariate Analysis of the Relationship Between Depression Measures and Consistent Condom Use with Primary Partner During Last Sexual Intercourse

	Any Depression		Cognitive & Somatic sub-scales		Minor vs. Major Depression	
	O.R.	95% C.I.	O.R.	95% C.I.	O.R.	95% C.I.
Any Depression (Binary)	0.61	0.35, 1.08	–	–	–	–
Cognitive sub-scale	–	–	1.01	0.89, 1.15	–	–
Somatic sub-scale	–	–	0.90	0.79, 1.04	–	–
Minor Depression	–	–	–	–	0.53	0.28, 1.03
Major Depression	–	–	–	–	0.79	0.34, 1.83
Partner Status: NEGATIVE	2.63	1.18, 5.87	2.61	1.16, 5.84	2.56	1.15, 5.73
Partner Status: UNKNOWN	0.70	0.34, 1.41	0.65	0.32, 1.31	0.72	0.35, 1.46
Disclosed HIV status to partner	1.14	0.48, 2.70	1.09	0.46, 2.59	1.19	0.50, 2.84
Age	1.01	0.98, 1.04	1.01	0.98, 1.05	1.01	0.98, 1.04
Male gender	1.25	0.70, 2.22	1.28	0.72, 2.29	1.24	0.70, 2.21
Any secondary education	0.63	0.32, 1.26	0.61	0.31, 1.23	0.63	0.31, 1.25
Working past 7 days	0.97	0.53, 1.75	1.01	0.56, 1.83	0.95	0.52, 1.72
Married or in relationship	1.29	0.58, 2.86	1.33	0.60, 2.95	1.32	0.60, 2.94
CD4 Count	1.00	0.998, 1.00	1.00	0.998, 1.00	1.00	0.998, 1.00
Any alcohol use	1.23	0.68, 2.23	1.30	0.71, 2.39	1.19	0.65, 2.17
Site 2	0.43	0.20, 0.93	0.40	0.18, 0.87	0.43	0.20, 0.93
Site 3	1.19	0.51, 2.76	1.16	0.50, 2.71	1.19	0.51, 2.76
Site 4	0.69	0.36, 1.30	0.65	0.34, 1.24	0.68	0.36, 1.29