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Changes in Anxiety and Depression Symptoms Predict Sexual Risk Behaviors Among Young Men Living in Dar es Salaam, Tanzania

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Abstract

Young men are important targets in HIV prevention in Tanzania and throughout sub-Saharan Africa. Anxiety and depression are common among youth and may be important predictors of HIV risk behaviors; evidence of these relationships in high-risk populations is needed. Using baseline and 1 year follow-up assessments from an HIV prevention trial we assessed the association between changes in symptoms of anxiety and depression and follow-up sexual risk behaviors (condom use and sexual partner concurrency) controlling for baseline sexual risk behaviors among 1113 male members of social groups known as “camps” in Dar es Salaam, Tanzania. Anxiety and depression were measured using the HSCL-25 and condom use and sexual partner concurrency were assessed through self-report. In separate models, increases in anxiety and depression were associated with sexual partner concurrency and with lower levels of condom use. In a combined model, both anxiety and depression appeared to independently affect concurrency but only depression was independently associated with condom use, with the association between anxiety and condom use being likely attributable to covariance with depression symptoms. The results of this study indicate the importance of screening and providing treatment for depression and anxiety disorders in high HIV-prevalence contexts, and the need to develop effective HIV prevention interventions targeting young men living with anxiety and depression.

Keywords

Tanzania; sexual behaviors; anxiety; depression; men

INTRODUCTION

There are 4 million young people ages 15–24 living with HIV [1], 85% of whom live in sub-Saharan Africa [2]. AIDS-related deaths among youth rose by 50% between 2005 and 2012 and adolescents and young adults account for a growing proportion of African populations [2], making the need to target and engage youth in HIV prevention increasingly important. 40% of new infections in Tanzania occur among 16–24 year olds [3] and 17% of women and 8% of men ages 15–19 years in Tanzania are HIV-positive [4]. Young men are important targets in preventing HIV transmission in this context as gender norms position them to control the terms and conditions of sexual relationships [5]. Traditional gender norms, still common in Tanzania's urban areas [6,7], encourage young men to engage in high risk sexual behaviors [8] by assigning value to greater numbers of sexual partners [9,10], and condomless sex [9]. Among young men in Dar es Salaam, the commercial capital of Tanzania, the proportion of young men reporting condom use at last sex seems to decline over adolescence (92% of 15-year-olds compared to 70% of 19-year-olds) [11], and the proportion reporting concurrent sexual partnerships increases with age, from 5% at age 15 to 44% by age 19 [11]. This trend is consistent with national studies in Tanzania; half of sexually active youth ages 15–24 surveyed in 2010 did not use a condom at last intercourse, and nearly one-third reported concurrent sexual partners [12].

Anxiety and depression are important correlates of sexual risk [13–18] and may influence risk through multiple mechanisms including substance use [17], maladaptive coping to deal with stress [19], and impaired decision making [20]. Cross-sectional associations have repeatedly been found between both anxiety and depression, and sexual risk behaviors [14–17,21], but we have little understanding of the longitudinal association between anxiety, depression, and sexual risk [14,18,22–24], particularly from low-income or high HIV-prevalence contexts as the bulk of the extant evidence comes from high income contexts [15,17,18,22,23,25–27]. As the presentation of mental health disorders varies culturally [28], it is reasonable to expect that the psychopathology of depression and anxiety disorders in this context [29], and therefore the risk behaviors associated with symptoms thereof, would be different than those seen in western populations. Due to its prevalence and frequent comorbidity with depression [30], understanding anxiety as a predictor of sexual risk is particularly needed in this context, as there has been only one study examining anxiety as a predictor of sexual risk in a sub-Saharan Africa to our knowledge [21]. Finally, given the importance of young men in HIV prevention, we need better evidence of these risk relationships among young men who have sex with women, a literature which is lacking. To address these gaps in the literature, we assessed the longitudinal relationship between symptoms of anxiety and depression and sexual risk behaviors among a population of socioeconomically marginalized young men in Dar es Salaam. The results of this study provide much needed information for the development of effective HIV prevention interventions relevant to the growing population of male youth in sub-Saharan urban areas.

METHODS

Study context

This study was conducted in the context of an HIV prevention trial, *A Multilevel Intervention to Reduce HIV Risk Among Networks of Men in Tanzania* (PI: Suzanne Maman; R01MH098690), a cluster randomized trial of a microfinance and health leadership intervention to prevent sexually transmitted infections and intimate partner violence [31]. Participants in this trial are members of venues known as “camps” in Dar es Salaam where men socialize and engage in small scale enterprise [6]. Most camp members are not formally employed and spend several hours each day at their camp [6].

Sampling and data collection

We identified camps for inclusion in the trial in four wards (equivalent to U.S. census tracts) of Dar es Salaam (Manzese, Tandale, Mwananyamala, and Mabibo) using an adaptation of PLACE (Priorities for Local AIDS Control Efforts) methodology [32]. To be eligible for inclusion in the trial, camps had to have between 20 and 80 members, have been in existence for at least one year prior to the baseline assessment, and report no violent incidents with weapons in the past 6 months. A total of 303 camps were verified, of which 205 were eligible. 60 camps were randomly selected for inclusion in the study. Through member rosters completed by the leaders of these camps, 1581 male members were identified and assessed for eligibility. To be eligible men had to: 1) be a registered camp member for at least three months; 2) plan on residing in Dar es Salaam for the next 30 months; 3) be 15 years or older; 4) visit the camp at least once per week; and 5) be willing to provide contact information for themselves and two family members or friends.

Eligible participants were asked to provide written consent, and consenting participants completed the baseline assessment in fall 2013 and a follow up assessment 12 months after the launch of the intervention. Both questionnaires were administered by trained Tanzanian interviewers in Swahili using computer assisted personal interviewing (CAPI). The interviews lasted approximately 60–90 minutes. A total of 1,258 men completed the baseline behavioral assessment, after which camp members from one camp (n=9) were removed from the study because of new information rendering them ineligible for participation, resulting in a final baseline sample of 1,249 men within 59 camps. 978 men in the 59 camps completed the follow-up assessment for 78% retention. Of the 271 men lost to follow-up, 138 men were unable to be contacted, 111 men were unavailable to schedule or did not attend the appointment for the follow-up assessment, and 22 men declined to participate in the follow-up assessment.

Measures

Symptoms of anxiety and depression were measured using a version of the Hopkins Symptom Checklist-25 (HSCL-25) [33] that had previously been translated and validated in Tanzania [29,34]. The HSCL-25 includes anxiety and depressive dimensions derived from the original Symptom Checklist-90 [35]. Participants rated a total of 25 symptoms (10 related to anxiety, 15 to depression) rated on a 4-point Likert-type scale. Anxiety and depression scores were calculated by taking the mean of the corresponding 10 and 15 items,

respectively. In the baseline sample both subscales showed good internal consistency ($\alpha = 0.94$ for anxiety, $\alpha = 0.91$ for depression). Where depression and anxiety are described dichotomously in the results, the recommended cutoff of 1.75 was used for clinical caseness [36].

Condom use was measured as an ordered-categorical variable created from men's self-report of condom use with their 3 most recent sexual partners over the past 12 months. For each of up to 3 of their most recent sexual partners, men reported how many times they had engaged in sex with the partner over the most recent month of the relationship, and how many of these times they had used a condom. We calculated men's proportion of condom use by dividing the number of times condoms were used by the total number of sex acts. Using these proportions, participants were assigned to one of three categories: "never use" (0% use), "some use" (greater than 0%, less than 100%), or "always use" (100%). This categorical approach was preferred over a continuous variable in the interest of minimizing the effect of recall bias, and over a dichotomous variable per the recommendations of Noar et al [37]. Sexual concurrency was evaluated by self-report of any overlapping sexual partnerships in the past year. Participants were asked to enumerate their 3 most recent relationships over the past 12 months and to report if they had sex with anyone else during any of these partnerships. This measure was developed following best practices recently recommended by USAID [38].

Covariates included in all analyses were age, education level, economic status, marital status, and treatment condition. Age was calculated based on reported date of birth, or when not available, the reported age in years. Participants reported the highest level of education they had completed and education responses were collapsed into three categories: primary school or less (no education, Standard 4 or less, or Standard 5–7); some secondary school (Form 1, Form 2, or Form 3); or secondary school completed or greater (Form 4 or Greater than Form 4). Socioeconomic status (SES) was evaluated through the Filmer Pritchett Wealth Index [39]. Participants were asked to indicate which of 10 possible assets they owned [40] and a composite score was created by weighting each asset by its factor loading on the first component in a principle components analysis [39]. The weighted composite score for each participant was categorized into terciles based on the entire baseline sample (the lowest tercile as "lowest SES", the highest tercile as "highest SES," and the remainder as "middle SES"). Marital status was evaluated by asking men if they had ever been married. Finally, as the intervention being evaluated was designed to affect condom use and sexual partner concurrency, treatment condition was included as a covariate to account for this design effect in all analyses.

Analysis

All statistical analyses were conducted in SAS v 9.4 and used a 2-sided significance level of 0.05. First we described demographic characteristics of the participants and levels of variables of interest at baseline and at the follow-up. To address missing data (primarily due to attrition), we applied sequential multiple imputation using the fully conditional specification in *Proc MI*. Forty imputations were created using a linear regression specification for continuous variables and a logistic regression specification for categorical

variables. To test the primary hypotheses while accounting for dependence due to clustering within camps, we fit multilevel models with a generalized link function. All models were fit using *Proc Glimmix* with quadrature estimation, random intercepts, and logit and cumulative logit link functions (for dichotomous concurrency, and three-level condom use, respectively).

All models assessed the association between the dependent variable of reported sexual behavior at the follow-up (condom use or concurrency) and the independent variable of within-person change in symptoms of anxiety or depression, controlling for baseline sexual behavior and the covariates listed above. Change scores of symptoms of anxiety and depression were chosen to increase the plausibility of causal inferences about the observed temporal associations between men's symptoms and sexual risk behaviors. Because of the frequent comorbidity between anxiety and depression, we were concerned about a possible level of collinearity between measurements of their symptoms (the correlation of symptoms of anxiety and depression was 0.76 at baseline and 0.74 at the follow-up). For this reason, we tested three models for each sexual behavior dependent variable (for a total of six models): 1) Change in anxiety symptoms only; 2) Change in depression symptoms only; and 3) Change in both anxiety and depression symptoms. We compared the parameter estimates and confidence intervals of models 1 and 2 to those in model 3 to assess the effects of our two primary predictors. The parameter estimates and significance levels from model 3 were used as evidence of the independent effect of symptoms of anxiety and depression rather than interpreted directly, given the high level of collinearity between these two sets of symptoms.

Ethical Review

The study was approved by the ethical review committees at the University of North Carolina at Chapel Hill and Muhimbili University of Health and Allied Sciences in Dar es Salaam, Tanzania. Individual written informed consent was obtained from all study participants.

RESULTS

1249 men were interviewed at baseline, of whom 1113 (89%) reported being sexually active. These 1113 men were included in the analyses presented below.

Participant characteristics

Sexually active men interviewed at baseline had an average age of 27 years (range 15–19; Table 1). Over half had a primary school education or less (59%), nearly a third had graduated from secondary school (31%), and the remaining 11% had some secondary school but had not graduated. A quarter of the men had ever been married (25%) and 38% had children.

Change in symptoms of anxiety and depression and sexual behaviors

Men had an average score of 1.4 (range: 1 to 4, with higher scores indicating more severe symptoms) for both anxiety and depression symptoms at both baseline and at the follow-up

assessment (Table 2). At baseline 21% and 19% reported clinically significant symptoms of depression and anxiety, respectively, based on a common clinical cutoff (score ≥ 1.75 [36]). At the follow-up 20% and 16% of respondents met the criteria for depression and anxiety, respectively. The mean within-person change scores in depression and anxiety were both close to zero, but there was substantial variation in change scores (-0.03 ± 0.76 for depression and -0.03 ± 0.72 for anxiety). The within-person correlation between baseline and follow-up symptoms was 0.08 for anxiety and 0.13 for depression.

At the sample level, there were relatively similar levels of condom use and concurrency across the two time points; about half of men reported never using condoms at both baseline and the follow-up (53% and 52%, respectively). More men reported always using condoms at baseline than at the follow-up (33% and 26%, respectively). 14% of men reported sometimes using condoms at baseline, and this proportion increased to 22% at the follow-up. Within individuals, there were significant changes in condom use; only 325 (48%) of men remained in the same condom use category at the follow-up as compared to baseline (Table 3). The within-person correlation between baseline and follow-up condom use was 0.21. Many more men reported concurrency at the follow-up (262, 32%) than at baseline (193, 20%; Table 2). 30% of men who did not report concurrency at baseline did so at the follow-up (Table 4) while half (49%) of men who reported concurrency at baseline reported concurrency again at the follow-up. The within-person correlation between baseline and follow-up concurrency was 0.16.

Model estimates

Estimates for the condom use and concurrency models are presented in Tables 5 and 6, respectively. In both, for each of the three model classes (anxiety only, depression only, both anxiety and depression), a model without control covariates is presented to the left and a full model with all covariates is presented to the right. Estimates discussed below are taken from the fully adjusted models.

Anxiety models—The random intercepts models for anxiety (Tables 5 and 6, Model 1) indicated that changes in anxiety symptoms were significantly associated with both condom use and concurrency at the follow-up, controlling for baseline behavior and all covariates. Specifically, men who experienced an increase in anxiety symptoms reported lower condom use levels and had higher odds of concurrency at the follow-up than did men with decreasing anxiety symptoms. For each one-unit increase in anxiety symptoms, there was an estimated 18% decrease in the odds of a higher level of condom use (aOR=0.82, 95% CI: 0.68, 0.99; Table 5, Model 1). For each one-unit gain in anxiety symptoms, there was an estimated 67% increase in the odds of sexual partner concurrency (aOR=1.67, 95% CI: 1.34, 2.08; Table 6, Model 1).

Depression models—The random intercepts models for depression (Tables 5 and 6, Model 2) indicated that changes in depression symptoms were also significantly associated with both condom use and concurrency at the follow-up, controlling for baseline behavior and all covariates. Specifically, men who experienced an increase in depression symptoms reported lower condom use levels and had higher odds of concurrency at the follow-up than

did men with decreasing depression symptoms. For each one-unit increase in depression symptoms, there was an estimated 24% decrease in the odds of a higher level of condom use (aOR=0.76, 95% CI: 0.64, 0.90; Table 5, Model 2). For each one-unit gain in depression symptoms, there was an estimated 60% increase in the odds of sexual partner concurrency (aOR=1.60, 95% CI: 1.30, 1.97; Table 6, Model 2).

Independent effects of anxiety and depression—To evaluate the relative strength of the association of anxiety and depression with each sexual behavior, we tested additional models for condom use and concurrency including both anxiety and depression change as predictors in the same models (Tables 5 and 6, Model 3). The width of the confidence intervals for the estimated effects of anxiety and depression on condom use showed little change between the separate and combined models (Table 5), indicating that collinearity had minimal effect on model fit. There was a larger widening of the confidence intervals in the combined concurrency model (Table 6), indicating that precision was negatively but modestly affected by collinearity between anxiety and depression. When the effects of anxiety and depression were estimated together, only depression was significantly associated with condom use, and not anxiety (Table 5, Model 3). For concurrency, when anxiety and depression effects were estimated together, anxiety and depression change predictors remained significant or marginally significant (Table 6, Model 3). This indicates that both anxiety and depression symptoms may independently affect concurrency, but the effect of each is attenuated when controlling for the other. On the other hand, the observed association between anxiety symptoms and condom use may be explained by anxiety's high level of covariance with depression.

DISCUSSION

In this sample of young male members of “camps” in Dar es Salaam, we found that many men experienced clinically significant symptoms of anxiety and depression (19% and 21%, respectively at baseline), and reported significant levels of sexual partner concurrency and inconsistent condom use. We found that changes in anxiety and depression were significantly associated with both condom use and concurrency at the follow-up controlling for baseline behavior. A secondary model indicated that anxiety and depression may independently affect concurrency but depression may be the primary predictor of condom use, with the observed relationship between anxiety and condom use being likely attributable to the covariance between anxiety and depression symptoms. These findings provide important evidence of the longitudinal association between symptoms of anxiety and depression and HIV risk in a primarily heterosexual population of young men in a sub-Saharan urban setting.

Though the present study did not assess potential mechanisms explaining the observed relationships, there are multiple theorized pathways through which negative affect in the form of symptoms of anxiety and depression may lead to sexual risk behaviors. Negative affective states may hamper one's ability to self-regulate and regulate thoughts, emotions, and behaviors [41,42]. Without this ability to self-regulate, individuals experiencing anxiety and depression may face greater challenges in avoiding risky sexual behaviors. Furthermore, when faced with negative emotions individuals may be motivated to act to relieve the

negative emotion [43,44], which can be achieved through self-gratifying behaviors (e.g. sex with a secondary partner) which serve as a distraction from the negative emotions [44–50]. Finally, people experiencing depressed emotions may have decreased motivation to care for themselves and to avoid risky behaviors [51]. Future research is needed to determine which of these mechanisms is in operation in this population.

These mechanisms may help to explain our finding that depression and not anxiety seemed to be independently associated with condom use. Because of the hopelessness, sense of futility, and tendency toward self-destructive behaviors associated with depression [52], men experiencing greater levels of depression may be less likely to use condoms. On the other hand, men with symptoms of anxiety may have a range of experiences of anxiety that affect condom use differently. While some individuals may experience excessive worry [53], leading to vigilance about condom use, others may experience impulsivity [54] that could lead to disregard for condom use. If at the individual level feelings of anxiety encourage or discourage condom use differently for different men, at the population level there may be no consistent observable relationship between general symptoms of anxiety and condom use. Future studies should seek to understand how different anxious tendencies (e.g. worry-type vs. impulsive-type) relate to condom use.

Men in this study experienced substantial changes in their anxiety and depression symptoms. Substantial fluctuations in symptoms of anxiety and depression have been frequently observed, particularly among adolescents and young adults [55–57], and may be dependent upon the extent to which a person's anxiety or depression is related to genetic heritability rather than environmental influences [57]. Further research is needed to determine the extent to which sexual risk behaviors are associated with enduring traits of anxiety or depression as opposed to shorter-term states of anxiety or depression which may be highly contextually influenced. To further elucidate these relationships, event-level data such as ecological momentary assessment (EMA) data will be needed [58]. No such study has been undertaken in sub-Saharan Africa to our knowledge. Future studies employing event-level data should include a focus on the relationship between anxiety and partner concurrency, as there has been an overwhelming focus on depression in this line of research to date.

Limitations

There are important limitations to this study. Respondents' willingness to report sexual risk behaviors may have been associated with the social acceptability of such an acknowledgment. In addition, reports of sexual risk behaviors were retrospective, and thus recall bias may be an issue. The coding of the condom use and concurrency variables was designed to minimize the influence of recall bias, as discussed in the Methods. The HSCL-25 scale which was used to measure symptoms of anxiety and depression was developed in a different cultural context than the study setting, though the version of the scale used has been previously validated in Tanzania [29,34]. Further, the two time points as measured a year apart do not allow us to establish whether affective manifestations of anxiety and depression directly precede decisions to engage in risky sexual behaviors. Event-level data is needed to establish a precise temporal relationship between anxiety, depression, and sexual risk [58]. Within the limitations of the data available, the hypotheses

as tested allow us to establish that changes in anxiety and depression are associated with sexual behaviors in this population.

Future directions

The results of this study indicate the need to address anxiety and depression among young men in HIV prevention efforts. Previous HIV prevention trials for women have been more effective when they have also been able to improve mental health [59]. While there are promising interventions to address depression in this context [60,61], we need evidence-based interventions to address the burden of anxiety in low resource settings. Very few treatment services are available for people suffering from anxiety, depression, and other common mental disorders in Tanzania; per 100,000 population there are only 2 psychiatric nurses, 0.04 psychiatrists, and 0.005 practicing clinical psychologists [62]. This lack of formalized mental health services highlights the need to promote scalable screening and treatment services in Tanzania. Promising models of mental health promotion which may be scalable in this setting include training nurses to implement mental health screening and treatment [61,63], or training lay people to screen for common mental disorders and make referrals to counseling [64–66]. To be able to target such interventions, we need to understand which men are most at risk for anxiety and depression. More population-based research is needed in sub-Saharan Africa, but the few available studies from this context indicate that depression may be associated with age [67,68], marital status [67,69,70], education [69,71], employment and income [68,69,71], and gender [67,69]. Though studies have observed a higher risk of depression among women, the substantial levels of clinically significant symptoms of anxiety and depression among men in this study should not be discounted. Research specific to men will be needed as the determinants of anxiety and depression are likely to be different among men than among women [67,69].

Conclusion

This study contributes to our understanding of the association between mental health and sexual risk behaviors among young men in an African urban setting. The results indicate that changes in anxiety and depression were associated with both condom use and concurrency, but that anxiety may only independently affect concurrency and not condom use. As we found clinically significant symptoms of anxiety and depression among one out of five men in this setting, efforts to screen and provide treatment for depression and anxiety disorders are indicated as a potentially important component of primary HIV prevention in this setting. The results further indicate the development of effective HIV prevention interventions targeting young men living with anxiety and depression.

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Table 1.Baseline Participant Characteristics (n=1113)^a

	Total
Age (y)	26.8 ± 7.1
Currently in school	97 (8.7%)
Education level (ref = less than primary school completed)	
Primary school or less	652 (58.7%)
Some secondary school	116 (10.5%)
Secondary school completed or greater	342 (30.8%)
Socioeconomic status	
Lowest	291 (26.2%)
Middle	435 (39.1%)
Highest	386 (34.7%)
Ever married	277 (25.0%)
Has children	423 (38.0%)

^aData are expressed as No.(%) or Mean ± SD

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Table 2.Cross-sectional description of symptoms of anxiety and depression and sexual risk^a

	Baseline	Follow-up
Depression score	1.43 ± 0.57	1.42 ± 0.56
Anxiety score	1.38 ± 0.51	1.36 ± 0.53
Depression (score > 1.75)	237 (21.3%)	174 (20.0%)
Anxiety (score > 1.75)	206 (18.5%)	141 (16.2%)
Both depression and anxiety (both scores > 1.75)	164 (14.7%)	101 (11.6%)
Condom use		
Never	491 (52.7%)	408 (51.6%)
Sometimes	133 (14.3%)	176 (22.3%)
Always	308 (33.1%)	207 (26.2%)
Concurrency	193 (20.2%)	262 (32.1%)

^aData are expressed as No. (%) or Mean ± SD

Table 3.

Condom use change

		Follow-up condom use		
		None	Some	Always
Baseline condom use	None	216 (59.7%)	73 (20.2%)	73 (20.2%)
	Some	54 (53.5%)	26 (25.7%)	21 (20.8%)
	Always	82 (37.3%)	55 (25.0%)	83 (37.7%)

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Table 4.

Concurrency change

		Follow-up concurrency	
		No	Yes
Baseline concurrency	No	400 (69.9%)	172 (30.1%)
	Yes	76 (51.0%)	73 (49.0%)

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Condom use models

Table 5.

Variable	1. Anxiety change only			2. Depression change only			3. Both anxiety & depression					
	aOR (95%CI)	p	aOR (95%CI)	p	aOR (95%CI)	p	aOR (95%CI)	p	aOR (95%CI)	p		
Age	--	--	0.97 (0.94, 0.99)	0.012	--	--	0.97 (0.94, 0.99)	0.014	--	--	0.97 (0.94, 0.99)	0.014
Treatment condition	--	--	0.92 (0.70, 1.21)	0.556	--	--	0.91 (0.68, 1.20)	0.492	--	--	0.91 (0.68, 1.20)	0.493
SES (ref=low)												
Mid	--	--	1.08 (0.76, 1.52)	0.676	--	--	1.06 (0.75, 1.50)	0.731	--	--	1.06 (0.75, 1.50)	0.730
High	--	--	1.17 (0.77, 1.78)	0.455	--	--	1.16 (0.76, 1.77)	0.484	--	--	1.16 (0.76, 1.77)	0.483
Education (ref=primary or less)												
Some secondary	--	--	0.91 (0.60, 1.39)	0.671	--	--	0.93 (0.61, 1.43)	0.753	--	--	0.94 (0.61, 1.43)	0.757
Secondary completed or greater	--	--	1.37 (1.02, 1.83)	0.035	--	--	1.38 (1.03, 1.85)	0.032	--	--	1.38 (1.03, 1.85)	0.032
Ever married	--	--	0.56 (0.37, 0.83)	0.004	--	--	0.56 (0.37, 0.83)	0.004	--	--	0.56 (0.37, 0.83)	0.004
Baseline condom use (ref=never)												
Sometimes	1.17 (0.78, 1.77)	0.445	1.04 (0.69, 1.57)	0.845	1.18 (0.78, 1.78)	0.431	1.05 (0.69, 1.58)	0.826	1.18 (0.78, 1.78)	0.438	1.04 (0.69, 1.58)	0.835
Always	2.30 (1.66, 3.19)	<0.0001	1.80 (1.28, 2.55)	<0.0001	2.33 (1.68, 3.24)	<0.0001	1.83 (1.29, 2.59)	0.001	2.32 (1.67, 3.24)	<0.0001	1.82 (1.28, 2.58)	0.001
Anxiety change	0.82 (0.68, 0.99)	0.042	0.82 (0.68, 0.99)	0.042	--	--	--	--	1.04 (0.79, 1.37)	0.772	1.02 (0.77, 1.15)	0.873
Depression change	--	--	--	--	0.76 (0.64, 0.90)	0.002	0.76 (0.64, 0.90)	0.002	0.74 (0.57, 0.95)	0.017	0.75 (0.58, 0.97)	0.026

Table 6.

Concurrency Models

Variable	1. Anxiety change only			2. Depression change only			3. Both anxiety & depression					
	aOR (95%CI)	p	aOR (95%CI)	p	aOR (95%CI)	p	aOR (95%CI)	p	aOR (95%CI)	p		
Age	--	--	0.98 (0.95, 1.01)	0.129	--	--	0.98 (0.95, 1.01)	0.122	--	--	0.98 (0.95, 1.01)	0.124
Treatment condition	--	--	0.83 (0.61, 1.12)	0.226	--	--	0.84 (0.62, 1.14)	0.265	--	--	0.84 (0.62, 1.14)	0.260
SES (ref=low)												
Mid	--	--	0.98 (0.63, 1.51)	0.915	--	--	0.99 (0.64, 1.54)	0.959	--	--	0.99 (0.64, 1.54)	0.962
High	--	--	1.06 (0.65, 1.74)	0.807	--	--	1.06 (0.65, 1.75)	0.808	--	--	1.07 (0.65, 1.76)	0.781
Education (ref=primary or less)												
Some secondary	--	--	0.83 (0.50, 1.38)	0.480	--	--	0.82 (0.50, 1.36)	0.438	--	--	0.82 (0.50, 1.36)	0.446
Secondary completed or greater	--	--	0.99 (0.71, 1.40)	0.964	--	--	0.98 (0.70, 1.38)	0.909	--	--	0.99 (0.70, 1.39)	0.943
Ever married	--	--	1.27 (0.81, 2.00)	0.289	--	--	1.27 (0.81, 1.98)	0.300	--	--	1.28 (0.81, 2.00)	0.287
Baseline concurrency	2.50 (1.76, 3.54)	<.0001	2.51 (1.76, 3.58)	<.0001	2.47 (1.74, 3.49)	<.0001	2.48 (1.75, 3.55)	<.0001	2.52 (1.78, 3.57)	<.0001	2.54 (1.78, 3.62)	<.0001
Anxiety change	1.67 (1.35, 2.08)	<.0001	1.67 (1.34, 2.08)	<.0001	--	--	--	--	1.38 (1.02, 1.86)	0.036	1.40 (1.04, 1.89)	0.026
Depression change	--	--	--	--	1.61 (1.31, 1.97)	<.0001	1.60 (1.30, 1.97)	<.0001	1.29 (0.96, 1.71)	0.087	1.27 (0.96, 1.67)	0.095