The impact of substance use, sexual trauma and intimate partner violence on sexual risk intervention outcomes in couples: A randomized trial

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Abstract

Background—Few HIV prevention interventions focus on sexual risk reduction as mutual process determined by couple members, though risk behaviors are inter-dependent.

Purpose—This trial examined the impact of substance use, history of sexual trauma and intimate partner violence on sexual risk associated with participation in a risk reduction intervention.

Methods—HIV sero-concordant and -discordant multicultural couples in Miami, Florida (n = 216) were randomized to group (n = 112) or individual (n = 104) couple-based interventions.

Results—Group intervention participants increased condom use in couples in which women had a history of sexual trauma ($F(2,221) = 3.39$, $p = .036$) and by partners of alcohol users. History of sexual trauma was a determinant of conflict resolution, predicting negative communication and intimate partner violence.

Conclusions—Results emphasize the need for group sexual risk reduction interventions targeting sexual trauma, partner violence and substance use among HIV seroconcordant and discordant couples.

Many of those engaging in the highest sexual risk behaviors report substance use and a history of sexual trauma (1). Rates of sexual trauma in HIV seropositive men and women entering clinical trials are high (e.g., 65% women, 32% men) (2–3) compared to the general population. A history of sexual trauma among women has been associated with multiple social, behavioral and health problems (4–6), including substance use, depression, domestic violence, prostitution, sexual risk behavior, multiple sex partners, repeated victimization and sexually transmitted diseases, including HIV (7–14). Among people living with HIV/AIDS,

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a history of sexual truama is also associated with HIV treatment failure and higher morbidity and mortality (15). Among substance abusers, the associated high levels of distress and repeated traumatic stressors may also trigger relapse and reduce inhibition to engage in risk behaviors (16).

Models of the interaction of sexual trauma, substance use, HIV, and sexual risk have suggested that sexual trauma is directly (17) and indirectly associated with HIV risk (18–19) through a pathway of drug abuse and adult victimization. Abuse severity has also predicted HIV risk behavior after accounting for childhood trauma and other behavioral and psychological problems (20). However, the relationship between sexual trauma, substance use and risky sexual behavior is also influenced by sexual partners' behaviors (e.g., partners' substance use, intimate partner violence (9,10,19,21–23)).

Multilevel modeling with dyads examines the influence of partners (24), but most HIV prevention interventions have focused primarily on the individual rather than the couple (12,25) as the unit of change and analysis, neglecting the role played by partners (26). Only recently have studies examined the effects of sexual trauma, substance use and violence on the uptake of behavioral interventions within a dyadic model (10) or the effect of partners (27), though most neglect the interrelated impact of both partners on sexual risk behavior (28). Of particular importance, prevention studies have failed to assess the influence of inter-partner on the uptake of sexual risk reduction interventions aimed at HIV sero-discordant and –concordant couples.

This study examined the relationships between substance use, a history of sexual trauma, intimate partner violence and sexual risk behavior following a behavioral intervention. It was hypothesized that dyads in which women reported a history of sexual trauma, and one or both members reported substance use or intimate partner violence, would be less likely to benefit from the intervention and more likely to engage in sexual risk behavior (decreased condom use) at follow-up. Additionally, this study assessed the relative contribution of partners' substance use on intervention outcomes, theorizing that male partners' substance use prior to sex would be the primary predictor of decreased condom use.

Methods

Study Design and Population

Ethical review and approval was received from the Institutional Review Board at the University of Miami Miller School of Medicine prior to study onset. All procedures followed were in accordance with the ethical standards of the University of Miami Miller School of Medicine Institutional Review Board and with the Helsinki Declaration of 1975, as revised in 2000. The NOW2 (New Opportunities for Women & Partners) study recruitment, screening, and enrollment were conducted from May 2006 through October 2009; participants were recruited by study staff not affiliated with the recruitment sites. Participants were recruited in-person as well as through flyers and word-of-mouth referral. Venues for recruiting included community health centers, community agencies and non-governmental organizations and churches. All participants provided written informed consent at the time of enrollment. Data presented were drawn from a longitudinal study conducted in urban Miami-Dade County in South Florida. Heterosexual couples (N = 216 couples) were enrolled and completed a baseline assessment and were randomized to condition (group = 112 couples; individual = 104 couples). Randomization was accomplished using a generated table of random numbers; participants were assigned to condition by a study staff member following baseline assessment and completed recruitment of each cohort (n = 20 couples). Sample size was determined from earlier studies conducted by this team, assuming a retention rate of 85%; interim analyses were conducted to ensure

intimate partner violence was not associated with participation in either study condition. Couples attended 4 gender-concordant sessions and completed 3 follow-up assessments. The study consisted of a group-based intervention aimed at increasing couples' skills in sexual risk reduction, condom negotiation, and conflict resolution strategies.

Eligibility screening was conducted at recruitment venues and by telephone. Couples were eligible for the study if, after screening, they met the following criteria; a) member of a couple for six months or more and both members willing to enroll and attend study sessions, b) age 18 or older, c) one or both members of the couple diagnosed HIV seropositive, d) sexually active within the last month, e) in sero-discordant couples, negative member willing to be tested for HIV, f) willing and able to give informed consent, and g) able to understand and communicate in English. Couples status was verified at the study offices to ensure male and female dyads were primary sexual partners (29). Couples were separated and asked a rotating series of six parallel questions of an intimate and personal nature drawn from a pool of 21 questions that were compared for consistency. The majority (85%) of couples screened for eligibility met enrollment criteria, and enrolled in the study. The most frequent reason for non-enrollment was lack of sexual intercourse within the last month and not being part of a couple for at least 6 months.

Participants provided written informed consent prior to completing an audio computer-assisted self-interview. All data were collected at study offices located at the University of Miami Miller School of Medicine complex adjacent to Jackson Memorial Hospital in urban Miami, South Florida, USA. Study IDs were coded to ensure participant confidentiality. All participants received $50 for completing each study assessment and $25 for each study session attendance. In the event of permanent loss of one member of a couple (e.g., illness, death, estrangement), individual participants were encouraged to continue attending sessions, but were not allowed to participate with a new partner. The primary causes for attrition were substance use relapse, incarceration, illness and death.

Procedures

Both group and individual intervention conditions consisted of four structured two-hour sessions delivered weekly by a single female or male facilitator, matched to the gender of the participant, who had been trained by a clinical psychologist in the delivery of the intervention and had at least a bachelor's degree or 6 years of HIV prevention experience. Quality assurance was conducted by digitally recording all intervention sessions, and recordings and session-specific quality assurance checklists were reviewed by a clinical psychologist to monitor fidelity to condition and provide feedback to facilitators.

The group-based HIV risk reduction intervention was guided by the theories of reasoned action (i.e., attitudes and subjective norms influence intentions which influence beliefs about behavior) (30) and planned behavior (i.e., perceived behavioral control influences intentions and behavior) as predictors of sexual barrier use (31). While the theory of reasoned action has been utilized in previous research regarding condom use and sexual behavior (30), it was anticipated that the planned behavior component (31) would best describe the role playing and training elements of the intervention, in describing the process of behavioral decision making and planning in this population. The core components of the group intervention focused on sexual risk reduction, adherence to the use of male and female condoms, conflict resolution, sexual negotiation and effective communication, effect of substance use on sexual risk behavior, and antiretroviral medication adherence. The intervention was guided by cognitive behavioral principles (e.g., reframing thoughts, heightening participants' awareness of their reactions to condom use in their sexual relationships and reframing automatic thoughts that might impede barrier use and communication) as the principal behavior change strategy. Sessions addressed intimate partner violence and antecedents to

conflict, anger and violence, and were designed to enhance participants' abilities to be aware of and de-escalate conflict and potential violence as it arose, providing techniques to select appropriate times and safe venues for discussions that could become problematic. Each session included relaxation techniques (deep breathing, imagery or meditation) which were also presented as methods to reduce anger and the potential for violent confrontation. Group strategies included establishment of a safe environment for sharing personal experiences, role-playing negotiation, problem solving and communication skills, and hands-on experiential training with condoms. While all sessions were gender separate (i.e., mens' sessions and womens' sessions), participants were given "homework assignments" to practice with their partners between sessions, and provided with a week's supply of male and female condoms. Each subsequent week, participants were encouraged to share their experiences and apply cognitive behavioral skills in problem solving.

The individual-based condition was delivered to either the male or female partner in individual sessions by a gender-matched facilitator. The weekly session content was modeled on the Florida Department of Health Counseling and Testing Services program. Participants were provided with HIV risk reduction information and counseling, and counseling to assist in making plans for their own behavior change and strategies for ongoing appraisal of their own behaviors (32). Participants were provided with hands-on condom use training, opportunity for discussion with the facilitator, and a week's supply of male and female condoms at the end of each session. All were encouraged to practice HIV-risk reduction strategies and share HIV information with their partners. The session represented an enhanced standard of care for HIV sero-concordant and -discordant couples. Individual sessions were supplemented with HIV related health education videos for time equivalence with the group condition.

Data collection

Study assessments for participants in both conditions were baseline, and 6- and 12-month post-intervention; while assessments were collected using a computer system, all assessors were blind to study condition. The assessments and intervention sessions were conducted in a private room in the study offices, which were nearby public transportation and adjacent to the county public hospital and infectious disease clinic. Assessments included self-report behavioral, psychological and interpersonal information, including a) demographics and history of sexual trauma, b) recent (one month) intimate partner violence, c) condom use (typical, monthly and weekly), and 2) recent (one month) substance or alcohol use prior to intercourse. Assessments by audio computer-assisted self-interview provided audio and video representation of all questions, also enabling individualized use by those with low literacy. Correlations between reported sexual behavior between primary partners were significant ($p < .001$) but there was no correlation between reported sexual behavior that included both primary and non-primary partners ($r = -.066$, $p > .05$); discrepant reports between partners were reflected in the error terms in individual responses within the dyad unit in the multilevel mixed effects model.

Outcomes: Assessment Instruments

Demographic Questionnaire—This questionnaire elicited data on age, religion, nationality, ethnicity, educational level, employment status, residential status, HIV serostatus (date of HIV infection (if known), mode of infection with HIV), living situation, number of children and history of substance or alcohol treatment, and history of sexual trauma. Due to higher reported rates of sexual trauma among women and its association with intimate partner violence (1–17), only women were assessed on history of sexual trauma as it was anticipated that rates among men would be too low to analyze.

Conflict Tactics Scale—This 18-item scale (33) was modified to assess current conflict resolution strategies across 4 domains: positive, negative, violent and extremely violent. Scores presented indicate the total Likert scale scores of the combined items in four subscales, a) positive communication, (e.g., discussion of information); b) negative communication (e.g., swearing or sulking); c) violence (e.g., threatening to hit to hitting) and d) extreme violence (punching to assault with a deadly weapon). Participants reported previous experiences with relationship violence and reported *their partners'* frequency of violence in the last month (scored using a Likert scale of 0 (*never*), 1 *(once)*, 2 *(twice)*, 3 *(3–5 times)*, 4 *(6–10 times)*, 5 *(11–20 times)*, 6 (*more than twenty times*), and the type. Subscale scores used in analyses were grand mean centered.

Sexual Activities Questionnaire—This instrument was adapted from the Sexual Risk Behavior Assessment Schedule (34). Responses included self-reported frequency of alcohol or drug use (substance use) prior to the initiation of sexual activity over the previous month and associated condom use (scored using a Likert scale of 0 (*never*), 1 *(once)*, 2 *(sometimes)*, 3 *(half of the time)*, 4 *(most of the time)*, 5 *(all of the time)*. This scale was used to assess current drug and alcohol use during sex with primary partners.

Sexual diary—This measure assessed the number of occurrences of sexual intercourse and number of male and female condoms used, if any, for each day of the week. The type of condom used was assessed using pictorial representations of male and female condoms distributed in the intervention. This scale was used to calculate the rate of condom use as a percentage of total occurrences of sexual intercourse with both primary and non-primary partners.

Risk reduction strategies—This instrument (35) assessed if participants have practiced specific risk reduction actions. Items are responded to using an interval scale of how often the strategy was used since the last study visit. Strategies included refusing to have sex because the respondent did not have a condom. In addition, participants report their typical condom use during sex with primary and non-primary partners using a 5-point rating scale (1= Every time, 2 = Almost every time, 3 = Sometimes, 2 = Almost never, and 1 = Never).

Statistical analyses

Descriptive analyses were used to characterize participants by demographic and behavioral variables, and correlations were estimated using Pearson correlations. The analytic sample sizes varied somewhat across demographic and behavioral factors due to instances of missing data on questionnaire items. Because this research involved longitudinal dyadic data (36), multilevel modeling using restricted maximum likelihood was used for the primary analyses. Unless otherwise noted, these models treated condition as a between-dyads independent variable, and time and gender were treated as within-dyads predictor variables.

Our general data analytic approach was to examine mean differences in outcomes as a function of time, condition, gender and one additional predictor (e.g. sexual trauma) while controlling for nonindependence due to dyad. In most models there were no significant gender main effects or interactions and so gender was removed from these models. Significant interactions were followed with simple effects analyses.

Our first analysis, framed by the Actor-Partner Interdependence Model approach, investigated the effects of the two partners' alcohol and drug use, along with the effects of condition and time (there were no gender effects) on rate of condom use during the past week. In this analysis both the person's and the partner's alcohol (or drug) use were included. Actor effects measure the effects of the person's own status on a predictor on that

person's outcomes (e.g., do individuals who report using alcohol prior to sex report lower condom use?); and partner effects measure the effects of the partner's status on the person's predictor (e.g., do individuals whose partners report more frequent alcohol use report lower condom use?).

Our second set of analyses examined the effects of history of sexual trauma on how often participants used condoms when they had sex in the past month. As before, gender did not have an effect on the outcome as either a main effect or in an interaction, and so these models simply included time, condition, and history of sexual trauma as predictors. Our final set of analyses examined the effects of time, condition, and the woman's history of sexual trauma on both partners' reports of communication and intimate partner violence. There was some evidence of gender differences for these measures, and so gender was also included as a predictor. The outcome variables for each of these analyses, including sexual risk behavior, typical condom use and weekly condom use, as well as other key predictor variables (e.g., substance use prior to sex with primary partners, intimate partner violence), were assessed at baseline, 6 month and 12 month post-intervention for each of the two partners. History of sexual trauma was assessed only at baseline. All analyses were conducted with Predictive Analytics Software 18 (PASW®, SPSS Microsoft Corp, Chicago).

Results

Participants were primarily African-American ($n = 329$, 76%), ranging in age from 20 to 73 (mean 45 ± 8) years old. Most were not working ($n = 325$, 75%) and reported less than $5,000 of personal income for the previous year ($n = 231$, 54%). Over half ($n = 222$, 51%) reported that they were on disability. Although more than half lived in a personal (or partner's) house or apartment ($n = 237$, 55%), 19% ($n = 82$) were living in a homeless shelter or halfway house at the time of study entry. Almost all ($n = 398$, 92%) had a grade twelve education or less. Eighty five percent of participants were HIV-positive ($n = 368$). Fifteen percent ($n = 64$) were negative, resulting in 30% ($n=64$) of couples being serodiscordant. The mean length of time participants had been HIV-positive was 11.2 ± 6.7 years, and most ($n = 264$, 72%) reported that they were on antiretroviral medication at study entry. Two hundred sixteen couples completed baseline assessments utilized in the dyadic analyses. (see Table 1 and Figure 1).

At baseline, 40% ($n = 83$) of women reported a history of sexual trauma. Overall, 32% ($n = 139$) of participants were substance users or binge drinkers; 26% ($n = 111$) engaged in alcoholic bingeing, 17% ($n = 72$) were drug users, and 10% ($n = 44$) used both alcohol and drugs. Intimate partner violence was reported by 52% ($n = 225$) of participants. Unprotected sex was reported by 53% ($n = 148$) of those participants who were sexually active in the last month ($n = 280$, 65%), and 17% ($n = 48$) reported using alcohol or drugs within one hour of having sex.

Rate of condom use as a function of time, condition, and both partners' substance use

In these analyses time, condition, the person's own alcohol use (actor), and the partner's alcohol use (partner) were used to predict typical rate of condom use (computed as a proportion and therefore ranging from 0 to 1). Drinking (and drug use) was assessed by the number of times the individual had been drinking one hour prior to having sex with 5 = all the time and 1 = never, in the past month. Although neither the overall effect of time ($F(2,74) = .97$, $p = .385$) nor the main effect of condition ($F(1,116) = 3.13$, $p = .079$), was statistically significant, there was a significant interaction effect between time and condition ($F(2,74) = 4.501$, $p = .014$). This interaction showed that the rate of condom use did not change over time in the individual condition, whereas, in the group condition, the rate of condom use increased from baseline to 6 months ($t(77) = 2.699$, $p = .009$) and from baseline

to 12 months ($t(77) = 2.227$, $p = .029$). The intercepts presented in Table 2 estimate the means for this condition by time interaction.

Actor Alcohol Use—Across both conditions and time, there was a non-significant trend towards a negative coefficient for actor alcohol use ($b = -.055$, $t(153) = 1.74$, $p = .083$) such that individuals who reported more alcohol use prior to sex had somewhat lower rates of typical condom use. However, there was a three-way interaction between actor alcohol use, time, and condition ($F(2,88) = 10.64$, $p < .001$). Table 2 presents the separate estimates of actor and partner unstandardized regression coefficients for drinking across the three times and two conditions. As can be seen in the table, the actor effect in the individual condition at baseline was negative ($b = -.106$, $t(151) = 2.07$, $p = .040$) indicating that these individuals reported lower condom use when using alcohol prior to sex. In contrast, in the group condition at baseline, the effect of actor substance use on typical condom use was positive ($b = .102$, $t(222) = 2.19$, $p = .029$), such that these individuals reported more condom use when using alcohol prior to sex. Thus, the two conditions differed significantly at baseline ($t(220) = 3.01$, $p = .003$).

Changes in the relationship between actor drinking and condom use across time are apparent in Table 2. Within the individual condition, the actor effect for substance use increased significantly from baseline to 6 months ($t(58) = 2.10$, $p = .040$) and from baseline to 12 months ($t(84) = 2.40$, $p = .018$); there was virtually no change between 6 and 12 months. Thus, although participants who reported higher drinking prior to sex tended to report lower condom use at baseline, this relationship was close to zero at the two follow-up assessments. The pattern for the group condition was different. There was no significant change in the actor effect for drinking in the group condition from baseline to 6 months ($t(106) = 1.63$, $p = .10$). However, from 6 to 12 months, there was a substantial change in the group condition, with the actor effect changing ($b = -.319$, $t(79) = 2.27$, $p = .026$) to become a strong negative effect at 12 months ($b = -.361$), such that these individuals reported lower rates of condom use when using alcohol.

Partner Alcohol Use—Across both conditions and time there was a positive coefficient for partner substance use ($b = .096$, $t(187) = 2.93$, $p = .004$), such that individuals whose partners reported more alcohol use prior to sex had higher typical condom use rates. The effects of partner alcohol use also differed significantly across in time by condition interaction ($F(2,150) = 4.55$, $p = .012$). In the individual condition at baseline, there was an association between the partner's alcohol use prior to sex and the degree to which the individual reported typically using condoms ($b = .162$, $t(83) = 3.76$, $p < .001$), suggesting that these individuals reported greater condom use when their partner was using alcohol prior to sex. In contrast, in the group condition at baseline, there was no effect of partner alcohol use on typical condom use ($b = .025$, $t(220) = .42$, $p = .67$). The difference between partner effects at baseline between conditions approached significance ($b = .137$, $t(211) = 1.86$, $p = .065$).

There was significant change over time in the partner effects for the two conditions. In the individual condition, the partner effect for alcohol use decreased significantly from baseline to 6 months ($t(75) = 2.63$, $p = .010$), indicating that at 6 months there no association between partner drinking and rate of condom use, and no change in this association from 6 to 12 months ($t(57) = .85$, $p = .397$). In the group condition, the effect of partner alcohol use did not change from baseline to 6 months ($t(176) = .29$, $p = .773$), however, the partner effect increased substantially by 12 months, ($t(79) = 2.27$, $p = .026$). Thus, in the group condition at 12 months post intervention, individuals whose partners drank more prior to having sex reported higher rates of condom use than those whose partners drank less prior to sex.

In sum, although there are differences in the size of actor and partner effects for drinking across time and condition, there is evidence that individuals who drank more prior to sex reported using condoms less often, but individuals whose partner's drank more prior to sex reported using condoms more often. The same analyses were conducted using actor and partner use of drugs prior to sex as predictors along with time and condition, and as noted, only the condition by time interaction was significant.

Frequency of condom use during sex as a function of time, condition, and history of sexual trauma

In this analyses, we first examined the effects of time, condition, and history of sexual trauma on the frequency of condom during sex (5 = Every time, 1 = Never; there were no effects of gender). There was a significant effect of time ($F(2,411) = 3.54$, $p = .030$) such that frequency of using condoms during sex increased significantly from baseline ($M = 3.79$, $SD = 1.48$) to 6 month follow-up ($M = 4.01$, $SD = 1.35$), with a modest decrease by 12 month follow-up, so the 12 month mean ($M = 3.95$, $SD = 1.37$) did not differ from baseline. The effect of time was not qualified by condition. Instead, there was a significant three way interaction between time, condition, and history of sexual trauma ($F(2,411) = 4.54$, $p = .011$). The means and standard deviations for this analysis are presented in Table 3.

Breaking down this interaction, analyses revealed no significant main effects or interactions between condition and time for the couples in which the woman did not report a history of sexual trauma. In contrast, in couples positive for sexual trauma there was a significant time by condition interaction ($F(2,221) = 3.39$, $p = .036$). In the individual condition there were no differences in condom use during sex across time for couples with a history of sexual trauma ($F(2,164) = .06$, $p = .942$). However, couples endorsing sexual trauma in the group condition did show evidence of change over time ($F(2,216) = 5.22$, $p = .006$). In the group condition, condom use increased significantly from baseline to 6 month follow-up and this increase was also significant from baseline to 12 month follow-up.

Communication and intimate partner violence by condition, time, gender, and history of sexual trauma

Scores on the subscales of positive communication, negative communication, violence, and extreme violence were tested for mean differences as a function of intervention condition, time, gender, and history of sexual trauma. Gender was included in the analyses as it showed significant main effects and interactions for these variables.

Positive Communication—There was an overall main effect of time for positive communication ($F(2,367) = 5.48$, $p = .005$) (baseline $M = 7.759$, $SD = 4.761$; 6 months $M = 7.459$, $SD = 5.017$; 12 months $M = 6.716$, $SD = 4.906$). Pairwise tests with a Bonferroni correction indicated that baseline values dropped significantly over time, with significant differences between baseline and 12 months. A main effect for history of sexual trauma also emerged ($F(1,205) = 5.20$, $p = .024$) such that positive communication was significantly lower ($M = 6.99$, $SD = 4.69$) in couples with a history of sexual trauma than in couples without ($M = 7.71$, $SD = 5.06$). There was also evidence of both a time by condition by history of sexual trauma interaction ($F(2,368) = 4.84$, $p = .012$) as well as an interaction between gender, time, condition, and trauma ($F(2,368) = 3.39$, $p = .035$). The cell means are presented in Table 4.

To investigate these interactions, we examined the time, condition, and history of sexual trauma interaction separately for men and women, and found that this interaction was significant for men ($F(2,337) = 6.76$, $p = .001$) but not for women ($F(2,384) = 1.73$, $p = .179$). Table 4 depicts the means for men, and follow-up tests for the interaction for men

revealed that men in couples with a history of sexual trauma showed only a main effect of time ($F_{(2,185)}$ = 3.13, p = .046), indicating that men's reports of women's positive communication decreased over time. In contrast, for couples with no history of trauma, the time by condition interaction was significant ($F_{(2,151)}$ = 8.809, p < .001). In the individual condition, positive communication decreased over time ($F_{(2,75)}$ = 10.53, p < .001), with the 12 month assessment showing lower positive communication than the baseline or 6 month assessments. However, in the group condition, there was no evidence of change over time, ($F_{(2,74)}$ = 2.296, p = .108).

Negative Communication—Results for negative communication revealed a significant main effect of time ($F_{(2,358)}$ = 9.95, p < .001) such that across both conditions negative communication decreased from baseline (M = 10.85, SD = 8.27) to 6 months (M = 9.38, SD = 7.85) and from baseline to 12 months (M = 9.02, SD = 8.31), with no difference between 6 and 12 month means. There was also a significant main effect of sexual trauma ($F_{(1,203)}$ = 9.28, p = .003) such that negative communication was significantly higher within couples with a history of trauma (M = 10.72, SD = 8.24) than those without (M = 8.65, SD = 7.83). There was also a significant main effect of gender ($F_{(1,200)}$ = 4.33, p = .039), with men reporting higher negative communication (M = 10.49, SD = 8.26) than women (M = 9.21, SD = 8.18).

These main effects were qualified by two significant interactions. First, there was a significant history of sexual trauma by gender interaction ($F_{(1,200)}$ = 13.10, p < .001). This interaction showed that men reported substantially higher negative communication by women than women did by men in couples not endorsing a history of sexual trauma (men M = 10.394, SD = 8.14; women M = 7.095, SD = 7.20), but in couples with trauma, women reported somewhat higher negative male communication than men (men M = 10.418, SD = 8.12; women M = 11.010, SD = 8.366). Second, there was a time by sexual trauma interaction ($F_{(2,358)}$ = 3.55, p = .030). This interaction shows that whereas negative communication dropped significantly over time in the couples without a history of sexual trauma ($F_{(2,171)}$ = 13.005, p < .001) (baseline M = 10.198, SD = 7.81; 6 months M = 8.380, SD = 8.215; 12 months M = 7.051, SD = 7.086), no such decrease occurred for the couples with a history of sexual trauma ($F_{(2,194)}$ = 1.295, p = .276) (baseline M = 11.223, SD = 8.406; 6 months M = 10.168, SD = 7.342; 12 months M = 10.725, SD = 8.247).

Violence—Results for violence indicated there were significant main effects of sexual trauma ($F_{(1,204)}$ = 3.88, p = .050) and gender ($F_{(1,203)}$ = 4.28, p = .040). Greater violence was reported in couples with a history of sexual trauma (M=6.636, SD = 10.267) than in couples without (M = 4.822, SD = 9.177). In addition, men reported greater female violence (M = 6.514, SD = 9.951) than women did by men (M = 5.181, SD = 9.650). However, both main effects were qualified by a significant interaction between gender and sexual trauma ($F_{(1,203)}$ = 13.221, p < .001). In couples without a history of sexual trauma, women reported substantially less violence than men (men M = 7.008, SD = 10.650; women M = 2.876, SD = 7.104) but in couples with a history of sexual trauma women reported somewhat more violence than men (men M = 6.157, SD = 9.370; women M = 7.082, SD = 11.032).

Extreme Violence—Finally, only the history of sexual trauma by gender interaction was a significant predictor of extreme violence ($F_{(1,200)}$ = 13.945, p < .001). As was the case for violence, in couples without a history of sexual trauma men reported more extreme violence than women (men M = 1.210, SD = 2.949; women M = .410, SD = 1.581), but in couples with a history of trauma, women reported greater extreme violence than did men (men M = .776, SD = 2.417; women M = 1.452, SD = 3.713).

Discussion

This study examined the relative impact of substance use, a history of sexual trauma and intimate partner violence on sexual behavior following group and individual couples-based behavioral interventions. Contrary to the primary hypotheses, dyads in which women reported a history of sexual trauma and/or one member reported a partner's substance use prior to sex were more likely to benefit from the group intervention and engage in and sustain condom use. As hypothesized, neither condition increased condom use among couple members actively engaging in substance use prior to sex. However, both men and women contributed to lower levels of condom use when using alcohol prior to sex, rather than male substance use being the primary predictor of decreased condom use as originally hypothesized.

Sexual risk reduction outcomes, i.e., increased condom use, suggest that while participants increased their condom use by study midpoint, as in previous studies addressing sexual risk reduction (37), gains were not maintained longer term, at 12 months. However, the group intervention was more effective among women with a history of sexual trauma among these HIV-affected multicultural low socioeconomic status couples, and couples did increase and maintain condom use over the 12 month study period. These results suggest that the group intervention was particularly useful for couples in which the woman had a history of sexual trauma. While this outcome supports previous literature that have used group sexual risk reduction interventions in this population (16, 38), the incorporation of male partners represents a novel approach.

As hypothesized, dyads in which one or both members reported substance use associated with sex were at greater risk of engaging in unprotected sex. However, while substance use is often a shared behavior between sexual partners, sexual partners in the intervention condition increased their use of condoms when the other partner was drinking. The use of the Actor Partner Interdependence Model approach, in contrast with more traditional multilevel modeling, illustrated that the decrease in condom use associated with substance use was determined by the "actor", rather than the "partner", in the dyad. Thus, results support the use of the group intervention for partners of substance users.

In contrast, results suggest that the neither condition was effective in improving condom use among active alcohol users, the "actors" in the dyad, during sex. This outcome suggests that partners participating in the group condition were more likely to take a more active role in ensuring condom use during sex at 12 months post-intervention. Thus, interventions that encourage planning ahead for alcohol use may be most useful for those endorsing more frequent alcohol use prior to sex, perhaps engaging those with steady partners as "designated drivers" to increase couple condom use.

While there were no effects of either condition on intimate partner violence, couples' reported communication was determined, in part, by history of sexual trauma and condition. Overall, both positive and negative communication declined over time. However, among couples reporting a history of sexual trauma, positive communication declined and negative communication increased. In fact, men in couples with a history of sexual trauma reported that women's communication became less positive, while women reported that men's communication became more negative. In contrast, among couples without a history of sexual trauma, men reported more negative communication by women, however, this negative communication decreased over time. While results suggest a relative stability of communication styles within existing couples, there also appears to be potential difficulty in influencing established communication and intimate partner violence patterns. However, the

differences in communication between couples with and without a history of sexual trauma may account for or contribute to the differences identified in partner violence (39).

Couples with a history of sexual trauma were more likely to report experiencing intimate partner violence, such that women reported more violence by men than men did by women. In contrast, in couples without a history of sexual trauma, women reported less violence by men than men did by women. The risk of intimate partner violence highlights the need for violence risk reduction interventions targeting women with a history of sexual trauma that encourage or allow the participation of both sexual partners, where appropriate and safe. In addition, results suggest that the fundamental differences between women with and without a history of sexual trauma (12) may impact a variety of aspects of couples' relationships. It was unexpected that men in this sample reported more violence by women than women did by men in couples without a history of trauma, which may be due to a variety of factors, including co-occurring intoxication by women or partners and higher overall rates of negative communication reported by sexual trauma endorsing couples. Future research should explore the relative impact of interventions on specific types of communication styles within couples, such as topic shifting, transitions, problem solving and directed attribution of responsibility.

This study provides support for couples-focused risk reduction interventions that include analyses targeting the sexual dyad (26). The evaluation of treatment efficacy using dyadic data analyses and the Actor Partner Interdependence Model approach (36) provided support for the identification of the unique roles of both partners in sexual risk behavior and focused information to guide the development of more effective risk reduction strategies. As HIV prevention efforts refocus on prevention at the dyadic level to address prevention as a mutually influenced process determined by the couple as a unit (26, 40–41), more studies may examine the interdependent role of interpersonal variables, e.g., communication, intimate partner violence, substance use, in HIV prevention decision-making within couples (27, 41–44).

This study was limited primarily by its reliance upon self-reported risk behavior, but the use of the audio computer-assisted self-interview may have reduced the potential for biased responding. In addition, the setting for the sample was urban, and results may not generalize to the larger population. Results may also be limited by the intervention itself, which was not designed to address sexual trauma or substance use directly. Studies should continue to target history of sexual trauma and substance use within the framework of HIV prevention. Finally, not all participants were sexually active at baseline and their responses to the intervention could not be interpreted.

Conclusions

This study of HIV sero-positive and -discordant multicultural couples identified a large number of couples with women with a history of sexual trauma, individuals engaging in substance use during sex, and intimate partner violence. Clinicians working with couples living with HIV, while addressing sexual risk behavior, should consider sexual trauma, intimate partner violence and substance use when "prescribing" behavioral interventions which may exceed the capabilities of their clients. Patient interventions should acknowledge the impact of violent partners and substance use, and the difficulties associated with behavior change in unpredictable settings. Research should continue to explore the use of models which account for the influence of both members of the sexual dyad in the use of the effective behavioral interventions available (14,16,21,25,28).

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References

1. Brown-Peterside P, Ren L, Chiasson MA, Koblin BA. Double trouble: Violent and non-violent traumas among women at sexual risk of HIV infection. Women Health. 2002; 36:51–64.10.1300/J013v36n03_04 [PubMed: 12539792]

2. Kalichman SC, Sikkema KJ, DiFonzo K, Luke W, Austin J. Emotional Adjustment in Survivors of Sexual Assault Living With HIV-AIDS. J Trauma Stress. 2002; 15:289–296.10.1023/A:1016247727498 [PubMed: 12224800]

3. Markowitz SM, O'Cleirigh C, Hendriksen ES, Bullis JR, Stein M, Safren SA. Childhood sexual abuse and health risk behaviors in patients with HIV and a history of injection drug use. AIDS Behav. 2011; 15:1554–60. [PubMed: 21161362]

4. Wegman HL, Stetler CA. Meta-analytic review of the effects of childhood abuse on medical outcomes in adulthood. Psychosom Med. 2009; 71:805–12. [PubMed: 19779142]

5. Sachs-Ericsson N, Cromer K, Hernandez A, Kendall-Tackett K. A review of childhood abuse, health, and pain-related problems: the role of psychiatric disorders and current life stress. J Trauma Dissociation. 2009; 10:170–88.10.1080/15299730802624585 [PubMed: 19333847]

6. Wilson DR. Stress Management for Adult Survivors of Childhood Sexual Abuse: A Holistic Inquiry. Western J Nursing Research. 2009; 20(10):1–25.10.1177/0193945909343703

7. Liebschutz J, Savetsky JB, Saitz R, Horton NJ, Lloyd-Travaglini C, Samet JH. The relationship between sexual and physical abuse and substance abuse consequences. J Substance Abuse Treat. 2002; 22:121–128.10.1016/S0740-5472(02)00220-9

8. Mehrabadi A, Craib KJ, Patterson K, et al. Cedar Project Partnership. The Cedar Project: A comparison of HIV-related vulnerabilities amongst young Aboriginal women surviving drug use and sex work in two Canadian cities. Int J Drug Policy. 2008; 19:159–68.10.1016/j.drugpo.2007.07.005 [PubMed: 17870461]

9. Myers HF, Wyatt GE, Loeb TB, et al. Severity of Child Sexual Abuse, Post-Traumatic Stress and Risky Sexual Behaviors Among HIV-Positive Women. AIDS Behav. 2006; 10:191–199.10.1007/s10461-005-9054-6 [PubMed: 16479413]

10. El-Bassel N, Gilbert L, Witte S, Wu E, Chang M. Intimate Partner Violence and HIV Among Drug-Involved Women: Contexts Linking These Two Epidemics Challenges and Implications for Prevention and Treatment. Subst Use Misuse. 2011; 46:295–306.10.3109/10826084.2011.523296 [PubMed: 21303249]

11. Meade CS, Kershaw TS, Hansen NB, Sikkema KJ. Long-term correlates of childhood abuse among adults with severe mental illness: adult victimization, substance abuse, and HIV sexual risk behavior. AIDS Behav. 2009; 13:207–216.10.1007/s10461-007-9326-4 [PubMed: 17968646]

12. Stockman JK, Campbell JC, Celentano DD. Sexual violence and HIV risk behaviors among a nationally representative sample of heterosexual American women: the importance of sexual coercion. J Acquir Immune Defic Syndr. 2010; 53:136–43.10.1097/QAI.0b013e3181b3a8cc [PubMed: 19734802]

13. Van Roode T, Dickson N, Herbison P, Paul C. Child sexual abuse and persistence of risky sexual behaviors and negative sexual outcomes over adulthood: Findings from a birth cohort. Child Abuse Neglect. 2009; 33:161–172.10.1016/j.chiabu.2008.09.006 [PubMed: 19327837]

14. Wilson HW, Widom CS. Sexually transmitted diseases among adults who had been abused and neglected as children: A 30-year prospective study. Am J Pub Health. 2009; 99(Suppl 1):S197–203.10.2105/AJPH.2007.131599 [PubMed: 19218173]

15. Pence BW. The impact of mental health and traumatic life experiences on antiretroviral treatment outcomes for people living with HIV/AIDS. J Antimicrob Chemother. 2009; 63:636–40. [PubMed: 19153077]

16. Hien DA, Campbell ANC, Killeen T, et al. The Impact of Trauma-Focused Group Therapy upon HIV Sexual Risk Behaviors in the NIDA Clinical Trials Network "Women and Trauma" Multi-Site Study. AIDS Behav. 2010; 14:421–430.10.1007/s10461-009-9573-7 [PubMed: 19452271]

17. Wyatt GE, Myers HF, Williams JK, et al. Does a history of trauma contribute to HIV risk for women of color? Implications for prevention and policy. Am J Public Health. 2002; 92:660–5.10.2105/AJPH.92.4.660 [PubMed: 11919068]

18. Medrano MA, Desmond DP, Zule WA, Hatch JP. Histories of childhood trauma and the effects on risky HIV behaviors in a sample of women drug users. Am J Drug Alcohol Abuse. 1999; 25:539–606.10.1081/ADA-100101881

19. Wilson HW, Widom CS. Pathways from childhood abuse and neglect to HIV-risk sexual behavior in middle adulthood. J Consult Clin Psychol. 2011; 79:236–246.10.1037/a0022915 [PubMed: 21355638]

20. Elze DE, Auslander W, McMillan C, Edmond T, Thompson R. Untangling the impact of sexual abuse on HIV risk behaviors among youths in foster care (abstract). AIDS Educ Prev. 2001; 13:377–389.10.1521/aeap.13.4.377.21427 [PubMed: 11565596]

21. Wyatt GE, Longshore D, Chin D, et al. The efficacy of an integrated risk reduction intervention for HIV-positive women with child sexual abuse histories. AIDS & Behav. 2004; 8:453–474.10.1007/s10461-004-7329-y

22. Senn TE, Carey MP, Vanable PA. Childhood and adolescent sexual abuse and subsequent sexual risk behavior: Evidence from controlled studies, methodological critique, and suggestions for research. Clin Psychol Rev. 2008; 28:711–735.10.1016/j.cpr.2007.10.002 [PubMed: 18045760]

23. Johnson SD, Cottler LB, Ben Abdallah A, O'Leary CC. History of sexual trauma and recent HIV-risk behaviors of community-recruited substance using women. AIDS Behav. 2011; 15:172–8. [PubMed: 20625927]

24. Eaton LA, West TV, Kenny DA. HIV Transmission Risk among HIV Seroconcordant and Serodiscordant Couples: Dyadic Processes of Partner Selection. AIDS Behav. 2009; 13:185–195.10.1007/s10461-008-9480-3 [PubMed: 18953645]

25. Puffer ES, Kochman A, Hansen NB, Sikkema KJ. An evidence-based group coping intervention for women living with HIV and history of childhood sexual abuse. Int J Group Psychother. 2011; 61:98–126.10.1521/ijgp.2011.61.1.98 [PubMed: 21244204]

26. Burton J, Darbes LA, Operario D. Couples-focused behavioral interventions for prevention of HIV: systematic review of the state of evidence. AIDS Behav. 2010; 14:1–10.10.1007/s10461-008-9471-4 [PubMed: 18843530]

27. Sales JM, Lang DL, DiClemente RJ, et al. The Mediating Role of Partner Communication Frequency on Condom Use Among African American Adolescent Females Participating in an HIV Prevention Intervention. Health Psychol. 2012; 1:63–69.10.1037/a0025073 [PubMed: 21843001]

28. Sikkema KJ, Wilson PA, Hansen NB, Kochman A, Neufeld S, Ghebremichael MS. Effects of coping intervention on transmission risk behavior among people living with HIV/AIDS and a history of childhood sexual abuse. J Acquir Immune Defic Syndr. 2008; 14:506–13.10.1097/QAI.0b013e318160d727 [PubMed: 18176319]

29. El-Bassel N, Witte SS, Gilbert L, et al. The efficacy of a relationship-based HIV/STD prevention program for heterosexual couples. Am J Public Health. 2003; 93:963–969. [PubMed: 12773363]

30. Albarracin D, Johnson BT, Fishbein M, Muellerleile PA. Theories of reasoned action and planned behavior as models of condom use: A meta-analysis. Psychol Bull. 2001; 127:142–61. [PubMed: 11271752]

31. Ajzen I. The theory of planned behavior. Organ Behav Hum Dec. 1991; 50:179–211.

32. Florida Department of Health. [Accessed August 20, 2012] HIV Counseling and Testing Annual Report. 2004. http://www.doh.state.fl.us/disease_ctrl/aids/trends/ct/2005Data/Annual2004.pdf

33. Straus MA. Measuring Intrafamily Conflict and Violence: The Conflict Tactics Scales. J Marriage Family. 1979; 41:75–88.

34. Meyer-Bahlberg, HFL.; Ehrhardt, AA.; Exner, TM., et al. Sexual Risk Behavior Assessment Schedule: Adult (SERBAS-A-DF-4) Manual. 1990.

35. Kalichman SC, Cain D, Weinhardt L, et al. Experimental components analysis of brief theory-based HIV/AIDS risk-reduction counseling for sexually transmitted infection patients. Health Psychol. 2005; 24:198–208. [PubMed: 15755234]

36. Kenny, DA.; Kashy, DA.; Cook, WL. Dyadic data analysis. New York: Guilford Press; 2006.

37. Rugpao, S.; Koonlertkit, S.; Pinjaroen, S., et al. Patterns of male condom use and risky sexual behaviors in Thai couples receiving ongoing HIV risk reduction counseling. Abstract presented at: XV International AIDS Conference; 11–16 July 2004; Bangkok. p. abstract no. ThPeC7408

38. Sikkema KJ, Hansen NB, Kochman A, et al. Outcomes from a group intervention for coping with HIV/AIDS and childhood sexual abuse: Reductions in traumatic stress. AIDS Behav. 2007; 11:49–60.10.1007/s10461-006-9149-8 [PubMed: 16858634]

39. Sikkema KJ, Hansen NB, Meade CS, Kochman A, Fox AM. Psychosocial Predictors of Sexual HIV Transmission Risk Behavior among HIV-Positive Adults with a Sexual Abuse History in Childhood. Arch Sex Behav. 2009; 38:121–134.10.1007/s10508-007-9238-4 [PubMed: 17999171]

40. Harman JJ, Amico KR. The relationship-oriented information-motivation-behavioral skills model: a multilevel structural equation model among dyads. AIDS Behav. 2009; 13:173–84. [PubMed: 18259851]

41. Orengo-Aguayo R, Perez-Jimenez D. Impact of relationship dynamics and gender roles in the protection of HIV discordant heterosexual couples: an exploratory study in the Puerto Rican context. P R Health Sci J. 2009; 28:30–9. [PubMed: 19266737]

42. Perez-Jimenez D, Seal DW, Serrano-Garcia I. Barriers and facilitators of HIV prevention with heterosexual Latino couples: beliefs of four stakeholder groups. Cultur Divers Ethnic Minor Psychol. 2009; 15:11–7. [PubMed: 19209976]

43. Persson A. Sero-silence and sero-sharing: managing HIV in serodiscordant heterosexual relationships. AIDS Care. 2008; 20:503–506. [PubMed: 18449830]

44. Montgomery CM, Lees S, Stadler J, et al. The role of partnership dynamics in determining the acceptability of condoms and microbicides. AIDS Care. 2008; 20:733–740. [PubMed: 18576176]
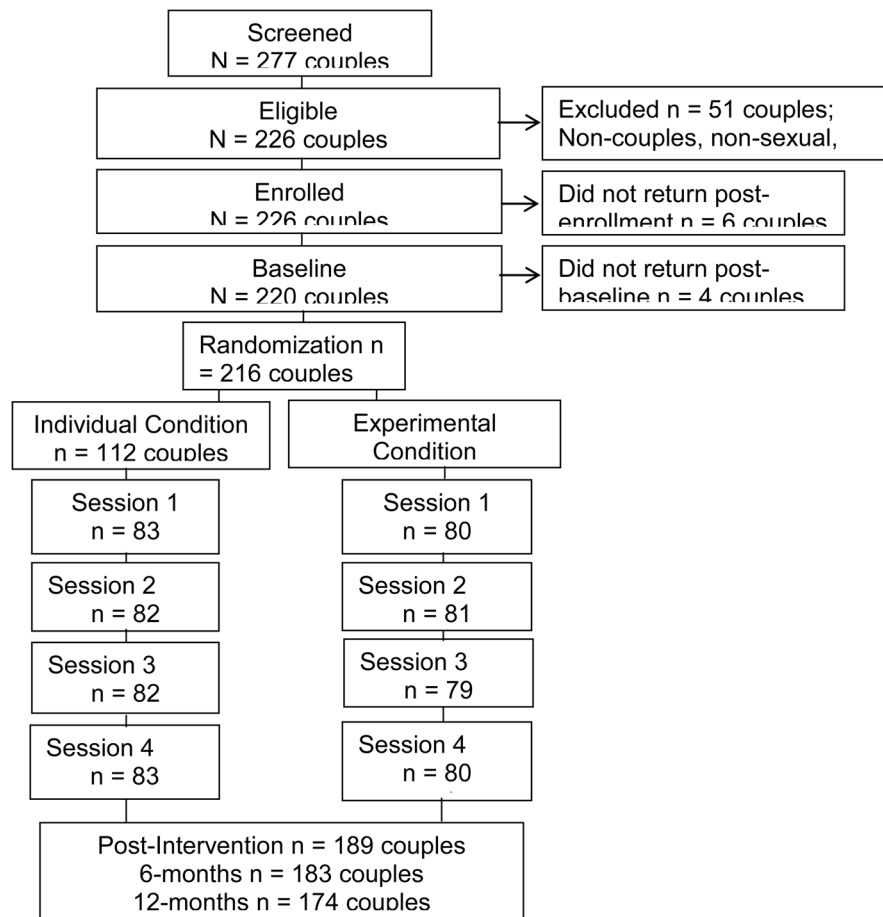
Figure 1.
CONSORT Flow Diagram

Table 1

Demographics by condition assignment

Characteristic (n = 432 individuals)	Total n(%) m(sd)	Group n=224	Individual n=208	t, χ^2
Age	45(8)	44(7)	45(8)	1.7
Ethnicity				9.6 **
African-American	329(76%)	184(82%)	145(70%)	
Hispanic	35(8%)	12(5%)	23(11%)	
Other	68(16%)	28(13%)	40(19%)	
Employment status				1.0
Employed	107(25%)	60(27%)	47(23%)	
Unemployed	325(75%)	164(73%)	161(77%)	
Income (USD annually)				3.9
<5,000	231(54%)	117(52%)	114(55%)	
5,000–10,000	157(36%)	78(35%)	79(38%)	
>10,000	44(10%)	29(13%)	15(7%)	
Education				.05
Grade 12	398(92%)	207(92%)	191(92%)	
> Grade 12	34(8%)	17(8%)	17(8%)	
HIV-Positive Only n = 368				
Length of time since HIV diagnosis (yrs)	11.2(6.7)	11.1(6.3)	11.3(7)	.19
On antiretroviral therapy				.30
Yes	264(72%)	140(70%)	124(73%)	
No	105(28%)	59(30%)	46(27%)	

*
$p < .05$,

**
$p < .01$,

***
$p < .001$

Table 2

The effects of actor and partner drinking prior to sex on rate of condom use across conditions and time

		Intercept	Actor Drinking *b*	Partner Drinking *b*
Individual	Baseline	.667	−.106[*]	.162[**]
	6 months	.605	.037	−.023
	12 months	.599	.039	.036
Group	Baseline	.622	.102[*]	.025
	6 months	.805	−.042	.057
	12 months	.773	−.361[**]	.318[**]

Note. Table entries are unstandardized regression coefficients.

[*]
p < .05,

[**]
p < .01

Table 3

Means and standard deviations of frequency of condom use as a function of time, condition, and history of sexual trauma

	History of Sexual Trauma		No History of Sexual Trauma	
	Group Condition	**Individual Condition**	**Group Condition**	**Individual Condition**
Condom Use				
Baseline $M(SD)$	3.60(1.52)	3.92(1.43)	3.84(1.50)	3.92(1.43)
6 months	3.98(1.31)	3.86(1.50)	3.95(1.37)	3.86(1.50)
12 months	4.10(1.29)	3.89(1.41)	3.72(1.51)	3.89(1.41)

Table 4

Means and standard deviations for positive communication as a function of gender, time, condition, and woman's history of sexual trauma

	Men			
	History of Sexual Trauma		No History of Sexual Trauma	
	Group Condition	**Individual Condition**	**Group Condition**	**Individual Condition**
Baseline *M*(*SD*)	7.53(5.21)	6.69(4.22)	6.46(4.41)	8.94(5.07)
6 months	6.96(4.27)	5.93(5.02)	8.32(4.97)	8.00(4.89)
12 months	5.67(4.25)	5.87(4.47)	7.80(4.92)	5.46(3.56)
	Women			
Baseline *M*(*SD*)	7.21(4.50)	8.00(5.03)	7.71(3.86)	9.19(4.73)
6 months	8.00(4.32)	6.39(4.62)	7.16(5.60)	8.26(5.96)
12 months	7.07(7.74)	7.81(5.32)	6.67(5.48)	7.54(5.87)