

Reducing Sexual Risk Behavior Among High-Risk Couples in Northern India

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Published online: 12 May 2012
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Abstract

Background With a population of 1.1 billion, India is considered to be a country in which effective prevention interventions could contain the development of a human immunodeficiency virus (HIV) epidemic. Heterosexual transmission accounts for 85 % of the extant HIV infections.

Purpose This study sought to assess the feasibility of conducting a group, culturally tailored behavioral intervention and its impact on sexual barrier use, self-efficacy, knowledge, conflict resolution, and coping among high-risk heterosexual couples in Northern India.

Method This pilot study was conducted at the Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, India from February 2008 to January 2009. Thirty sexually active high-risk couples were drawn from a convenience sample of PGIMER patients attending infectious disease and family planning clinics. Couples participated in 1 month of three weekly gender-concordant behavioral intervention groups and were individually administered assessments preintervention and post-intervention. The intervention was tailored to the Northern Indian context and addressed sexual barrier use, human immunodeficiency virus

(HIV)/sexually transmitted infection transmission, and cognitive behavioral skill building focusing on sexual negotiation and communication.

Results The participants had a mean age of 32 years (men) and 29 years (women), and the majority had at least 10 years of education. At baseline, the majority reported inconsistent condom use (<100 % of the time; 64 % of women, 59 % of men). Post-intervention, nearly all participants reported consistent condom use (100 % of the time; 100 % of men, 97 % of women). Participants also reported decreased verbal aggression, increased self-efficacy, and increased HIV-related knowledge, and women increased their use of positive coping tactics.

Conclusions The results highlight the potential to successfully utilize a group intervention to discuss sensitive issues such as sexual risk behavior among both men and women. Strategies to improve condom use and communication without increasing intimate partner violence in high-risk couples may be an important adjunct to preventing the development of a generalized epidemic in India.

Keywords Intimate partner violence · Self-efficacy · Knowledge · Coping · Sexual risk reduction · India

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Introduction

With a population of 1.1 billion, India is considered to be a “next wave” country [1], a country in which effective prevention interventions *could* contain the development of a human immunodeficiency virus (HIV) epidemic. AIDS has been predicted to become the dominant cause of mortality on the subcontinent in the next decade [2]. To date, HIV has been concentrated in southern (64 %) and northeastern India, reflecting transmission via intravenous drug-using

populations and sexual transmission associated with major highway routes and commercial sex workers [3]. In contrast, Northern India, with the exception of Delhi, has been primarily associated with HIV cases among those traditionally considered “low risk,” e.g., housewives and wealthier members of society, though more recently, Punjab has been increasingly associated with intravenous drug use cases [4]. Public health recommendations in India [5–9], including the HIV awareness train, the Red Ribbon Express, in February 2012, have called for behavioral interventions to reduce sexual risk among high-risk men and women while there is still time to change the course of the pandemic.

Heterosexual transmission accounts for 85 % of the extant HIV infections, and although much attention has been focused upon high-risk subpopulations (e.g., long-distance truck drivers, commercial sex workers), the principal bridge for infection to married couples is via husbands having multiple partners or contact with high-risk partners, such as commercial sex workers. Among Indian men, these high-risk sexual contacts have been associated with male beliefs regarding their own sexual health and performance (the ability to function sexually). A variety of studies in India [10, 11] have noted that most men value sexual performance over risk of disease, perceive sexual problems as threats to masculinity, and tend to seek treatment for sexual problems from traditional Ayurvedic or homeopathic rather than allopathic providers. Men’s sexual risk behavior is considered to stem from “socially sanctioned norms of masculinity that prioritize sexual entitlement and multiple partnering, and physical and sexual domination” [12].

Sexual behavior and condom use in India appear to be influenced by the interaction of risk of exposure to disease, risk of pregnancy, culture and gender norms regarding sexual dynamics within the couple relationship, as well as the involvement of peers and relatives. For example, family members, i.e., husband’s parents, also impact decision-making, including sexual, reproductive, and financial decisions [13]. Cultural issues, such as perceptions of ability to control life events and personal vulnerability to HIV, perceived power within sexual relationships [14–16], and the maintenance of harmony within marital relationships [17] appear to contribute to sexual decision-making. Women may accept infidelity as a punishment for sins committed in a previous lifetime (“karma”) [18]. Gender-based power dynamics and sexual practices that promote disease transmission may also profoundly limit women’s ability to protect themselves, as men are the primary sexual decision-makers in couples.

Domestic violence is a predictor of HIV [19–23] and is associated with poverty, limited education [24], and reduced contraception [25–27]. For many women, the threat of domestic violence and emotional disruption also prohibits communication and sexual negotiation within the couple

[18, 24–28]. Many women report that they are too shy to communicate with their partners about concerns regarding sexual health [15, 28, 29], while their husbands may potentially remain sexually active outside their relationship following marriage [30, 31].

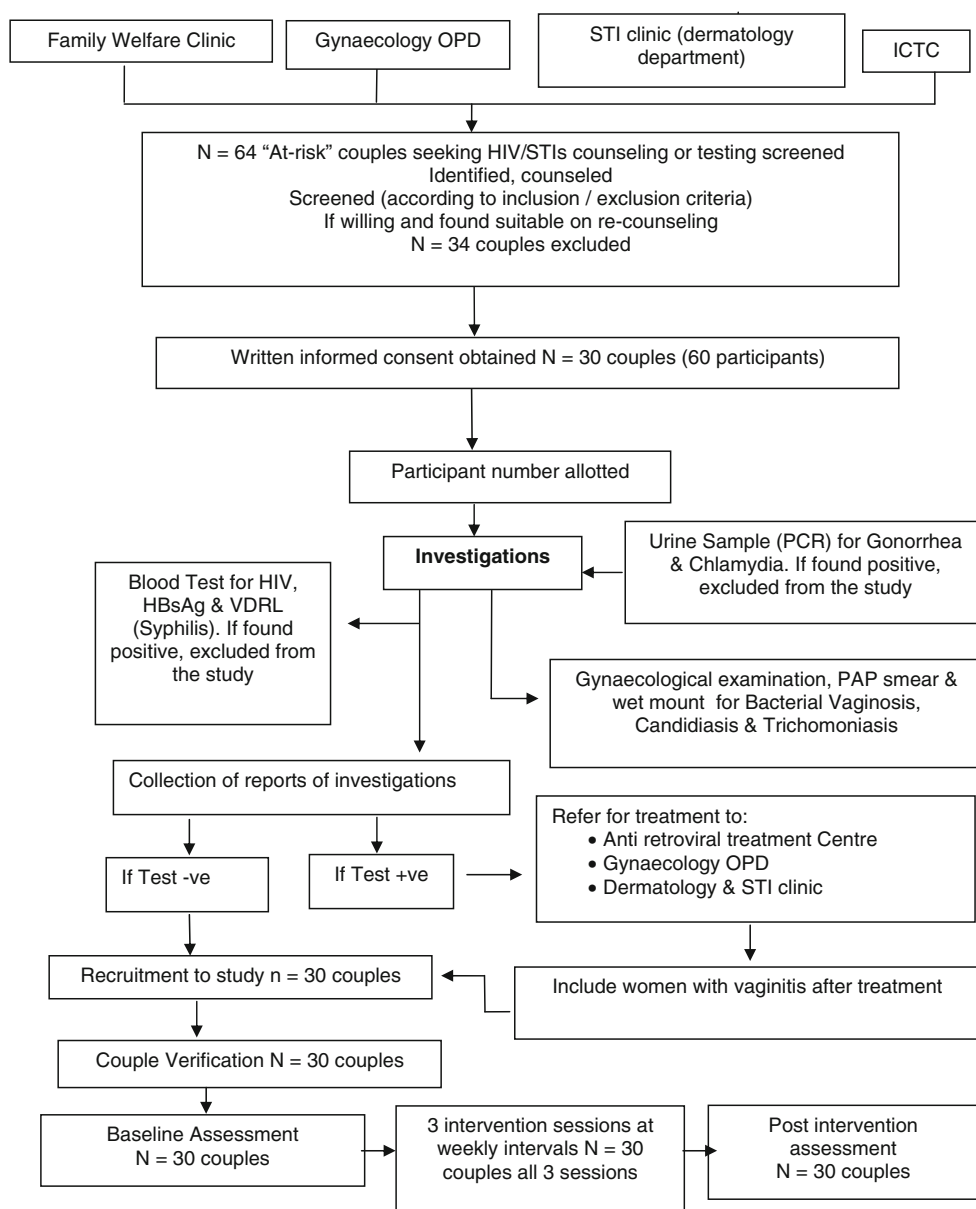
While culturally specific gender power dynamics constrain communication within couples [32–34], sexual negotiation is essential to controlling the transmission of HIV and sexually transmitted infections (STIs) [19, 35]. A study in Jaipur, India found that increased communication within couples produced greater receptivity to condom use [19]. However, men rarely discuss sexual needs or sexual health with their wives, and HIV interventions for men that focus on developing sexual communication skills are needed [36]. Some men may initiate conversation about sexual risk only when there is suspected infidelity [36]. Women’s perceptions of power or dominance by their male partners have also been associated with limited condom use and sexual decision-making [37]. To date, effective sexual risk reduction programs for high-risk men in heterosexual relationships have been limited [37].

HIV prevention efforts have primarily focused on prevention at the individual level and have neglected to see prevention as a process which is mutually influenced and determined by the couple as a whole [38, 39]. Recent research has begun to focus on the role of communication in HIV prevention and decision-making of sexual barrier use within couples [39–43].

This pilot study was designed to test the feasibility of implementing a behavioral intervention to decrease sexual risk and enhance coping, self-efficacy, HIV-related knowledge, and sexual negotiation skills among Indian heterosexual couples “at risk” for acquiring STIs, including HIV. An evidence-based intervention [44, 45] was tailored to the Northern Indian context using focus groups and key informant interviews and utilized group cognitive behavioral strategies designed to modify sexual risk behaviors among Indian couples. It was hypothesized that it would be feasible to utilize a group intervention to reduce sexual risk behavior. In addition, it was hypothesized that it would be feasible to utilize the group intervention to enhance conflict resolution, HIV knowledge, coping (e.g., problem solving and response to difficult situations associated with sexual negotiation), and self-efficacy (e.g., the individual’s perceived ability to carry out a behavior).

Method

This study was carried out at the Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, India from February 2008 to January 2009 in collaboration with the Miller School of Medicine, University of Miami

Fig. 1 CONSORT diagram and flowchart

(UM). Prior to study onset, approval from the PGIMER Ethics Committee and the UM Institutional Review Board was obtained. See Fig. 1 for the CONSORT diagram.

Individuals attending the PGIMER Family Welfare and STI Clinics and the Departments of Immunopathology and Gynecology were approached by the study recruiter during alternating clinic days for a 1-month period and asked to participate in the study. Potential candidates were screened for participation and asked to return with their partners ($n=64$ couples). The initial contacts at the Family Welfare and Gynecology units were female; the initial contacts at the STI clinic were male; the majority of participants were attending the clinics alone at the time of initial contact. Reasons for exclusion were outside catchment area ($n=7$), husband unwilling to participate ($n=11$), not able to return for follow-

up ($n=12$), HIV/sexually transmitted disease (STD) diagnosis ($n=2$), and pregnancy ($n=2$). Enrollment required that couples were (1) 18–59 years, (2) sexually active within 1 week, (3) in a monogamous heterosexual relationship for 1 month or more, (4) not pregnant, and (5) negative for HIV/STIs but considered themselves “at risk” (i.e., seeking testing or treatment for STIs or HIV during the preceding 3 months). Eligible couples ($n=30$) were consented, enrolled, and assessed by assessors in Hindi. Participants were tested for STIs (HIV, hepatitis B [serology], chlamydia, and gonorrhea [urine polymerase chain reaction]). Female participants had a pelvic examination for cervical dysplasia and vaginal infections (i.e., Pap smear and vaginal swabs). All participants were provided with compensation for transportation to the two assessment sessions.

Assessment Measures

The following instruments were administered by a study assessor at baseline and post-intervention in a private room at the study office located within the PGIMER. Couples were not evaluated together; all assessments were individually administered to each participant in a private room by a gender-concordant study assessor. All data were identified with a participant ID number and stored independently of individually identifying consent forms. Intervention groups were conducted by gender-concordant facilitators not conducting assessments.

Demographic Interview

This interview included data on age, religion, nationality, ethnicity, educational level, employment status, residential status, marital status/current partner status, number of children, and current living situation.

Sexual Behavior

Participants were asked to recount their sexual activities and indicated for each of the 7 days of the past week whether or not they had sexual intercourse, and if so, the type of sexual barrier method used, if any, e.g., male and female condoms, vaginal lubricants. The diary used a pictorial representation of the three types of products that were introduced in the intervention and was administered at baseline, post-intervention, and at each weekly visit. The final score represented the total percentage of sex acts using a combination of both male and female condoms over the last 7 days. In order to examine the relationship between male and female condom use and self-efficacy, conflict resolution strategies, knowledge, and coping, baseline condom use was dichotomized into consistent (100 % of the time) and inconsistent condom use (<100 % of the time). Participants who did not report sexual activity at baseline ($n=5$ individuals) were excluded from these analyses.

Conflict Resolution

An 18-item modified version of the Conflict Tactics Scale [46] was used to assess current and previous incidents of relationship violence. Participants reported their partners' current or previous conflict resolution strategies, including the frequency of use in the last month (a Likert scale of 0=never, 1=once, 2=twice, 3=3–5 times, 4=6–10 times, 5=11–20 times, and 6=more than 20 times) and the type (total of subscales): (1) negotiation (e.g., discussing problems, working out solutions, getting more information), (2) verbal aggression (e.g., insulting, sulking, crying, stomping, spitefulness), and (3) violence (e.g., threatening to hit, throwing,

shoving, slapping, kicking, punching, threats with weapons, assault with a deadly weapon). Scores presented indicate the total Likert scale scores of the combined items in each subscale. The Revised Conflict Tactics Scale demonstrated high validity for each subscale (negotiation, Cronbach's $\alpha=0.86$; verbal aggression, $\alpha=0.79$; violence, $\alpha=0.86$) [46].

Coping

The Brief COPE—Revised [47], a 33-item revised version of the Brief COPE, was used to measure the extent to which an individual engaged in various forms of coping strategies in response to life stressors. Likert scale items were rated from 1 (I haven't been doing this at all) to 5 (I've been doing this a lot). Higher scores were associated with greater use of the coping strategy. Factor analysis indicated that the structure of the Brief COPE was similar to that of the original COPE [48]. Items from the Brief COPE were combined into emotion-focused and problem-focused coping subscales, following the methods of Cooper et al. [49]. Validity (Cronbach's α [50]) for the emotion-focused subscale was 0.72 and for the problem-focused subscale was 0.84. As a personality assessment, a coefficient α of 0.70 is considered to be acceptable [51, 52]. The COPE subscales are assessments of coping strategies which represent personality styles, and as such, an α between 0.70 and 0.80 is appropriate for these subscales. From the two subscales, active coping, acceptance, positive reframing, using emotional support, and using instrumental support were selected for analysis because of relevance to the intervention outcomes.

Self-efficacy

The Cognitive Behavioral Self-Efficacy Inventory (Cronbach's $\alpha=0.89$), an adapted six-item Likert-type scale specifically tailored to evaluate participants' self-efficacy, was used to assess the cognitive behavioral skills taught in the intervention. These skills focused on the reduction of distress and anxiety associated with negotiation of sexual barrier use with a partner. Self-efficacy for cognitive behavioral skills (sometimes called cognitive coping self-efficacy) is defined as an individual's belief in their ability to restructure distress-provoking thoughts [53] and is based upon Beck's model of cognitive therapy [54]. Each participant was asked to rate their confidence to perform the skill on a 5-point Likert-type scale with polar anchors labeled "not at all" and "all of the time," with a total possible score of 30 (range, 5–30).

HIV-Related Knowledge

This 10-item instrument [55] with a maximum score of 10 was used to assess HIV-related knowledge and to reflect

information about HIV transmission; a higher score indicates better knowledge.

Intervention

Intervention group cohorts were divided into 3 groups of 10 couples each. Three weekly intervention sessions (2 h per session) were conducted with each group over a 1-month period. Gender-specific groups of 10 men or 10 women were led by a gender-congruent counselor and a peer facilitator. Counselors and peer facilitators were trained in the intervention strategies by US and Indian psychologists and provided with ongoing supervision in the provision of the sessions. While all sessions were gender separate, participants were given “homework” to work on session topics together at home. Participants received cognitive-behavioral skill training targeting HIV/STD prevention, reproductive choice issues, communication, sexual negotiation and education to increase self-efficacy, coping, and the use of sexual barrier products. The intervention has been described in previous literature [45]; it utilized the theories of reasoned action (i.e., in which behavioral intentions are determined by attitudes and subjective norms about the behavior), which in turn influence planned behavior (i.e., perceived behavioral control influences intentions and behavior [56] as a predictor of sexual barrier use [57]). Self-efficacy, conflict resolution, and coping were conceptualized as mediators of perceived behavioral control, and information was conceptualized as a facilitator of behavioral change.

During group sessions, information was presented through multiple modalities (visual, auditory, and experiential), with ample opportunities for practice, feedback, and reinforcement (e.g., discussion on methods of reproductive choice, sharing experiences using products with their partners, questions on product use, opportunity to handle and examine products). Participants were introduced to sexual barrier products (male and female condoms) and a vaginal lubricant (KY Jelly). The content of the women’s and men’s interventions included gender-relevant issues (e.g., relationships, influence of in-laws, sexual negotiation) and each session included relaxation techniques (deep breathing or meditation).

Intervention Sessions

Session 1 Addressed HIV/STDs, safer sex, barrier use, reproductive choice, and communication. The HIV/STD and safer sex segment informed the participants about the need for safer sex (HIV transmission, infection with STDs) and the health implications for participants and their partners, including reduction of sexual risk through limiting sexual partners and contact with sex workers. This segment

presented a hierarchical method of sexual barrier use [58, 59] in which male and female condoms were introduced as the most effective forms of sexual protection and the correct method of use was demonstrated. “Hands-on” skill training with both products, including practice with placing male and female condoms on/in models, was conducted. The female condom was also illustrated with anatomical charts to clarify procedures for insertion.

Cognitive/behavioral skill training and communication skills in relationships [60] were introduced in the context of cognitive reframing, heightening participants’ awareness of their reactions to barrier use in their sexual relationships and reframing automatic thoughts that may impede barrier use and communication [61]. Participants learned self-management techniques (e.g., learning to recognize antecedents of conflict). At the conclusion of the session, participants received and were encouraged to use a week’s supply of male and female condoms.

Session 2 Followed a similar format to session 1, continuing the discussion of sexual knowledge and practices. Participants were encouraged to discuss their experiences with the products, the reactions of partners, and the problems encountered. The group process was used to facilitate the sharing of experiences by those who tried the products to encourage those who had not. Cognitive/behavioral skill building focused on sexual negotiation and open communication techniques in relationships, karma [62], and influences of family and in-laws. The use of a vaginal lubricant was introduced. At the end of the session, participants received a week’s supply of male and female condoms and vaginal lubricant.

Session 3 Addressed the potential for engaging in high-risk sexual behavior under the influence of alcohol and/or drugs. Skill building focused on sexual negotiation, influencing [63], and positive communication (e.g., expressing appreciation, avoiding blaming and contempt and domestic violence) [63–65]. Cognitive/behavioral skill training exercises and role plays used the experiences of the participants in problem solving and cognitive restructuring, and participants were guided in applying cognitive restructuring skills to practicing safer sex and improving communication [65]. Discussion focused on conflict resolution, communication, and sexual negotiation within the relationship. Role playing was used to illustrate elements of open successful communication and elements of negative communication, such as negativity, escalation, and invalidation. Participants were trained in communication with empathy, increased positive messages, and the reduction of negative verbal messages. Association of stress management with Ayurvedic lifestyle is discussed. At the close of the session, participants received a week’s supply of male and female condoms.

Data Analysis

Univariate and bivariate analyses were conducted to determine frequencies and associations between demographic information and outcome measures. Mixed between–within ANOVA was used to determine longitudinal changes in outcome variables as well as the difference between genders and baseline consistent and inconsistent condom users. Statistical analyses were conducted using SPSS versions 17.0 and 19.0.

Results

Participants' demographic characteristics are presented in Table 1. Education level was high in this sample; 70 % of

Table 1 Demographics

Parameters	Men, N=30	Women, N=30
Age		
Up to 30 years	14	18
30 to 50 years	16	12
Mean±SD	32.2±5.8	29.3±5.4
Occupation		
Professional/semiprofessional	2	3
Clerical/shop owner	3	0
Skilled/semiskilled	25	5
Homemaker	0	22
Education		
Did not completed high school	9	11
Completed high school	21	19
Monthly income		
Below 6,000 INR(<\$120)	19	19
6,000 INR and above (>\$120+)	11	11
	Couples, N=30	
Family type		
Nuclear	13	
Non-nuclear	13	
Children		
Below two	7	
Two and more	23	
Locality		
Urban	20	
Rural	10	
Contraceptives being used		
	N (%)	
Tubal ligation	8 (26.7)	
Oral pills	2 (6.7)	
IUCD (Copper T)	1 (3.3)	
Implanon	7 (23.3)	
Condoms	11 (36.7)	
None/abstinence	1 (3.3)	

males and 63 % of females had completed tenth class (10 years) or more of education. Most participants' religion was Hinduism (83 %); 65 % lived in joint or extended family households. The majority of couples had children (97 %; 77 % had at least two children) and 67 % lived in the urban area. Most of the men (93 %) were skilled/semiskilled workers and the women were housewives (73 %). More than half (64 %) had a monthly income below 6,000 INR (<\$120). All participants were negative for HIV/STIs; half of the women presented with bacterial vaginosis. In the previous 2 years, 25 out of 30 women had been diagnosed with vaginitis ($n=11$), pelvic inflammatory disease ($n=3$), or both ($n=11$). None of the men reported any previous STIs. Participant retention was 100 % over the 1-month course of the study. There was no association between demographic variables (i.e., age, education, income, or children) and the outcome variables of condom use, knowledge, conflict resolution styles, knowledge, coping, or self-efficacy.

Baseline Condom Use, Self-efficacy, HIV-Related Knowledge, Conflict Resolution, and Coping

All values reported are individual values (not couples) as there was minor disagreement between couple members at baseline on sexual behavior reported. At baseline, the majority of women (64 %) and men (56 %) reported using condoms inconsistently and all but one couple had an identified method of contraception (see Table 1). There was no difference between the amount of condom use reported by men and women ($F(1, 53)=0.223, p=0.64$). Only 37 % of the couples used condoms for contraception but most endorsed other sexual barrier methods. No participants reported experience with female condoms or vaginal lubricants. Condom use was associated with the use of active coping strategies ($r=0.44, p=0.02$), and among men, condom use was associated with self-efficacy ($r=0.45, p=0.02$). Condom use was not associated with HIV-related knowledge or any method of conflict resolution.

At baseline, women used negotiation as a conflict resolution tactic more often than men ($t(58)=2.4, p=0.02$) and men reported a better ability to cope because of instrumental social support than women ($t(58)=-4.1, p<0.001$). There was no difference between men and women in baseline self-efficacy or HIV-related knowledge. Among consistent and inconsistent condom users, there were no differences in self-efficacy, HIV-related knowledge, coping strategies, or conflict resolution tactics.

Preintervention–Post-intervention Condom Use

Combined male and female condom use increased from baseline to follow-up among both men (baseline mean=42 % to follow-up mean=100 %) and women (baseline

mean=37 % to follow-up mean=96 %) ($F(1, 52)=64.93, p < 0.001$). Agreement between male and female reported condom use was excellent (Cohen's $\kappa, 1.0, p < 0.001$).

Preintervention–Post-intervention Self-efficacy and Knowledge

Self-efficacy scores increased at post-intervention among both men and women ($F(1, 58)=24.54, p < 0.001$). HIV-related knowledge also increased among men and women ($F(1, 58)=41.68, p < 0.001$). There was no difference in self-efficacy or HIV-related knowledge between consistent and inconsistent condom users (Table 2).

Preintervention–Post-intervention Conflict Resolution and Coping

Participants reported a decrease in verbal aggression ($F(1, 58)=11.29, p < 0.001$) by their partners at post-intervention. There was no difference between men and women or consistent and inconsistent condom users. The use of positive reframing as a coping strategy increased among female participants (baseline mean=5.4 to follow-up mean=6.5), but not among males (baseline mean=5.07 to follow-up mean=5.03) (main effect, $F(1, 58)=26.28, p < 0.001$; interaction effect, $F(1, 58)=29.67, p < 0.001$), and did not differ among inconsistent or consistent condom users (see Table 3).

Discussion

The results of this study illustrate the feasibility and potential efficacy of implementing a group cognitive behavioral

intervention strategy to teach safe sexual behavior and strategies to enhance self-efficacy, increase knowledge, and improve coping and communication among Indian couples. Participants reporting inconsistent condom use increased to consistent use and those reporting consistent use maintained their level of condom use. Self-efficacy, HIV-related knowledge, and coping strategies improved. Overall, participants reported decreased verbal aggression by their partners. Additionally, examination of inconsistent condom user characteristics indicated that coping, self-efficacy, and positive and negative conflict resolution strategies were comparable with consistent condom users' at follow-up.

The intervention utilized a strategy that was relatively novel to India, discussion of sexual issues in a group context. Pilot results support the feasibility of using a group intervention strategy and the introduction of cognitive behavioral methods to address sexual issues in this context. However, social and cultural factors could limit the uptake of the intervention, e.g., marital prohibition by one member of the couple, negative influence by in-laws, and financial ability to participate. In fact, during recruitment for the current pilot study, the husbands' willingness to participate and the ability to return to the clinic were the two primary impediments to participation, both of which may be related to financial constraints. This suggests that future implementation of the intervention on a larger scale may have to include its provision outside working hours or availability of support for transportation. However, overall, the majority of those approached expressed willingness to participate.

The application of group intervention strategies within the broader public health context appears to merit consideration. For example, group sessions could be conducted as an element of HIV posttest counseling for both HIV seropositive

Table 2 Condom use, self-efficacy, and HIV-related knowledge by gender and baseline condom use

	Consistent condom user ($n=21$)	Inconsistent condom user ($n=34$)	F (df)	p value	Male ($n=30$)	Female ($n=30$)	F (df)	p value
Condom use								
Pre, M (SD)					0.42 (0.49)	0.37 (0.49)	0.07 (1, 52)	0.93
Post, M (SD)					1.00 (0.00)	0.96 (0.19)		
F (df), p					64.93 (1, 52), <0.001			
Self-efficacy								
Pre, M (SD)	18.10 (2.72)	17.24 (2.03)	0.78 (1, 53)	0.38	18.33 (2.50)	17.33 (2.26)	2.43 (1, 58)	0.12
Post, M (SD)	20.00 (2.14)	19.88 (2.03)			19.70 (1.70)	19.97 (2.40)		
F (df), p	29.24 (1, 53), <0.005				24.54 (1, 58), <0.001			
HIV-related knowledge								
Pre, M (SD)	7.19 (2.16)	6.62 (2.70)	0.87 (1, 53)	0.36	6.63 (1.88)	7.20 (2.83)	0.40 (1, 58)	0.53
Post, M (SD)	8.76 (0.44)	8.79 (0.54)			8.70 (0.53)	8.90 (0.40)		
F (df), p	33.32 (1, 53), <0.005				41.68 (1, 58), <0.001			

Significance levels were adjusted using Bonferroni correction, pairwise α set at 0.002

Table 3 Communication, violence, and coping by gender and baseline condom use

	Consistent condom user (<i>n</i> =21)	Inconsistent condom user (<i>n</i> =34)	<i>F</i> (<i>df</i>)	<i>p</i> value	Male (<i>n</i> =30)	Female (<i>n</i> =30)	<i>F</i> (<i>df</i>)	<i>p</i> value
Negotiation								
Pre, <i>M</i> (SD)	2.67 (1.39)	2.41 (1.56)	1.16 (1, 53)	0.29	2.10 (1.90)	3.07 (1.05)	8.01 (1, 58)	0.01
Post, <i>M</i> (SD)	2.33 (1.46)	2.59 (1.46)			1.27 (0.83)	3.53 (0.90)		
<i>F</i> (<i>df</i>), <i>p</i>	0.11 (1, 53), 0.74				0.64 (1, 58), 0.43			
Verbal aggression								
Pre, <i>M</i> (SD)	2.43 (3.38)	2.06 (2.82)	0.00 (1, 53)	0.99	2.13 (2.21)	2.83 (4.54)	3.80 (1, 58)	0.06
Post, <i>M</i> (SD)	1.09 (1.26)	0.74 (1.21)			1.33 (1.32)	0.43 (0.94)		
<i>F</i> (<i>df</i>), <i>p</i>	11.29 (1, 53), 0.001				15.20 (1, 58), <0.001			
Violence								
Pre, <i>M</i> (SD)	0.52 (1.08)	0.76 (1.74)	0.12 (1, 53)	0.75	1.17 (2.17)	0.67 (1.79)	0.33 (1, 58)	0.57
Post, <i>M</i> (SD)	0.05 (0.22)	0.15 (0.44)			0.20 (0.48)	0.00 (0.00)		
<i>F</i> (<i>df</i>), <i>p</i>	6.37 (1, 53), 0.02				9.69 (1, 58), 0.003			
Emotional social support								
Pre, <i>M</i> (SD)	9.67 (2.06)	9.18 (1.93)	1.34 (1, 53)	0.25	8.53 (1.38)	10.23 (2.05)	6.23 (1, 58)	0.02
Post, <i>M</i> (SD)	9.76 (1.84)	9.88 (2.13)			8.4 (1.30)	11.23 (1.33)		
<i>F</i> (<i>df</i>), <i>p</i>	2.31 (1, 53), 0.13				3.64 (1, 58), 0.06			
Instrumental social support								
Pre, <i>M</i> (SD)	6.38 (1.20)	6.15 (1.26)	1.72 (1, 53)	0.20	5.63 (0.93)	6.80 (1.27)	5.78 (1, 58)	0.02
Post, <i>M</i> (SD)	6.38 (1.12)	6.62 (1.40)			5.50 (0.73)	7.43 (0.90)		
<i>F</i> (<i>df</i>), <i>p</i>	1.72 (1, 53), 0.20				2.46 (1, 58), 0.12			
Active coping								
Pre, <i>M</i> (SD)	10.57 (1.29)	9.91 (1.19)	2.55 (1, 53)	0.12	10.13 (1.14)	10.23 (1.38)	4.59 (1, 58)	0.04
Post, <i>M</i> (SD)	10.67 (1.53)	10.59 (1.35)			10.13 (1.25)	10.97 (1.40)		
<i>F</i> (<i>df</i>), <i>p</i>	4.49 (1, 53), 0.04				4.59 (1, 58), 0.04			
Positive reframing								
Pre, <i>M</i> (SD)	5.19 (1.03)	5.21 (0.84)	0.97 (1, 53)	0.33	5.07 (0.87)	5.40 (0.89)	29.67 (1, 58)	<0.001
Post, <i>M</i> (SD)	5.90 (1.45)	5.65 (1.01)			5.03 (0.93)	6.50 (1.18)		
<i>F</i> (<i>df</i>), <i>p</i>	17.44 (1, 53), <0.001				26.28 (1, 58), <0.001			
Acceptance								
Pre, <i>M</i> (SD)	4.90 (0.94)	4.85 (0.93)	0.01 (1, 53)	0.92	5.00 (1.14)	4.83 (0.83)	4.46 (1, 58)	0.04
Post, <i>M</i> (SD)	5.29 (0.96)	5.21 (0.84)			5.00 (0.98)	5.37 (0.85)		
<i>F</i> (<i>df</i>), <i>p</i>	7.31 (1, 53), 0.01				4.46 (1, 58), 0.04			

Significance levels were adjusted using Bonferroni correction, pairwise α set at 0.002

and negative individuals, enhancing the standard of care for HIV testing. The use of a group format in a public health setting reduces the overall staff burden by expanding the coverage of intervention and providing it to a greater number of individuals simultaneously while potentially increasing its overall impact through increased peer support. It is important to note, however, that the level of education among women in the sample was higher than that found in other regions of India; the literacy rate among women in Chandigarh is among the highest in the country and comparable to that of men (men, 90.5 %; women, 81.4 %) [66]. Thus, while literacy or educational attainment did not present a significant impediment to the implementation of the intervention, similar outcomes might not be obtained among less educated audiences.

Given the lack of a control condition and the ceiling effect attained in condom use, it was not possible to assess the relative influence of specific elements of the intervention on overall behavioral change. Within the transtheoretical framework of the process of change [67] (i.e., behavioral change and uptake of condom use), it can be conjectured that enhanced communication and an anticipated concomitant reduction in the potential for domestic violence may be a necessary precondition for increased self-efficacy and reductions in sexual risk. As noted in the agreement reached at the International Conference on Population and Development [68] in Cairo, Egypt: “Changes in both men’s and women’s knowledge, attitudes and behavior are necessary conditions for achieving the harmonious partnership of men and women.”

Interestingly, levels of HIV knowledge did not appear to be associated with condom use, suggesting the need for continued efforts to enhance awareness of HIV risk among married couples.

Several limitations associated with this study should be noted. Most importantly, this pilot study did not include a control comparison group. Additionally, the small sample size and the lack of control group limit the generalizability of the results obtained and the use of mediation analyses. Outcomes, most notably condom use, relied on participant self-report and may have been subject to social desirability biases. In addition, the 1-month duration between pretest and final posttest was too short to assess long-term effects. While these results are encouraging, they will be more meaningful if future studies show an impact for a much longer period of time. However, condom use changed significantly during a single month among married adults already using contraception.

The nature of the intervention, which incorporated multiple components, e.g., educational components on male and female condoms, coping, conflict avoidance, self-management, and communication, as well as the provision of barrier products, makes the interpretation of the study outcomes challenging. In addition, given this small study and the number of factors assessed, it is unclear which specific component may have contributed to the increase in condom use. Future studies could clarify these issues by comparing this intervention with a control group or a group that only receives barrier products without a health educational component. Finally, some constructs presented in the study assessments, such as coping, may have been novel to participants at study entry, but as they were introduced to them in the intervention, participants may have become more conscious of some skills or characteristics of their relationships. Thus, changes in constructs may also reflect a change in knowledge as well as greater awareness of specific health behaviors.

Conclusion

While this pilot study relied on a small number of couples drawn from an urban hospital setting, results suggest that it may be possible to move couples along a continuum towards behavioral change. Results also highlight the feasibility of achieving sexual behavior change among established couples. Based upon the results of this feasibility study and the lessons learned in this Northern Indian setting, a randomized controlled trial could be developed to determine whether similar findings could be obtained among a larger, more representative sample of high-risk couples and to identify whether improvements would be maintained in the longer-term (e.g., 1 to 2 years). While it remains essential to continue to focus on sex workers and men

engaging in high-risk behaviors, focusing on high-risk couples may be an important step to prevent the development of a generalized epidemic in India.

Acknowledgments This study was jointly funded by the National Institutes of Health, grant no. R01MH63630S1, and the India Council of Medical Research.

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