

Reducing Inner-City Women's AIDS Risk Activities: A Study of Single, Pregnant Women

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Behavioral change reduces risk of HIV infection and development of AIDS. We compared 206 inner-city women who were randomly assigned to a 4-session AIDS-prevention group or to one of two controls, a health-promotion group or a no-intervention group. AIDS-prevention and health-promotion groups provided information, behavioral competency training, and social support. Only the AIDS-prevention group focused on AIDS-specific knowledge and skills. The AIDS-prevention group produced moderate, consistent increases in knowledge and safer sex behaviors in comparison with either the health-promotion or no-intervention group. Self-report and objective changes were sustained 6 months after intervention for both African-American and European-American women.

Key words: AIDS, HIV, inner-city women, women, African American

Development of effective behavioral intervention to reduce women's risk for exposure to HIV infection is critical (Ickovics & Rodin, 1992; Mays & Cochran, 1988). It is estimated that about 37,000 women have been diagnosed with AIDS (Centers for Disease Control, 1993), and the number of women affected is doubling every 1-2 years. Early research attention in the United States focused on gay men and injection drug users (Mays, Albee, & Schneider, 1989), but the greater number of heterosexuals in the population translates to greater ultimate risk for the general population as the epidemic widens. Given that male-to-female transmission of HIV is as much as 12 times more likely as female-to-male transmission (Padian, Shiboski, & Jewell, 1990), women are at appreciable risk in heterosexual relationships.

Women of color and inner-city women in general are at particular risk for HIV exposure because of the rate of infection among others with whom they are likely to be in sexual contact and because of the higher than average prevalence of injection drug users in the inner city (Centers for Disease Control, 1991). Their risk is further increased to the extent that safer sex behaviors are inconsistent with cultural imperatives (Mays & Cochran, 1988). Women of color may not

find it acceptable to appear knowledgeable about sex, to be confrontational on sexual matters, to demand monogamy, to use condoms, or to discuss their partners' sexual history (Ickovics & Rodin, 1992; Mays & Cochran, 1988). Furthermore, condom use impedes reproduction, which is a desired goal in many cases. Women may also erroneously still believe that they are not at risk (Kalichman, Hunter, & Kelly, 1992).

Kelly and Murphy (1992) wrote, "it is discouraging that, even more than 10 years into the AIDS epidemic, there have still been only a handful of controlled studies evaluating the behavioral change impact of HIV prevention interventions" (p. 578). Cognitive-behavioral risk reduction efforts have, however, proven successful in those few reported controlled studies (Jemmott, Jemmott, & Fong, 1992; Kelly, St. Lawrence, Hood, & Brashfield, 1989; Rotheram-Borus, Koopman, & Haignere, 1991). To our knowledge, only one North American study has found appreciable change among women after intervention (Rotheram-Borus et al., 1991), and no study has shown such change for women in a randomized control design or among inner-city women or women of color.

Prevention of HIV infection depends on behavioral change, but few prevention studies have been conducted that address behavioral impact (Kelly & Murphy, 1992). Furthermore, any objective information that buttresses trends found in self-report would be enormously helpful in drawing conclusions about program effectiveness.

Previous research suggests that the components of a successful prevention program include: (a) providing accurate information on transmission and safer sex options, (b) raising women's personal sense of risk, (c) increasing their competence to perform safer sex behaviors, (d) increasing their beliefs that they can successfully perform safer sex behaviors, (e) increasing social support for such behavior, and (f) placing the behavior within an acceptable cultural context for the target group (Ickovics & Rodin, 1992; Kelly & Murphy, 1992; Mays & Cochran, 1988). There is also growing agreement that condom use is a key goal because, first, people are not necessarily privy to knowledge about their partners' sexual behavior and,

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second, as HIV infection increases, there is decreasing merit in the strategy of reducing the number of partners. We incorporated these components in a multiple-session intervention program for single, pregnant, inner-city women.

Theoretically, our intervention was based on Bandura's (1977) social learning theory and Hobfoll's (1988, 1989) conservation of resources (COR) theory. Social learning theory emphasizes the use of modeling to increase specific feelings of efficacy around targeted behaviors. COR theory suggests that the threat of AIDS is an additional stressor facing women who are already overtaxed in their coping efforts. In such situations COR theory posits that an intervention must increase both women's personal and social resources in order to combat increased threat. COR theory further suggests that target groups must see the intervention as both adding new resources and building on their current resource strengths.

We also felt that an emphasis on communal mindedness was relevant to women in general (Jackson & Meadows, 1991; Myers, 1988), as women tend to make better use of social support than do men (Hobfoll & Stokes, 1988). Studies of the psychology of women assert a similar emphasis (Winstead & Derlega, 1993), and we felt that a communal orientation would be palatable to our participants. Hence, we adopted a communal emphasis to our intervention, underscoring the need for women to support each other, their families, and the health of their community.

We chose single, pregnant women as the target group for our study because they come for care and become accessible to prevention efforts, they risk infecting themselves and their fetus or infant, and they may be particularly motivated to improve their health because of their maternal feelings. Also, because being single and pregnant in the inner-city is normative (Lancaster & Hamburg, 1986), this strategy may potentially be applied to millions of women. Previous work also indicated that women from this particular sample base had poor AIDS knowledge and did not consider themselves at risk for HIV infection (Hobfoll, Jackson, Lavin, Britton, & Shepherd, 1993).

We predicted that the AIDS-prevention intervention would be most effective in producing increases in knowledge about AIDS and both the intent to adopt and actual adoption of safer sex behaviors because it concentrated on AIDS-related knowledge, attitudes, and skills. We further predicted that the health-promotion intervention would be more successful than the no-intervention control, because many of the same behaviors and attitudes that relate to being healthy generalize to adoption of safer sex behavior.

Method

Participants

Participants were recruited between August 1990 and March 1992 from among single, inner-city women who sought obstetrical care at three inner-city clinics for low-income women in a middle-sized, Midwestern city. We restricted analyses to women who completed at least 3 of 4 intervention sessions. The final sample included 206 women.

One hundred eighteen (57%) of the women were African Americans, and 82 (40%) were non-Hispanic European Americans. There were 6 women (3%) of other ethnic origins. The women's average age

was 21.0 years (range, 16–29). Thirty-three percent did not complete high school, 36% completed high school, and 30% had some post-high school education or training. Most (75%) had incomes under \$10,000 per year. Forty-five percent of the women had already had at least one child.

Few demographic differences were found between African- and European-American participants. When these differences were significant, they were not appreciably related to the outcome variables and hence did not affect the hypotheses. We also conducted analyses of 37 women who began but did not complete the study. Only one significant difference was found for 18 tests between dropouts and retainers on any of the demographic and outcome variables, namely, dropouts were slightly more educated. One significant finding in 18 is likely to be attributable to chance. There was no differential drop-out rate for ethnic group.

Measures

We assessed a variety of variables, including measures of AIDS-related knowledge, safer sex practices, self-report of intention to purchase and reported purchase of condoms and spermicide, and pharmacy reports of condom and spermicide acquisition. Women also responded to questions about the number of their partners. Measures were carefully pilot tested so that virtually all women could complete them with no more than minor assistance. Assistance was, however, always available.

Safer sex knowledge. A safer sex knowledge questionnaire measured the accuracy of subjects' knowledge of HIV transmission and prevention. Items were scored as either incorrect or correct, and scores are the percentage of items correctly answered. The 8 questions used to assess knowledge of HIV transmission were adopted from the National Public Health Service AIDS Information Survey (U.S. Public Health Service, 1988). The items assessed the degree to which participants understood that the HIV virus is transferred by the exchange of body fluids and not by casual contact. Participants rated from 1 to 4 the likelihood of being infected through different types of exposure. The 6 items on prevention assessed knowledge of ways to prevent HIV infection during sexual contact. The two parts were designed separately, but the strong relation between the two subscales and other similar findings for them led to our combining them into a single scale. One item was deleted because of its poor item-total correlation, which resulted in a 13-item scale with an internal consistency of .74.

Current condom and spermicide usage. The women were asked about their use of condoms and spermicide over the preceding few weeks. The two items focused on use of condoms and spermicide during vaginal sex. Ratings were made on a 4-point scale, *no, sometimes, almost always, or always, whenever I have sex*. Cronbach's alpha for this sample was .84.

Anal-sex practices. Anal sex was practiced at any time during the periods assessed in the study by about 25% of the participants. For these 47 women only, condom and spermicide usage during anal sex was assessed; the other women responded that they had not engaged in this behavior. The women were asked to rate their behavior (on the same scale given for current condom and spermicide usage) during anal sex. Two items were used, "I use condoms" and "I use condoms and spermicide" (past few weeks). They were answered on a 4-point scale: *no, sometimes, almost always or always, whenever I have sex*. Internal consistency for these two items was .88.

Abstinence and number of partners. Women reported whether or not they had been refraining from sexual contact (i.e., abstinence), whether they had chosen monogamy, and the number of recent sexual partners. Women were also questioned about the number of their partners during the preceding year (*no partners, 1 partner, 2–4 partners, or 5 or more*).

Discussion with partners. A single item was used to assess whether women discussed AIDS-related behavior with their partners. The item was phrased as follows: "I discuss AIDS and AIDS prevention with my partner(s)." It was answered on a 4-point scale: 1 = *no*, 2 = *I discuss it [only] when my partner(s) initiates discussion*, 3 = *I initiate discussion if I believe partner(s) may be infected or at risk*, and 4 = *I always initiate discussion*.

Intention and purchase of condoms and spermicide. Women reported whether they intended to purchase condoms and spermicide in the future and whether or not they had recently been obtaining condoms and spermicide. The four items were: "I intend to buy or obtain condoms," "I intend to buy or obtain spermicide," "I have bought or obtained condoms," and "I have bought or obtained spermicide." These statements were rated on a 4-point scale: 1 = *no*, 2 = *occasionally*, 3 = *frequently*, and 4 = *all the time (i.e., when I need them)*. We combined their intentions and reports of obtaining condoms and spermicide, because we were interested in current and future behavior and because the items were moderately correlated, which suggested a single underlying construct. Cronbach's alpha for this scale was .72.

Pharmacy report of obtaining condoms and spermicide. Women were issued condom credit cards that contained their photo and identification number (but not their name). They were allowed to use these cards at three pharmacies that were convenient to the clinic sites. They could choose any brand of latex condom. These cards were valid from the time they began their study participation until 12 months after the intervention (yoked to time for the no-intervention control group participants). We received reports of the number of condoms and spermicide tubes obtained and the identification numbers of those who obtained them.

Procedure

Participant selection and questionnaire scheduling. Single, pregnant women were randomly assigned to this study and invited to participate. The women were approached if they were single (i.e., not living with a partner steadily for 6 months or longer and not married), under 6 months pregnant, and between 16 and 29 years of age. Women who were under treatment for a chronic illness (e.g., diabetes or kidney disorders) were excluded. As an incentive, women were paid \$10, \$15, and \$20 for their pretest, posttest, and follow-up participation, respectively. Women were given \$5 for car fare and to offset child-care costs for each group attended. Women who completed all questionnaires had their names placed in a lottery for a color television (one was awarded yearly over three years). Parental permission was required for minors, in addition to the minor's assent; otherwise women gave their own informed consent.

At initial contact, women completed the instruments and items. Approximately 80% of women who were approached agreed to participate. The participants were randomly assigned to either an AIDS-prevention group (Group 1) or one of two control groups, a health-promotion group (Group 2) or a no-intervention group (Group 3). Fifty percent more women were assigned to Group 1 or Group 2 than to Group 3 (for every 3 women assigned to each of the first groups, 2 were assigned to the last) in order to ensure enough participants for intervention sessions. Questionnaires were administered again at the end of the women's group participation and 6 months later. Group 3 responded to questionnaires on a schedule that paralleled the intervention groups.

Selection and training of group leaders. Female group leaders were selected from among master's-level psychologists and health educators. They were selected for empathy with target women, AIDS and health knowledge, and their ability to communicate a positive health message. Training consisted of role playing, videotape feedback, and discussion with two experienced professionals with backgrounds in

multicultural psychology. Representatives of different ethnic groups were selected to maximize representative discussion when ideas and problems were considered in the ongoing research and intervention.

Intervention. Women in the two intervention groups participated in four curriculum-based sessions (for groups of 2-8 women) that began during their second trimester of pregnancy. Groups lasted 1½-2 hr for each session, and women typically came to group every 2nd or 3rd week. Women did not necessarily attend with the same group of women, as their lives were simply not organized in a fashion that allowed this. However, scheduling was conducted to ensure that women visited the appropriate group (i.e., session number and type). A detailed qualitative account of the intervention may be found in Levine et al. (1993).

Group leaders operated interactively with four studio-quality videotapes. Following the videotapes and the planned curriculum increased uniformity across groups. The group leader showed a taped segment, for example, and then asked women to discuss it or to role play. Taped segments illustrated assertiveness, negotiation skills, planning skills, and specialized skills (e.g., cleaning drug works). Tapes also had general interest segments, such as live-action illustrations of comfortable, healthy sexual positions during later pregnancy. The videotapes featured a group of actors from a similar population as the target group. The group leader on the videotape was an experienced, female, African-American health educator who portrayed warmth, understanding, and openness. For example, one taped segment portrayed women who hesitated to role play and then conducted the role playing after the warm encouragement and praise of the group leader. Tapes served as both stimulus material and models for the live group leaders and targeted group participants.

Each session had a specific focus but addressed the same set of competencies already described (i.e., assertiveness, etc.). The AIDS-prevention and health-promotion groups were yoked. They focused on identical general competencies for matched portions of time but differed in terms of content. For example, when assertiveness for refusing sex without a condom was the Group 1 theme, Group 2 worked on assertively turning down alcohol. When Group 1 practiced aversive conditioning toward unsafe sex, Group 2 was exposed to aversive conditioning for smoking while pregnant. In this way, Group 2's program design controlled not only for use of time but for general skills as well. Differences between Groups 1 and 2 ought to be attributable to the specific AIDS content. Differences between Groups 2 and 3 ought to be attributable to differences in skill acquisition not specific to AIDS prevention.

The central theme of the sessions for both the AIDS-prevention and health-promotion groups was to formulate and apply a sound health action plan. To enhance practice of action plans, sessions encouraged a sense of mastery, positive expectation of success, negotiation skills, assertiveness skills, and fear of negative health consequences for not acting in an healthy manner. Mastery was addressed by reinforcing positive actions and prior successes and by projecting positive expectancies of women's success. Role playing was used to illustrate how behaviors could be enacted, to provide feedback, and to share ideas. For more private behaviors (e.g., using a condom during loving sexual play), women learned cognitive rehearsal (Meichenbaum, 1977). In cognitive rehearsal the participants described a situation or one was described to them, and then they imagined themselves problem solving. The groups reviewed scenarios and made suggestions and offered support.

Sessions also included aversive-conditioning (Wolpe, 1958) segments to increase both a sense of vulnerability and mastery. Women imagined a scene in which they practiced an unhealthy behavior and had an aversive outcome (e.g., became infected). The technique, if done correctly (see Wolpe, 1958), produces a deeply felt emotional and visceral reaction. We added a secondary component consistent with this type of classical conditioning. Specifically, after the negative

health scenario, we paired a healthy behavior with a positive outcome (e.g., having a healthy baby) and the attending joyful emotions. This addition was designed to increase a sense of mastery.

The final session specifically addressed relapse prevention. Discussion, role playing, and cognitive rehearsal focused on possible obstacles to women's continued and increased adoption of healthy behaviors.

Finally, the social support that was engendered in these groups must not be underestimated. We encouraged and built on women's communal mindedness. This entailed emphasizing the importance of behavior change in the context of its relevance to the self, unborn child, family, and ethnic group.

Results

Preliminary Analyses

Means and standard deviations for study variables are found in Table 1. The AIDS-prevention group contained 68 women, the health-promotion group contained 77 women, and the no-intervention group contained 61 women. No preinterven-

tion differences between the groups were found on outcome variables.

Treatment Effects

Women were first compared on the continuous outcome variables (i.e., safer sex knowledge, condom and spermicide use, intentions and purchase of condoms and spermicide, and discussion of safer sex with their partners) in a 3×2 multivariate analysis of covariance. Although the properties of these scales are not strictly interval, this type of statistic is generally accepted as appropriate for this kind of data (Cliff, 1993). Outcomes that had significant univariate F ratios were further analyzed in 3×2 analyses of covariance. For each of these analyses, pretest scores were used as the covariate, the first factor was group membership, and the second factor was a repeated measure (i.e., posttest and follow-up). When the univariate F ratio was significant, posttest means, adjusted for pretest scores, were compared in the Dunn-Sidak multiple

Table 1
Outcome Variables by Group Membership

Variable and group	Pretest		Posttest		Follow-up	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Knowledge (proportion correct)						
AIDS prevention	.65	.21	.74	.20	.72	.21
Health promotion	.67	.23	.67	.23	.70	.22
No intervention	.71	.20	.68	.22	.71	.20
Discuss AIDS with partners						
AIDS prevention	2.44	1.30	2.63	1.20	2.73	1.25
Health promotion	2.46	1.24	2.35	1.27	2.77	1.25
No intervention	2.16	1.17	1.93	1.17	2.23	1.16
Safer sex intentions and behaviors						
AIDS prevention	5.81	2.00	8.59	3.48	8.50	3.67
Health promotion	5.88	2.39	7.01	3.28	7.29	3.23
No intervention	5.91	2.40	6.29	2.77	7.15	3.12
Condom and spermicide usage (vaginal sex)						
AIDS prevention	2.93	1.44	3.66	2.04	3.86	1.85
Health promotion	3.32	1.75	3.09	1.76	3.70	2.07
No intervention	2.89	1.74	2.82	1.44	3.40	1.96
Condom and spermicide usage (anal sex)						
AIDS prevention	2.13	1.16	3.50	1.99	2.43	1.16
Health promotion	2.24	0.75	2.65	1.17	2.29	0.57
No intervention	2.13	0.34	2.25	1.00	2.50	1.55
Condom acquisitions ^a						
AIDS prevention					2.66	4.73
Health promotion					1.35	1.98
No intervention					0.69	2.04
Spermicide acquisitions ^b						
AIDS prevention					1.47	3.63
Health promotion					0.57	1.25
No intervention					0.33	0.88
Partners in the past year ^c						
AIDS prevention	2.29	0.58			2.02	0.58
Health promotion	2.32	0.60			2.05	0.48
No intervention	2.38	0.49			2.12	0.48

^aScores transformed by an inverse function were: for the AIDS-prevention group, $M = .60$, $SD = .38$; for health-promotion group, $M = .69$, $SD = .35$; and for the no-intervention group, $M = .87$, $SD = .28$.

^bScores transformed by an inverse function were: for the AIDS-prevention group, $M = .75$, $SD = .35$; for health-promotion group, $M = .84$, $SD = .29$; and for the no-intervention group, $M = .90$, $SD = .24$.

^cResponse choices were 1 = none, 2 = one, 3 = 2-4, and 4 = 5 or more.

comparison procedure (Kirk, 1982). These comparisons were designed to reveal significant group differences attributable to the intervention, because the covariate (i.e., pretest scores) statistically controlled for any initial differences. Group changes that occurred after intervention (i.e., the presence of group differences at follow-up that were not evident at posttest or differences at posttest that were no longer present at follow-up) are noted by significant Group \times Time interactions.

The results of the multivariate analysis of covariance showed overall significant effects for group, $F(8, 368) = 4.14, p < .001$, time, $F(4, 188) = 3.52, p < .008$, and the covariate (initial scores), $F(4, 184) = 21.98, p < .001$. The group main effect indicates that there were significant differences between the different intervention modes. The time effect indicates that there was some significant change between posttest and follow-up, but the absence of a Time \times Group interaction indicates that group differences were sustained from posttest to follow-up. The significant effect of the covariate simply means that initial scores were related to later scores.

Secondary analyses of covariance gave significant effects for group for the four outcome variables tested, knowledge, safer sex intentions and behaviors, discussion of AIDS and AIDS prevention with partners, and condom and spermicide usage (see Table 2). How the groups actually differed was further examined in Dunn-Sidak multiple comparisons (see Table 3). Group 1 made significantly greater gains than either Group 2 or Group 3 in almost every case. Group 2 tended not to change significantly, in comparison with Group 3. Again, the lack of Group \times Time effects indicated that these changes were sustained at follow-up.¹

Pharmacy reports. Reports of the numbers of condom and spermicide acquisitions (each credit card use equaled a box of 12 condoms or 1 tube of spermicide) were compared in a one-way multivariate analysis of variance with group membership as the between-subjects variable and the numbers of boxes of condoms and tubes of spermicide as the dependent measures. If the univariate analyses of variance (ANOVAs) were significant, comparisons among the means were conducted with the Dunn-Sidak procedure. Because so many of the women did not use the condom credit card to obtain safer sex supplies from the pharmacies, these data were also transformed and reanalyzed. By comparing the ratio of the largest and smallest range of the smallest and largest transformed score of each group for different transformations (Kirk, 1982), it was determined that a reciprocal transformation best suited the data.

The overall group effect was significant, $F(4, 404) = 4.98, p < .001$. Secondary ANOVAs indicated significant group effects for both condom acquisition, $F(2, 180) = 9.37, p < .001$, and spermicide acquisition, $F(1, 180) = 3.57, p < .03$. The Dunn-Sidak test indicated significantly greater condom and spermicide acquisition for the AIDS-prevention group than for the no-intervention group. The health-promotion group also obtained more condoms than the no-intervention group but did not obtain more spermicide.

We also conducted chi-square analyses to determine whether more women in the AIDS-prevention group used the credit cards. More women in Group 1 (55.9%) and Group 2 (46.4%) used the credit cards to obtain condoms than did women in

Table 2
Sources of Variance

Variable	df	MS	F	p
Knowledge				
Group	2	0.22	5.50	.005
Covariate ^a	1	4.41	181.75	.001
Error	202	0.04		
Time	1	0.01	0.42	.517
Group \times Time	2	0.03	0.02	.369
Error	203	0.02		
Discuss AIDS with partners				
Group	2	8.85	4.77	.009
Covariate ^a	1	41.09	22.18	.001
Error	190	1.85		
Time	1	7.36	7.99	.005
Group \times Time	2	0.83	0.90	.408
Error	191	0.92		
Safer sex intentions and behaviors				
Group	2	111.91	8.48	.001
Covariate ^a	1	422.11	31.99	.001
Error	179	13.19		
Time	1	10.89	1.82	.179
Group \times Time	2	6.44	1.08	.343
Error	180	5.98		
Condom and spermicide usage (vaginal sex)				
Group	2	12.95	3.28	.040
Covariate ^a	1	74.49	18.85	.001
Error	179	3.95		
Time	1	19.58	7.38	.007
Group \times Time	2	1.55	0.58	.558
Error	180	2.65		
Condom and spermicide usage (anal sex)				
Group	2	0.99	3.59	.557
Covariate ^a	1	44.56	26.66	.001
Error	43	1.67		
Time	1	3.58	5.09	.029
Group \times Time	2	3.26	4.64	.015
Error	44	0.70		
Condom acquisitions				
Group	2	1.10	9.37	.001
Error	180	0.12		
Spermicide acquisitions				
Group	2	0.31	3.57	.030
Error	180	0.09		

^aThe covariate is the preintervention score.

Group 3 (18.2%). The overall chi-square for groups was significant, $\chi^2(2, N = 183) = 18.10, p < .001$. However, no significant overall differences were found for the numbers of women who obtained spermicide, $\chi^2(2, N = 183) = 5.58, p < .06$.

Follow-up chi-square analyses on pairs of groups were conducted to determine which groups actually differed on condom acquisition by partitioning the chi-squares with two orthogonal partitions, Group 1 versus Group 2 and Groups 1 and 2 versus Group 3. The AIDS-prevention and health-

¹ We also examined frequency of intercourse. However, preliminary analysis suggested that frequency was not related to risk. Indeed, women in more stable relationships had intercourse most frequently. We did, however, look at group differences in frequency of intercourse, as this might affect the meaning of condom use. There were no group differences found.

Table 3
Differences Among Means for Dunn-Sidak
Multiple Comparison Procedure

Variable and compared groups	Difference ^a
Knowledge	
1, 3	2.749 ^b
1, 2	2.326
2, 3	.569
Discuss AIDS with partners	
1, 3	2.557 ^b
1, 2	1.225
2, 3	1.455
Safer sex intentions and behaviors	
1, 3	3.378 ^b
1, 2	2.452 ^b
2, 3	1.097
Condom and spermicide usage (vaginal sex)	
1, 3	2.444 ^b
1, 2	1.924
2, 3	.418
Condom acquisitions	
1, 2	4.227 ^b
1, 3	1.385
2, 3	3.024 ^b
Spermicide acquisitions	
1, 3	2.638 ^b
1, 2	1.692
2, 3	1.075

Note. Group 1 = AIDS-prevention group; Group 2 = health-prevention group; Group 3 = no-intervention group. For self-report data, comparisons were conducted on postintervention scores. For pharmacy data, comparisons were on the total number of boxes of condoms and tubes of spermicide.

^aCritical difference for three comparisons at alpha of .05 and with 120 degrees of freedom is 2.442. ^bSignificant difference between groups: The first group had a larger mean for variable, except for scores transformed by an inverse function. In the transformed case, higher means are associated with smaller transformed scores.

promotion groups did not significantly differ from each other, $\chi^2(1, N = 128) = 1.20, p > .20$, but they did significantly differ from the no-intervention group, $\chi^2(1, N = 183) = 16.90, p < .001$.

Abstinence. A chi-square analysis was conducted to analyze for change in abstinence status in a Group \times Time design, which looked for change in frequency of abstinent cases. Change was measured only between initial and follow-up reporting, because posttest reporting just preceded delivery, and this alone may have affected abstinence temporarily. The result was not significant, $\chi^2(6, N = 206) = 2.45, p = .87$.

Anal sex. A separate analysis was conducted for those women who reported participating in anal sex at any time in the study period. An analysis of covariance was conducted, with control for the initial levels of use of condoms and spermicide during anal sex. There was a significant effect for time, $F(1, 44) = 5.09, p < .03$, and the Group \times Time interaction, $F(2, 44) = 4.64, p < .02$, was also significant. Group 2 made initial gains in condom and spermicide usage, but these were lost at follow-up.

Number of partners. A chi-square analysis was conducted to analyze for change in number of partners in a Group \times Change design. Because the period was the preceding year, there was no overlap between pretest and follow-up. Three

levels of change were considered (more, fewer, or the same number of partners at follow-up than at pretest). The test was not significant, $\chi^2(4, N = 204) = 2.26, p = .69$.

Interactions with ethnicity. We reran the multivariate and univariate analyses of covariance and the multivariate analyses of variance and the ANOVAs. For these analyses we added ethnicity (African American vs. European American) as a dummy coded variable. None of the interactions of ethnicity with group were significant ($p > .25$). This indicates that the effects were independent of ethnic minority status.

Discussion

The AIDS-prevention group outperformed the health-promotion and no-treatment control groups on most outcome variables. Most of the changes made at the end of the intervention were sustained at the 6-month follow-up. This suggests at least a moderate effect of our treatment program. Furthermore, the intervention was effective for both African Americans and European Americans. The health-promotion group participants also obtained more condoms than the no-intervention group subjects.

The positive findings for knowledge, self-reported behavior, and objectively reported behavior suggest that important changes occurred. The magnitude of these changes varied, and most were moderate, which reflects the spectrum of change from none at all to major changes among individual women. This also reflects women's individual needs and perceptions. For example, for some women, condom use did not need to occur because they actually had a mutually monogamous relationship, whereas others incorrectly perceived their relationship to be mutually monogamous (Hobfoll et al., 1993). Unless an intervention focuses on a sample homogeneous as to high risk, one must not expect that more than moderate average change on any give outcome will occur in the most successful program.

The intervention did not produce predicted changes in abstinence or number of partners. These predictions may be particularly incongruent with our study population's goals. Change in number of partners may not have occurred because few women in our sample had a high number of partners (as in the case in the general population) and our participants were at a time of life that a few sexual partners a year is normative and developmentally consistent (Tanfer & School, 1992). Hence, most women already had only a few partners, and turning to abstinence may not fit their romantic desires or needs. Also, as the women did not necessarily know if their partners were practicing risky behaviors, decreasing number of partners was less important than condom use (Boyer & Kegeles, 1991).

Our multiple control groups design allowed us to narrow down the important intervention ingredients somewhat (Cook & Campbell, 1979). It appears that the general competencies of assertiveness, negotiation skills, and planning ability were not in themselves adequate for meaningful behavioral change. If they had been, the health-promotion group would have been as successful as the AIDS-prevention group. Rather, it seems women also needed to have the competencies, and perhaps

expectancies, specifically tied to AIDS information and AIDS-specific risk reduction.

Compensation for participating in our study may also have affected the outcome. There is reason to believe that it may have increased participation, but at the same time decreased effort, as women could attribute their participation to external sources rather than internal motivations (Lepper & Green, 1978). Care must also be taken in generalizing our study's findings. First, although pregnancy is normative, and we followed women well after delivery, this nevertheless is a special time of life. Women may be motivated to behave in a healthy manner at this time, and indeed this was a primary reason for our choice of this target group. By 6 months postpartum women had returned to levels of sexual activity similar to what they reported in the year before the beginning of intervention, which suggests that the follow-up period did allow us some insight into the women's general behavior when not pregnant.

Furthermore, few of our participants reported greater than 5 partners during the preceding year. Rotheram-Borus et al. (1991) also found that rather few women (even among those thought to be sexually active) have more than a handful of partners during a year. Nevertheless, this means that we cannot generalize to those few women who have many partners. We also had wanted women to meet with the same group of women at each intervention session, but this did not prove feasible in pilot testing. However, we were surprised at the amount of support women felt they received in the groups. Future research can examine this issue directly, as we only have spontaneous reports of social support generated by the groups.

In this investigation we demonstrated the potential benefit of psychosocial efforts to prevent HIV infection. Even though average change was only moderate, this may translate to potentially major impact on a public health scale. The fact that change was sustained 6 months after intervention and the use of pharmacy reports of condom and spermicide purchases serve to buttress the reliability of the findings and increase our confidence that intervention produces meaningful behavioral change.

References

- Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Boyer, C. B., & Kegeles, S. M. (1991). AIDS risk and prevention among adolescents. *Social Science Medicine*, 33, 11-23.
- Centers for Disease Control. (1991). *National HIV serosurveillance summary: Results through 1990*. Atlanta: Author.
- Centers for Disease Control. (1993, July). *HIV/AIDS surveillance report* (Vol. 5, No. 2). Atlanta: Author.
- Cliff, N. (1993). What is and isn't measurement. In G. Keren & C. Lewis (Eds.), *Handbook for data analysis in the behavioral sciences: Methodological issues* (pp. 59-93). Hillsdale, NJ: Erlbaum.
- Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation: Design and analysis issues for field settings*. Boston: Houghton Mifflin.
- Hobfoll, S. E. (1988). *The ecology of stress*. Washington, DC: Hemisphere.
- Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, 44, 513-524.
- Hobfoll, S. E., Jackson, A. P., Lavin, J., Britton, P. J., & Shepherd, J. B. (1993). Safer sex knowledge, behavior, and attitudes of inner-city women. *Health Psychology*, 12, 481-488.
- Hobfoll, S. E., & Stokes, J. P. (1988). The process and mechanics of social support. In S. W. Duck (Ed.), *Handbook of personal relationships* (pp. 497-517). London: Wiley.
- Ickovics, J. R., & Rodin, J. (1992). Women and AIDS in the United States: Epidemiology, natural history and mediating mechanisms. *Health Psychology*, 11, 1-16.
- Jackson, A. P., & Meadows, F. B. (1991). Getting to the bottom to understand the top. *Journal of Counseling and Development*, 70, 72-76.
- Jemmott, J. B., Jemmott, L. S., & Fong, G. T. (1992). Reductions in HIV risk-associated sexual behavior among Black male adolescents: Effects of an AIDS prevention intervention. *American Journal of Public Health*, 82, 372-377.
- Kalichman, S. C., Hunter, T. L., & Kelly, J. A. (1992). Perceptions of AIDS susceptibility among minority and nonminority women at risk for HIV infection. *Journal of Consulting and Clinical Psychology*, 60, 725-732.
- Kelly, J. A., & Murphy, D. A. (1992). Psychological interventions with AIDS and HIV: Prevention and treatment. *Journal of Consulting and Clinical Psychology*, 60, 576-585.
- Kelly, J. A., St. Lawrence, J. S., Hood, H. V., & Brashfield, T. L. (1989). Behavioral intervention to reduce AIDS risk activities. *Journal of Consulting and Clinical Psychology*, 57, 60-67.
- Kirk, R. E. (1982). *Experimental design: Procedures for the behavioral sciences* (2nd ed.). Monterey, CA: Brooks/Cole.
- Lancaster, J. B., & Hamburg, B. A. (Eds.). (1986). *School-age pregnancy and parenthood: Biosocial dimensions*. Hawthorne, NY: Aldine.
- Lepper, M. R., & Green, D. (1978). Overjustification research and beyond: Towards a means-ends analysis of intrinsic and extrinsic motivation. In M. Lepper & D. Green (Eds.), *The hidden cost of rewards* (pp. 109-148). Hillsdale, NJ: Erlbaum.
- Levine, O. H., Britton, P. J., James, T. C., Jackson, A. P., Hobfoll, S. E., & Lavin, J. P. (1993). The empowerment of women: A key to HIV prevention. *Journal of Community Psychology*, 21, 320-334.
- Mays, V. M., Albee, G. W., & Schneider, S. F. (Eds.). (1989). *Primary prevention of AIDS: Psychological approaches*. Newbury Park, CA: Sage.
- Mays, V. M., & Cochran, S. D. (1988). Issues in the perception of AIDS risk and risk reduction by Black and Hispanic/Latino women. *American Psychologist*, 43, 949-957.
- Meichenbaum, D. (1977). *Cognitive-behavior modification: An integrative approach*. New York: Plenum Press.
- Myers, L. (1988). *Understanding an Afrocentric world view: Introduction to an optimal psychology*. Dubuque, IA: Kendall/Hunt.
- Padian, N. S., Shiboski, S. S., & Jewell, N. (1990, June). *The relative efficiency of female-to-male HIV sexual transmission* (Abstract No. Th.C.101). Paper presented at the VIth International Conference on AIDS, San Francisco.
- Rotheram-Borus, M. J., Koopman, C., & Haignere, C. (1991). Reducing HIV sexual risk behaviors among runaway adolescents. *American Journal of Public Health*, 81, 208-210.
- Tanfer, K., & School, J. J. (1992). Pre-marital sexual careers and partner change. *Archives of Sexual Behavior*, 21, 45-68.
- U.S. Public Health Service. (1988). *National Health Interview Survey: AIDS knowledge and attitudes* (Report OMB 0920-0214). Washington, DC: Author.
- Winstead, B. A., & Derlega, V. J. (Eds.). (1993). Gender and close relationships [Special issue]. *Journal of Social Issues*, 49(3).
- Wolpe, J. (1958). *Psychotherapy by reciprocal inhibition*. Stanford, CA: Stanford University Press.