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Journal

Western Journal of Nursing Research, 21(3)

ISSN

0193-9459

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Publication Date

1999-06-01

DOI

10.1177/01939459922043956

Peer reviewed

Two-Year Follow-Up of AIDS Education Programs for Impoverished Women¹

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The long-term effects of two culturally competent AIDS education programs with different content on the risk behavior and AIDS-related knowledge of 410 homeless African American women 2 years after program completion were examined. Participants were members of a larger cohort of impoverished African American and Latina women recruited in Los Angeles from 1989 to 1991. Of a subsample of 527 African American women selected randomly for a 2-year follow-up interview, 410 (78%) were located and agreed to participate. Women participating in both AIDS education programs reported reduced HIV risk behaviors and demonstrated greatly improved AIDS knowledge at 2-year follow-up ($p < .001$). Women in a specialized program were less likely than those in a traditional program to report noninjection drug use at 2 years. Women in the traditional program had significantly better AIDS knowledge at follow-up ($p < .001$). These findings suggest that educational programs can produce sustained benefits among impoverished women.

Injection drug use and unprotected sexual activity play an important role in the spread of human immunodeficiency virus (HIV) (Astemborski,

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Vlahov, Warren, Solomon, & Nelson, 1994; Nwanyanwu, Chu, Green, Buehler, & Berkelman, 1993). Crack cocaine users likewise are implicated in the spread of HIV due to sexual exposure to multiple partners (Khalsa, Kowalewski, Anglin, & Wang, 1992).

In June 1998, the Centers for Disease Control (CDC) reported that more than 108,032 women in the United States have been diagnosed with Acquired Immune Deficiency Syndrome (AIDS), with African American and Latina women accounting for more than 75% of these cases. Nearly half (43%) of these women with AIDS are injection drug users (IDUs), whereas another 17% report having sex with IDUs (CDC, 1997). Moreover, impoverished women are reportedly at increased risk for HIV as a result of heterosexual exposure to multiple sexual partners at risk, specifically with men who have been in jail or prison and bisexual men (Mondanaro, 1987).

In the absence of a cure for HIV disease, education and information on preventing the transmission of the virus have been the most effective ways of halting the spread of the AIDS epidemic among gay or bisexual men (Kelly, St. Lawrence, et al., 1992), high-risk adolescents (J. B. Jemmott, Jemmott, & Fong, 1992; Rotheram-Borus et al., 1992), and college populations (Basen-Engquist, 1992). Few studies, however, have been conducted in which AIDS education programs among impoverished and homeless women have been evaluated. In those studies that have been done, AIDS education programs that incorporate cognitive and behavioral skill enhancement have been effective in improving knowledge, in reducing sexual and drug-related behaviors (Carey et al., 1997; Hobfoll, Jackson, Lavin, Britton, & Shepherd, 1994; L. S. Jemmott & Jemmott, 1992; Kelly, Murphy, et al., 1994; Nyamathi, Flaskerud, Keenan, & Leake, 1998), as well as emotional distress and depression on short-term follow-up (Nyamathi, Leake, Flaskerud, Lewis, & Bennett, 1993; Stein, Nyamathi, & Kington, 1997). Intervention programs that have demonstrated success in behavioral risk reduction have incorporated information, motivation, and behavioral skills (Carey et al., 1997). Such programs include HIV-related transmission and prevention content, behavioral skills training and interpersonal enhancement (DiClemente & Wingood, 1995; Hobfoll et al., 1994; Kelly, Murphy, et al., 1994), and sexual communication and self-management skills (Kalichman, Rompa, & Coley, 1996). Although these efforts demonstrate the success of both basic AIDS education programs on short-term follow-up (2 weeks to 6 months) in these populations, there is little evidence that more comprehensive programs result in better long-term outcomes. Sustained risk reduction is critical to stopping the spread of HIV in this population.

The purpose of this study is to examine the relative effects of two culturally competent AIDS education programs of different substance on the risk behavior and AIDS-related knowledge of a sample of homeless African American women 2 years after program completion. One program provided AIDS education and referrals to community resources alone (traditional program), whereas the second supplemented these components by offering risk reduction skills and enhancement of self-esteem and control (specialized program). The significance of this research relates to the critical need to evaluate the long-term impact of differing programs.

The Comprehensive Health Seeking and Coping Paradigm (CHSCP) (Nyamathi, 1989) has served as an overriding framework to guide the assessment and implementation of strategies related to coping and health outcome of impoverished women. The CHSCP, which was adapted from the Lazarus and Folkman (1984) Stress and Coping Paradigm and the Schlotfeldt (1981) Health Seeking Paradigm, contains seven components. The first five components are personal and social resources, cognitive appraisal, coping behaviors, and sociodemographic factors. Nursing strategies constitute the sixth major component, which along with the previous five components, directly influence the seventh and final factor, risk behaviors, which include sex with multiple partners and drug use behaviors. The CHSCP has informed investigators who work with drug-addicted and impoverished populations that increasing amounts of variance in drug and sexual behaviors are being explained by interventions that enhance self-esteem and coping (personal resources), social support (social resources), reduce environmental and personal threat, and increase knowledge of AIDS (cognitive appraisal).

Self-esteem and coping are major personal resources. High self-esteem and problem-focused coping have predicted fewer risky sexual behaviors and less drug use among impoverished women (Nyamathi, 1992; Nyamathi, Wayment, & Dunkel-Schetter, 1993). Self-esteem can be modified over time with behavioral intervention (Nyamathi & Stein, 1997), and improved self-esteem is significantly associated with reduced barriers to condom use as well as less unprotected sexual activity among African American women (Nyamathi, Bennett, & Leake, 1995).

Social support is seen as a buffer of the adverse health effects of stress (Cohen & McKay, 1984; Yates, Skaggs, & Parker, 1994). Furthermore, social support acts as a resource providing encouragement to the recipient, and as such, promotes health protection, a sense of belonging, and feelings of personal efficacy (Geissler, Borrmann, Kwiatkowski, Braucht, & Reichardt, 1995; Metsch et al., 1995; Nyamathi, 1994).

Although knowledge about AIDS has not been shown to be related to intentions to use condoms or actual use of condoms (Flaskerud & Nyamathi, 1989; L. S. Jemmott & Jemmott, 1992), drug use (Khalsa et al., 1992), or sharing needles (Malow, West, Corrigan, Pena, & Cunningham, 1994), knowledge is necessary to correct misconceptions, allay anxieties, and provide prevention methods (Nyamathi & Shinn, 1990).

Furthermore, there is a need to advance the theoretical applicability of the model both in guiding interventions and in predicting outcomes. Nursing interventions in this study, which were conceptually derived from the CHSCP, contend that nurses are effective in assisting individuals in reducing risky behaviors by assessing and reinforcing self-esteem; by providing culturally sensitive information and skills along with coping enhancement and problem-solving strategies; by motivating, reinforcing, and clarifying behavioral competencies; and by providing social support.

This article focuses on three key components: cognitive factors, of which knowledge of AIDS is a key representative; nursing strategies, which encompass the cognitive, motivational, and behavioral intervention designed to change the risk behaviors; and the risk behaviors, which include injection and noninjection drug use and sex with multiple partners. Guided by the CHSCP, the following research questions were raised: (a) What are the sociodemographic characteristics of homeless and drug-addicted African American women?; (b) What is their knowledge level of AIDS?; (c) What are their risky behaviors?; and (d) What are the relative effects of a specialized and a traditional AIDS education program on risk behavior and AIDS-related knowledge at 2-year follow-up?

METHOD

Sample

The sample in this quasiexperimental design consisted of 410 African American women who were part of a larger convenience sample of 3,187 impoverished African American and Latina homeless and drug-addicted women who were randomized by site into the specialized or traditional programs lasting 1 to 3 hours. Women in the sample of 3,187 resided in 1 of 22 homeless shelters or 18 drug recovery programs in the downtown and surrounding areas of Los Angeles. Women eligible to participate at baseline were African Americans and Latinas who were between 18 and 75 years of age and were self-identified as being a drug user, a sexual partner of an IDU,

a prostitute, as having been diagnosed with a sexually transmitted disease (STD), having unprotected sex with two or more partners in the last 6 months, or being homeless. Women were excluded if they were too incoherent to participate as evaluated by the nurse.

To accommodate a 2-year follow-up, only subjects recruited between June 1989 and July 1991 were included in this study. Subsequently, of the 1,878 women admitted during this period, a computer-generated random subsample of 638 African American and Latina women was selected for 2-year follow-up, which took place between June 1991 and July 1993. Trained African American and Latina nurses and outreach workers located 447 (70%) of these women through locator information provided at baseline (Nyamathi, Leake, et al., 1993). The nurses and outreach workers underwent special training by experts in the field of AIDS and drug addiction and became competent AIDS educators and facilitators of risk reduction. Specifically, they spent 4 weeks in training sessions and observed behavioral practice prior to testing out for entry into the field. They then readministered the instrument packet at the respondents' location of choice, primarily at homeless shelters (55%). Eight percent of women refused to participate at baseline, whereas only 1% refused to participate at 2-year follow-up. A nominal monetary reimbursement of \$5 was provided to compensate the women for their time. After the questionnaire was administered, the nurses allowed time for questions and answers about AIDS education.

In this article, we report on African American women exclusively because a relatively small number of Latina women were selected for 2-year follow-up ($N = 111$), and only one third of them ($N = 37$) were located. Few Latina women were selected for follow-up because Latina women were in the minority at homeless shelters and drug recovery programs participating in the study. In fact, Latina women only represented 30% of the women entered. Latina women also were difficult to follow up at 2 years due to frequent movement, and for some, fear of immigration authorities. In contrast, 410 of the 527 African American women selected for follow-up were located and agreed to participate, for a follow-up rate of 78%. Furthermore, previous studies suggest that risk behavior patterns of African American and Latina women are sufficiently different to warrant separate analysis (Nyamathi, Leake, et al., 1993).

The 410 African American women who were readministered the instrument packet did not differ at baseline from the 117 who were not located on the variables assessed in the study, except that the women followed were more likely to be employed and to have a history of sexually transmitted disease. There was a notable difference with respect to program participation:

87% of the women who had participated in the specialized program were followed up compared with 71% of the women in the traditional program ($p < .001$). Among women who were not followed up, some program-related differences also were found in baseline measures despite the women being randomly allocated to the two programs. In particular, traditional program women who were not followed up were more knowledgeable at baseline interview and less likely to have been in homeless shelters than their counterparts in the specialized program. There was also a trend for the women in the traditional program who were not followed up to be more likely to use noninjection drugs and to have multiple partners at baseline ($p < .10$).

Instruments

The instruments administered at 2-year follow-up were identical to that at baseline except that sociodemographic information was omitted and women were asked to answer questions about drug use in terms of their behaviors 1 year and then 2 years post intervention. Outcome measures elicited information about AIDS-related knowledge, sexual activity, and substance use.

Knowledge was assessed using a revised 15-item AIDS questionnaire (Flaskerud & Nyamathi, 1989). Revisions consisted of wording simplification and adding four items to the original scale. Items assessed facts about the etiology of AIDS, modes of transmission, signs and symptoms of AIDS, and prevention strategies (see Nyamathi, 1993, for knowledge scale items). Sum scores were formed for the 15 items, which were measured by a true/false response format. The resulting scale had a range of 0 to 15. In the current sample, Cronbach's reliability coefficient was found to be .77. Because of its highly skewed distribution (median = 13, mode = 14), knowledge was dichotomized into a perfect score (15) versus a less than perfect score for analytic purposes.

Sexual activity was measured by an item that assessed the average number of sexual partners per week over the last 6 months.

Drug use was measured by the 29-item Drug Use Questionnaire, which has been revised from the AIDS Initial Assessment Questionnaire (AIA) (Kalichman, Kelly, Hunter, Murphy, & Tyler, 1993). Information was recorded on the frequency of use of eight drugs used intravenously, intradermally, and orally during the last typical month and week of drug use. Drugs

assessed were heroin, cocaine, amphetamines, hallucinogens, other barbiturates, marijuana/hashish, designer drugs, and alcohol.

Test-retest reliability of the AIA, using 196 interview pairs of injection drug users, was assessed over a 6-month period. Frequency of use of injected drugs, including cocaine, amphetamines, heroin, heroin and cocaine mixed, and other opiates or narcotics, revealed Pearson correlation coefficients ranging from .57 to .76. Frequency of use of noninjected drugs, including alcohol, marijuana, amphetamines, and nonprescription methadone, yielded Pearson correlation coefficients that ranged from .50 to .86 (Myers, Snyder, Bryant, & Young, 1990). Furthermore, a 12-member panel of experts, which included researchers and clinicians, established content validity of the AIA. Percent agreement ranged from .86 to .99 for injection and noninjection drugs (Nyamathi, Leake, et al., 1993).

At baseline, women were asked about their current drug use and history of ever using drugs. Those who said they were no longer using drugs were asked to approximate the date they stopped using them. At 2-year follow-up, women were asked to respond to the drug use items in terms of both their current behavior and their behavior in the first year following the intervention. Information on number of sexual partners in the previous 6 months also was elicited at baseline and 2-year follow-up.

For this report, recent risky behavior was assessed by use of injection drugs within the past year (yes/no), use of other illegal drugs or alcohol within the past year (yes/no), and having at least two sexual partners within the past 6 months.

Sociodemographic information regarding age, race, place of birth, religion, education, employment, relationship status, and number of children was obtained at baseline by a structured questionnaire.

Procedure

Homeless shelters and drug recovery programs were recruited through letters that were sent to their directors. All interested subjects met with African American or Latina nurses and outreach workers who described the study and the nature of participation. Subjects who met eligibility criteria were assured confidentiality and signed informed consent. The study was approved by the human subjects protection committee of the University of California, Los Angeles. Subjects were paid \$5 for participating in the research.

Trained female African American and Latina nurses and outreach workers administered face-to-face structured survey instruments to participants of the same ethnicity. Baseline data collection on the entire sample occurred from June 1989 to July 1993 in a private room within the homeless shelters or drug recovery programs. Instrument administration required approximately 45 minutes to complete.

The traditional and specialized programs were implemented by African American and Latina nurses and outreach workers and included provision of HIV antibody testing and counseling, condoms, bleach, informational pamphlets, a videotape of AIDS transmission, and a list of available community resources, as has been described in detail elsewhere (Nyamathi, Leake, et al., 1993). Both programs were developed in a culturally competent manner.

Culturally Competent AIDS Education Programs

Cultural competency, a learned set of academic and interpersonal skills that allow individuals to increase their understanding and appreciation of cultural differences and similarities within, among, and between groups (American Nurses Association, 1992), was applied to the intervention programs and the instrument. Cultural competence is enhanced when programs are taken into the community to reach persons at risk where they live by health care professionals such as nurses, social workers, and psychologists, who are helping professionals capable of assessing and intervening in risk-reduction strategies. To acquire this competence, the researchers conducted focus groups with the population (Nyamathi & Lewis, 1991; Nyamathi & Vasquez, 1989); drew on community-based values, traditions, and customs; and worked with knowledgeable persons in the community. Furthermore, the instruments and individual questions used in the study were pilot tested to determine their clarity and sensitivity to the culture and living conditions of impoverished African American and Latina subjects (Nyamathi & Lewis, 1991).

The research investigators and staff were successful in developing culturally competent programs by emphasizing the value of life among the African American and Latina women before addressing issues that would improve their quality of life. Discussion in both programs addressed issues of trust and distrust, racism, and discrimination.

Women in the traditional intervention program received a 1-hour culturally competent AIDS education program in small group format by African American or Latina nurses and outreach workers. The program reinforced

basic AIDS education consisting of content related to AIDS etiology, symptoms, modes of HIV transmission, and methods of protection.

Women in the specialized intervention program were provided a 2- to 3-hour culturally competent program of AIDS education. This program was developed with the knowledge that when a program incorporates a number of cognitive, attitudinal, and behavioral skill competencies, successful long-risk behavior change is likely to occur (Kelly, 1995).

Additional cultural competency strategies incorporated included a focus on positive self-worth, self-concept, and human values, as well as the use of principles of the oppressed, wherein the staff members help the women to identify aspects of their lives they wish to change, identify the problems, find the cause of the problems, and work out practical solutions. These skill competencies incorporate AIDS risk education, threat personalization, perceived efficacy of change, intention to act, risk-reduction skills acquisition, and cognitive problem-solving skills for change implementation and maintenance. The provision of AIDS risk education in a simple and direct manner and with clear rationale for risk is very effective for long-term impact. Furthermore, to be culturally competent, the program must be presented in the language of the individual being counseled rather than in medical or scientific terminology. Threat personalization is most effective when it is delicately balanced so that the individual feels vulnerable to AIDS but not to the point where fear may become counterproductive. Perceived efficacy to change is a critical element if the individual believes that behavior changes can serve to lessen risk (Bandura, 1988). Intention to act has been found to be another predictor of behavior change (Fishbein, 1995) and occurs when clients are motivated to make behavioral changes and perceive the benefits of making change. Success in risk reduction also requires the acquisition of technical behavioral skills (condom placement on a model) and interpersonal skills (committing oneself to avoid high-risk conduct and assertively resisting coercions to engage in high-risk situations). Finally, problem-solving skills are critical to assist the individual in planning ways to handle triggers that could lead to risk behaviors.

Women in the specialized program were assisted in reducing risk behaviors through learning experiences pertinent to risk reduction, by rehearsing and practicing opportunities to build self-esteem, avoiding risky situations, building positive social support networks, strengthening negotiation skills, modifying and strengthening problem-solving strategies for dealing with life experiences, and by mastering behavioral competencies needed to successfully reduce risk. They were also assisted in cognitively strengthening their motivation to change behavior by appreciating the seriousness of AIDS

and their susceptibility to HIV infection and planning strategies appropriate to their stage of change.

The program was individualized by African American and Latina nurses and outreach workers to the expressed concerns of the women based on their responses to concern assessment questions. For example, women reported the greatest concerns related to getting off drugs to obtain custody of their children and to obtain food and shelter. To accommodate their concerns, the staff presented strategies to reduce risk behavior as well as providing immediate referrals to soup kitchens and homeless shelters. Additional strategies provided in the specialized intervention program included the following: demonstration and return demonstration of risk-reducing behaviors, such as placement of condoms on models and needle and syringe disinfection with bleach and water; discussion of problem-focused coping responses, such as ways to seek information, steps in decision-making, and ways to reduce stress; and techniques for enhancing self-esteem and feelings of control. These additional components in this program were designed to alleviate some major concerns, thus allowing the women to devote more attention to their risky behaviors and providing them with a greater sense of self-efficacy in dealing with a wide variety of situations related to HIV transmission.

Data Analysis

Baseline differences between the two programs for continuous sociodemographic variables (i.e., age and education) were assessed with *t* tests; baseline and follow-up differences for categorical sociodemographic and risky behavior variables were assessed with chi-square tests. Repeated measures log-linear modeling was used to examine change over time and group by time interactions for the categorical outcome variables (i.e., use of injection drugs, use of noninjection drugs, having multiple partners, and attaining a perfect AIDS-related knowledge score). When significant interactions between group and time were found, the analyses were repeated for each program separately to evaluate changes over time within the program. Chi-square and *t* tests also were performed to examine associations between the outcome measures at 2-year follow-up and sociodemographic and behavior variables measured at baseline. Finally, logistic regression analysis was used to assess differences in outcome measures between the two programs at 2-year follow-up, and in the case of drug use, at 1-year follow-up via retrospective reports. These analyses, which controlled for the value of the outcome measure at baseline and other important covariates, allowed for direct group comparisons while taking the effects of potential confounding

factors into consideration. Unadjusted and adjusted odds ratios also were calculated to describe the magnitude of the program effects on the outcomes of interest. The .05 level was required for statistical significance and all tests were two-tailed.

RESULTS

Baseline sociodemographic characteristics of the sample are shown in Table 1. The mean age of the 410 African American subjects enrolled in the study was 33 years (range = 18 to 63, $SD = 8.0$). The majority were single (55%), unemployed (90%), Protestant (78%), and resided in a homeless shelter (55%). At baseline, more than half of the subjects reported a history of STD (52%), having sex for money (45%), previous HIV testing (24%), and a partner injecting drugs (11%). As shown, specialized program women were more likely to have been recruited from homeless shelters than women in the traditional program. They were also somewhat more likely to be Protestant, single, employed, and to have been tested for HIV, and somewhat less likely to report a previous history of STD.

Although knowledge of AIDS at baseline was high, it was fairly low as measured by a perfect score (19%) and did not differ between groups (see Table 2). At 2-year posttest, perfect knowledge had increased to 80%, with the women in the traditional group demonstrating significantly greater knowledge. Although the improvement in knowledge was significant for both groups, combined and individually ($p < .001$), there was an indication of a group by time interaction ($p = .052$), with more striking improvement in the traditional group.

Traditional program women were more likely to report multiple partners at baseline (61% vs. 44%) as compared with women in the specialized group. Of all those reporting multiple partners, 96% said they had engaged in sex without a condom in the previous 6 months (not shown). A significant reduction at 2 years was noted with respect to multiple partners: The percentage of women reporting multiple partners decreased from 53% to 26%, and no group by time interaction was found. At 2 years, women exposed to the traditional program were again more likely to report multiple partners than women in the specialized group.

Reductions in IDU and non-IDU between baseline and 1 year ($p < .005$) and baseline and 2 years also were observed. No significant differences in change over time between groups were noted for IDU. Use of injection drugs by women in the traditional group decreased from 12% to 3%,

TABLE 1: Baseline Sociodemographic Characteristics of Study Women (N = 410)

Sociodemographic Variables	Specialized (N = 201)		Traditional (N = 209)		Total Sample (N = 410)	
	M	SD	M	SD	M	SD
Age	32.6	7.5	33.3	8.4	33.0	8.0
Years of education	11.9	1.6	12.3	1.7*	12.1	1.7
	<i>Percentage</i>		<i>Percentage</i>		<i>Percentage</i>	
Site						
Drug recovery program	29.9		58.9***		44.6	
Homeless shelter	70.2		41.2		55.4	
Marital status						
Single	61.2		48.5*		54.8	
Married	11.9		12.3		12.1	
Widowed/separated/ divorced	26.9		39.2		26.9	
Religion						
Protestant	81.9		73.2		77.5	
Catholic	7.5		6.8		7.2	
Other	6.5		13.2		9.9	
None	4.0		6.8		5.5	
Employed	13.4		6.7*		10.0	
Sexually transmitted disease	45.8		57.9*		52.0	
Previous HIV Testing	29.9		18.7***		24.2	
Partner shooting drug	11.0		11.6		11.3	
Sex for money	41.8		47.4		44.6	

* $p < .05$. ** $p < .01$. *** $p < .001$.

whereas women in the specialized group also reported a similar decline from baseline to 2 years. Significant baseline to 2-year reductions also were noted for non-IDUs in the specialized program (65% to 40%) and women in the traditional program (82% to 64%). An interaction was found ($p < .05$), reflecting the somewhat greater reduction reported by specialized program participants. Women in the traditional program reported greater noninjection drug use at all three time periods. Although reduction in non-IDU between baseline and 1 year was significant, it was considerably less than that between baseline and 2 years.

Overall associations between 2-year outcomes and selected baseline measures are shown in Table 3. Injection drug use at 2 years was positively associated with baseline IDU and having an injection-drug-using partner

TABLE 2: Pre- and Posttest Behavior and Knowledge Profiles of Specialized and Traditional Groups and the Total Sample

Variable	Specialized (N = 201)			Traditional (N = 209)		
	Pretest Percentage	1-Year Posttest Percentage	2-Year Posttest Percentage	Pretest Percentage	1-Year Posttest Percentage	2-Year Posttest Percentage
Perfect knowledge score ^{a, d}	15.4	N/A	71.6	21.5	N/A	88.5
Multiple partner ^{a, b, c}	44.3	N/A	20.2	61.1	N/A	31.7
Injection drug use ^a	10.5	4.5	3.5	12.0	7.2	2.9
Noninjection drug use ^{a, b, d, e}	64.7	59.2	39.9	81.8	72.3	64.4

Variable	Total Sample (N = 410)		
	Pretest Percentage	1-Year Posttest Percentage	2-Year Posttest Percentage
Perfect knowledge score	18.5	N/A	80.2
Multiple partner	52.8	N/A	26.2
Injection drug use	11.2	5.9	3.2
Noninjection drug use	73.4	65.9	52.6

a. $p < .001$ for change from baseline to 2 years.

b. $p < .001$ for group differences at baseline.

c. $p < .01$ for group differences at 2 years.

d. $p < .001$ for group differences at 2 years.

e. $p < .01$ for group differences at 1 year.

and negatively associated with being Protestant. Use of noninjection drugs at 2 years was associated with both injection and noninjection drug use at baseline. Women who reported multiple partners at 2 years were younger, more likely to have had multiple sexual partners, and engaged in prostitution at baseline, more likely to have had a history of STDs and non-IV drug use, and less likely to have been employed than those who reported one partner or no partners. Attainment of a perfect knowledge score at 2 years was unrelated to every baseline variable tested except for a negative association with noninjection drug use.

Six logistic regression analyses were performed for the outcomes presented in Table 4. These analyses examined the independent effect of program participation and controlled for baseline values of the dependent variable and the following baseline self-reported demographic and drug use information: being homeless, Protestant, unemployed or a prostitute, having had a sexually transmitted disease or a prior HIV test, educational level, having multiple partners, and injection and noninjection drug use. Results revealed that women in the specialized group were less likely to report use of noninjection drugs at 1 ($p < .05$) and 2 ($p < .001$) years as compared to women in the traditional group; there was also a trend for the specialized program participants to be less likely to report multiple partners at 2 years. As shown by both the crude and adjusted odds ratios, the odds of non-IDU and sexual activity with multiple partners were reduced about 40% or more in the specialized compared to the traditional program. Women who participated in this program also had significantly decreased odds of maximizing their AIDS-related knowledge.

DISCUSSION

This study represents the first long-term investigation of the impact of AIDS education programs on AIDS risk reduction in a large sample of homeless and impoverished women. Such studies are critical to provide educators and practitioners with concrete directives for AIDS education programs and the development of public policy initiatives to slow the spread of AIDS among impoverished minority women. The results of our study suggest that culturally sensitive AIDS education was effective in improving behavior and knowledge over a 2-year follow-up period.

In our study, AIDS-related knowledge increased and injection and noninjection drug use and sexual activity with multiple partners declined significantly from baseline to 2-year follow-up for women in both programs.

TABLE 3: Relationships Between Selected Baseline Measures and 2-Year Outcomes

Baseline Measures	2-Year Outcomes							
	Injection Drug Use (N = 410)		Noninjection Drug Use (N = 410)		Multiple Partners (N = 401)		Perfect Knowledge (N = 409)	
	No	Yes	No	Yes	No	Yes	No	Yes
Mean age	N = 397	N = 13	N = 200	N = 210	N = 296	N = 105	N = 81	N = 328
Means years of education	32.9	34.2	33.1	32.8	33.3	31.5*	32.0	33.2
	12.1	12.0	12.1	12.0	12.1	12.1	11.9	12.1
	Percentage		Percentage		Percentage		Percentage	
Homeless shelter	55.2	61.5	56.5	54.3	56.7	50.5	55.6	55.5
Marital status								
Single	54.6	61.5	55.8	53.9	52.6	60.2	54.3	55.1
Married	12.2	7.7	14.1	18.0	13.3	9.7	11.1	12.4
Separated/divorced/widowed	33.2	30.8	30.1	28.1	34.1	30.1	34.6	32.5
Employed	9.9	15.4	12.6	7.6	11.9	4.8*	8.8	10.4
Protestant	79.0	30.8***	78.6	76.4	77.5	76.5	80.0	76.8
Sexually transmitted disease	51.6	61.5	48.5	47.6	49.3	61.0*	50.6	52.1
Previously HIV testing	23.9	30.8	28.0	20.5	26.4	17.1	24.7	23.8
Partner shooting drugs	10.1	46.2**	11.5	11.1	11.2	12.5	7.4	12.3
Prostitution	44.6	46.2	41.5	47.6	40.5	59.1**	53.1	42.7
Injection drug use	9.0	69.2**	7.5	13.8*	10.5	11.4	11.1	10.7
Noninjection drug use	78.6	69.2	70.5	85.7**	76.0	86.7*	86.4	76.2*
Multiple partners	53.0	46.2	46.5	58.9*	46.3	74.0**	58.0	51.4
Perfect knowledge	17.9	38.5	17.5	19.5	18.2	19.1	17.3	18.9

419 * $p < .05$. ** $p < .001$.

TABLE 4: Unadjusted and Adjusted^a Odds Ratio With 95% Confidence Intervals for HIV Risk Behaviors for the Specialized Relative to the Traditional AIDS Intervention Program

<i>Outcome</i>	<i>Unadjusted OR (95% CI)</i>	<i>Adjusted OR (95% CI)</i>
Injection drug use year 1	0.61 (0.26, 1.42)	0.52 (0.17, 1.55)
Injection drug use year 2	1.22 (0.40, 3.70)	0.95 (0.20, 4.60)
Noninjection drug use year 1	0.56 (0.37, 0.83)	0.58 (0.36, 0.95)
Noninjection drug use year 2	0.40 (0.27, 0.60)	0.37 (0.23, 0.58)
Multiple partners year 2	0.55 (0.35, 0.86)	0.62 (0.37, 1.05)
Perfect knowledge year 2	0.33 (0.20, 0.56)	0.28 (0.16, 0.50)

a. Adjusted for the linear effects of the baseline value of the variable and baseline self-reported demographic and drug use information including being homeless, Protestant, unemployed or a prostitute, having had a sexually transmitted disease or a previous HIV test, age, educational level, injection and noninjection drug use, and multiple partners.

Moreover, at 2-year follow-up, women in the specialized group, as compared to the traditional group, demonstrated a greater reduction in noninjection drug use and a trend for greater reduction in multiple partners. Long-term impact in the specialized group is likely when programs incorporate a number of skills concurrently such as cognitive, attitudinal, and behavioral skill competencies (Kelly, 1995). For example, demonstration of condom placement on a phallus replica provided a mechanism for the research staff to accurately assess that the client knew how to use condoms correctly and without embarrassment. These skills, combined with safer-sex negotiation and sexual assertiveness role play, ensure that clients can perform well in real-life situations.

Furthermore, the specialized program incorporated a discussion of how cultural factors can influence risky behavior, such as the misperception that women don't initiate discussion of condom use or perceptions of fear or mistrust that partners may have if women insist on condom use. Thus, psychobehavioral skills learned as part of the specialized program may have an additional long-term impact on risk reduction. In addition, long-term impact was enhanced as the specialized program provided problem-solving strategies whereby clients attempted to determine alternative ways of dealing with risk triggers before a risky behavior occurred, such as learning the skill of stepping back from a situation, determine what aspect of the situation is risk producing, alternative steps to reduce risk, and ways to implement the necessary steps (Kelly, 1995). The fact that the specialized group was significantly less likely to report use of noninjection drugs at 1 and 2 years as

compared to the traditional group is consistent with findings of other researchers that targeted intervention can empower women to assume greater control in reducing AIDS risk (Malow et al., 1994; Schilling, El-Bassel, Schinke, Gordon, & Nichol, 1991). Addressing the women's most immediate concerns also may have allowed them to concentrate more on positive behaviors rather than being consumed with thoughts of where to get food and shelter for the night.

The fact that the traditional group reported increased knowledge levels at year 2 as compared with the specialized group is interesting and contrary to our expectations. One probable explanation is that because knowledge was the primary focus of the traditional program, this content was emphasized to a greater degree than knowledge content in the specialized program. The finding that the specialized group demonstrated greater risk reduction in some respects than the traditional group despite less improvement in knowledge supports results of numerous studies that report a poor correlation between AIDS knowledge and risk-reduction behaviors (Nyamathi, Bennett, Leake, Lewis, & Flaskerud, 1993; Schilling et al., 1991). Clearly, whereas AIDS knowledge is critical, other factors may be important for long-term behavioral impact. These factors may include meeting basic needs and improving coping skills, self-esteem, and sense of control (Mondanaro, 1987; Nyamathi, 1993). The finding that the traditional program revealed long-term impact in AIDS risk behaviors may also be related to the caring and culturally sensitive nature of the research staff as well as the time spent, regardless of content.

The findings of a pronounced reduction in both injection drug use and noninjection drug use at 2 years as compared with 1 year are interesting. One plausible explanation is evidence of continued improvement, especially for the specialized group. Other possible explanations that may be considered include either the possibility of social response bias at 2 years or recall bias for the year 1 data. Social response bias is of particular concern given that most of the findings are based on self-reported data. In any event, the need for objective data clearly is indicated.

The self-reported data is one limitation of this study. Our findings also need to be interpreted with caution because there was no true control group. The omission of a control group was based on ethical concerns that homeless women not be denied a basic AIDS education program. As we are unaware whether the women participated in other interventions in the community during the 2-year follow-up period, the effect of history remains an unknown. Such participation could sustain and reinforce the effects of our programs. The fact that attrition was nonrandom and that 22% of the

selected sample could not be followed up also may have biased the differential program results. Whereas program differences existed in the group lost to follow-up and in the group followed up, we did control for a number of baseline variables in the final analyses. Another limitation is the possibility that social desirability bias may have occurred as participants were aware that subsequent follow-up was scheduled. Findings of an ongoing one-time survey study of a different sample of homeless women did reveal a concordance of 92% between self-reported drug history and hair analysis of drug use. Potential for bias is also possible as the staff member who administered the questionnaire also participated in implementing the educational program. Furthermore, the effect of the pretest itself may yet be another potential threat to internal validity. Finally, because a West Coast, urban, African American population was studied, generalizability is limited.

Despite these limitations, the findings of this longitudinal study of difficult-to-reach women at risk for AIDS provides important information for program development and delivery. This study is one of the few that demonstrates successful and maintained behavior change among impoverished women of color. We believe that some of the reasons why women in both the traditional and specialized programs maintained behavior change unlike subjects in other studies include the following: the implementation of the program by caring, African American and Latina nurses and outreach workers; the presence of cultural and gender sensitivity in the design of the programs; and the attention paid to meeting the needs of the women. The results of this study support the conclusions of other investigators that culturally sensitive programs that link behavioral change recommendations to values that are important to the individual and his or her community can be beneficial (Kalichman, Kelly, et al., 1993).

Finally, the marginal impact of a more comprehensive AIDS education program on selected high-risk behaviors is demonstrated in this study. From a policy perspective, the additional impact should be compared with the additional costs. The traditional program cost of approximately \$40 per person as compared with the specialized cost of approximately \$80 per person must be weighed against the likely reduction in the probability of being infected with the AIDS virus and the human and societal costs that result from each additional infected person.

NOTE

1. This research was supported by National Institute on Drug Abuse (DA 05565 and DA06719). Correspondence concerning this article should be addressed to Adeline M.

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