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# Longitudinal Effects of an HIV Testing and Counseling Programme for Low-income Latina Women

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ABSTRACT

**Objectives.** *The purpose of this study was to assess the effects of an HIV antibody testing, counseling and education programme on the knowledge and practices of low-income Los Angeles Latina women.*

**Methods.** *The study design was prospective and longitudinal involving pre-test, post-test and retest measures over a 2-year period. The study employed an experimental group and a comparison group which did not receive the intervention. The study group was comprised of a convenience sample of 508 low-income Latina women who were recruited from the Public Health Service nutrition programme for women, infants and children (WIC). The comparison group (n = 51) was recruited from the same setting. A battery of instruments was selected to measure HIV knowledge and practices, the social support received, self-esteem, the level of acculturation and sociodemographic characteristics. The instruments were administered at pre-test, 2 weeks post-test and 1 year retest. The HIV antibody serostatus was assessed at pre-test and retest. An intervention protocol based on cultural competence, women as traditional health care givers and the major transmission categories was provided after the pre-test and was reinforced post-test. Finally, qualitative data were collected from the focus group participants (n = 55) to evaluate the intervention protocol.*

**Results.** *The participants in the study made significant improvements in HIV knowledge and reported condom use practices from pre-test to post-test that were retained on retest. The comparison group subjects did not make significant pre-test–post-test improvements on these measures.*

**Conclusions.** *It should be noted that the changes in practices made by the study group did not necessarily reduce their risk of HIV infection or transmission and were not related to the demonstrated knowledge and skills improvement. Of special significance to programme planners, educators and researchers, both the quantitative and qualitative data revealed problem areas with the intervention protocol related to cultural norms and the possible fragmentation of information based on the behavioral transmission categories.*

**Keywords:** counseling, ethnicity, HIV testing, Latina women.

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## INTRODUCTION

Human immunodeficiency virus (HIV) presents a growing threat to the health of the Latino population in Los Angeles County. Latinos are considered to be Spanish-speaking-surnamed individuals whose origins were in the countries of Latin America. At the end of July 1996, there were 33 107 reported cases of AIDS in Los Angeles County; 25% of these occured in Latinos.[1] The percentage of Latinos with AIDS in Los Angeles has increased steadily from 17.3% in 1988 to 25% today. Of the adult Latinos with AIDS, 92% are male and 8% female. Among the males, HIV was transmitted through male–male sexual contact (MWSM) in 75%, through injection drug use (IDU) in 6% and a combination of MWSM and IDU in 6%; 10% were undetermined. Among the females, HIV was transmitted through heterosexual contact (48%), IDU (18%), transfusion (14%) and undetermined causes (19%). It has been suggested that the large percentage of undetermined cases among both male and female Latinos is the result of a strong cultural value to conceal male–male sexual contact and for males to not self-identify as being homosexual or bisexual.[2-4] As part of this concealment, men who have sex with men also have sex with women, resulting in a risk to female partners who do not perceive themselves to be at risk nor protect themselves.[2-4]

Clearly the picture of the HIV epidemic among Latinos in Los Angeles has its own unique features. The ethnicity of the Latinos in Los Angeles is 75% Mexican, 22% Central and South American and 3% Caribbean[5] as compared to the east coast where Puerto Ricans, Cubans and other Caribbean ethnic groups predominate. In addition, in contrast to the east coast of the US, sexual transmission accounts for the large majority of adult cases among Latinos. Finally, in Los Angeles, the percentage of the total reported cases (25%) among Latinos does not exceed the percentage of Latinos in the total population of Los Angeles County (37.8%).[6] These unique features provide an emphasis on prevention as a major focus of HIV education and research programmes for the Los Angeles Latino community. The prevention programmes for Los Angeles Latinos must also take into account language and cultural barriers, poverty, discrimination and the fear of deportation.[5,6]

This paper reports on the results of an HIV education, counseling and antibody testing prevention programme for low-income Latina women in Los Angeles County. The study design was longitudinal involving pre-test, post-test and retest measures of HIV knowledge and practices and HIV antibody status over a 2-year period. The data were collected from 1991 to 1993. The study employed an experimental group and a comparison group which did not receive the intervention. The intervention was based on conceptualizations of cultural competence, women as traditional care-givers and health educators in their families and a public health approach to transmission in the major categories identified by the Centers for Disease Control and Prevention (CDC).

Several community intervention models and strategies for changes in sexual and drug use behavior have been implemented and evaluated. Some have been successful and have identified common characteristics that provide guidelines for community prevention efforts.[7-16] These programmes were designed around HIV antibody testing and counseling, risk reduction counseling and a health care plan for medical and psychosocial services. The programmes incorporated information, motivation, skills training, existing community structures and social networks, and attention to normative behaviors and methods of diffusing information. These programmes (1) used peer educators, (2) were approached as long-term efforts with multiple and repeated strategies to initiate and sustain change, (3) incorporated a comprehensive range of services and (4) used a field experimental design to evaluate the effectiveness. All the studies measured the changes in knowledge, practices and attitudes. Most studies employed self-reported measures of change or intention to change, while very few measured actual behavior changes.[7-16]

The prevention programmes pertinent to ethnic communities of color emphasized (1) cultural values, customs and traditions, (2) social networks and the use of the extended family, (3) peer counseling with an ethnic and gender match, (4) innovative communication strategies such as oral tradition, novellas and comic books, (5) integrating AIDS prevention into the context of ongoing, serious health, social and political problems of the community, (6) locating prevention programmes in accepted community settings/agencies and (7) reimbursing or providing services for participants in some manner.[16-34] Some of these studies employed social–psychological theoretical models to predict HIV-related sexual risk reductions and others warned against the use of such models.[24,26,32] All of the recommendations of the successful programmes were reviewed and many were used to design the prevention intervention for the study reported here: (1) cultural values, (2) the use of the family, (3) peer educators with an ethnic, language and gender match, (4) materials in comic book style, (5) the use of an accepted educational community setting, (6) skills training, (7) the repeated use of the intervention, (8) comprehensive services, (9) reimbursement and (10) a field quasi-experimental design.

## METHODS

### Subjects

The participants ($n = 508$) in the study group were low-income Latina women who were attending the Public Health Foundation's nutrition programme for women, infants and children (WIC) in Los Angeles. In order to be eligible for the WIC programme, the women must be documented US residents, below a specified income level and include in their household a pregnant woman, a nursing mother and/or children under 5 years old. However, other women accompanying the WIC recipients were eligible for this study and included mothers, sisters, female friends and grandmothers. The sample selection criteria were that the subjects be female, Spanish-speaking-surnamed individuals of Latin American ethnicity and that they self-identify as one of the Latino ethnic groups included in the screening question. The countries of birth of the subjects were Mexico (44%), other Central American countries (43%), South American countries (4%), the US (7%) and other (2%). The marital statuses were 43.8% married, 43.8% never married and 12.3% divorced, separated or widowed. Their religions were Catholic (66.2%), Protestant (17.2%), Seven Day Adventist (8.9%), none (5.3%) and other (2.4%). They ranged in age from 14 to 86 years with a mean of 28.6 years (SD = 9.6 years) and a median of 27.5 years. The number of years of formal education ranged from 1 to 18 years with a mean of 9.2 years (SD = 4.1 years) and a median of 9.7 years. The large majority (86.6%) had incomes of less than $1000 per month. The number of children 18 years and younger living in the subject's household ranged from 1 to 8 with a mean of 2.25 (SD = 1.5) and a median of 2.37. A comparison group of subjects ($n = 51$) recruited from the same setting did not differ significantly from the study subjects for any of the sample characteristics reported above.

### Procedures

A convenience sample of subjects was recruited from the WIC programme waiting room. The participants were paid $10.00 for each of three interviews. For the study group, 570 women who met the selection criteria were approached and invited to participate. Of these, 508 agreed for a response rate of 89%. Limited sociodemographic information was collected on the persons who refused to participate (age, marital status, ethnicity, income, number of children and country of birth). Those who refused did not differ from the study participants in these variables. The major reason for refusal was a lack of time.

Written informed consent was obtained in the subject's choice of either Spanish or English. The participants were interviewed in person by community health workers who

shared their ethnicity, language and gender; 87.4% completed the interviews in Spanish. The interviews took place in a small conference room next to the WIC waiting room. Child care and snacks were provided during the interviews.

The participants responded to a battery of instruments measuring sociodemographic characteristics, the level of acculturation, self-esteem, social support and AIDS-related knowledge and practices; the HIV antibody serostatus was tested using a needle stick procedure. The subjects ($n = 508$) were interviewed, counseled and tested for HIV antibody serostatus at baseline (pre-test). A psychoeducational intervention was given after the baseline data were collected. At 2 weeks post-test there was minimal (2%) attrition; the subjects ($n = 497$) were interviewed and counseled again in conjunction with receiving their HIV antibody test results. The psychoeducational intervention was reinforced post-test. A subsample of 200 subjects were randomly selected and invited to participate at 1 year follow-up (retest). Of these, 191 (96%) were interviewed and tested again for their HIV antibody serostatus.

The comparison group subjects were recruited following the same procedures and sample selection criteria. Sixty subjects were approached and 51 agreed to participate for a response rate of 85%. The comparison group subjects were interviewed at baseline (pre-test) ($n = 51$) and again at 2 weeks post-test ($n = 47$, 92%). After the post-test was completed, the comparison group was offered HIV antibody testing, counseling and the psychoeducational intervention; 85.6% chose to receive the testing, counseling and intervention.

After the interventional study had ended and a preliminary analysis of the data was completed, a series of focus group interviews (seven separate groups of seven to eight subjects in each group) was conducted in early 1994. The purpose of these interviews was to review and clarify the quantitative findings and to provide a final evaluation of the intervention protocol. The focus group subjects were recruited in the same manner and from the same location as the survey subjects and met the same selection criteria. Each focus group interview lasted from 2.5–3.5 hs. The interviews were conducted by the investigators and community health workers in a combination of Spanish and English. The interviewers took notes during the discussion and audiotaped it with the participants' permission for cross-validation of their findings. The subjects were paid $25.00 for their participation. The study had the continuous approval of the University Human Subjects Protection Committee.

## Intervention Protocol

Conceptually, the intervention protocol was based on and guided by three broad constructs. Of most importance and informing the entire study was the conceptualization of cultural competence.[33,34] Several approaches were used to ensure cultural competence. First, the community health workers who interviewed and provided the intervention shared the ethnicity, gender and language of the study participants.[27,35] Second, prior to the interventional study reported here, focus group interviews had been conducted to determine the lay beliefs about health, illness and AIDS among low-income Latina women.[22] Based partly on these interviews, the intervention protocol was developed and community health workers were trained and monitored by the investigators to provide the intervention protocol. Finally, the community health workers received additional formal training and yearly updates in HIV education and serostatus testing for ethnic women of color from the California Nurses Association AIDS Education and Training Program, Women at Risk: AIDS/HIV Training for Care Providers.[36]

A second conceptualization guiding the study intervention was the selection of female subjects as participants in the study. Latina women are considered care givers and health educators in their families. Other investigators have called for gender-specific programmes and some have reported the willingness of Latino family members to be

involved in AIDS prevention advice and information.[18,24,30] The provision of the HIV information and skills to Latina women was expected to have a ripple effect to a wider group of family members and neighbors/friends.

Finally, the intervention protocol was based on the categorization by the Centers for Disease Control (CDC), US Public Health Service of the major transmission routes (sexual, intravenous and perinatal[37,38]) and on a standard public health approach which included education, counseling and the provision of resources in an atmosphere of non-discrimination.[39,40] The intervention protocol consisted of (1) HIV antibody test counseling before and after HIV antibody serotesting, (2) counseling in risk reduction, lifestyle practices and health promotion, (3) skill development in condom use and in negotiating safer sex with a partner, (4) skill development in cleaning needles, (5) pregnancy counseling, (6) free condoms as often as desired and (7) referral and advocacy for medical, psychological, financial, legal and social services and for partner testing. The intervention made use of one-on-one peer counseling, group discussion, Spanish language videotapes and cartoons, role playing, demonstration and return demonstration, information and resource counseling and printed materials.

## Instruments

The instruments were translated into Spanish and back-translated into English by two different bilingual, bicultural translators to establish semantic and idiomatic equivalence.[21,41] The instruments were modified for clarity and cultural relevance, pilot tested and the initial reliabilities were established.[42–44] Table 1 includes a description and the psychometric properties of the instruments.

The AIDS Knowledge and Awareness Survey was used to collect data on knowledge of the HIV symptoms and transmission, knowledge of sexual prevention methods and risk behaviors. This instrument was developed by the National Center for Health Statistics (NCHS) and is a supplement to the National Health Interview Survey.[23,45,46]

The frequency and variety of sexual activities were measured by the sexual behavior subset of the AIDS Initial Assessment (AIA) Questionnaire developed by the National Institute on Drug Abuse (NIDA).[47] This instrument measures 13 descriptive kinds of sexual activity ranging from kissing and hugging to vaginal sex, anal sex, oral sex and a variety of sexual behaviors during menstruation. The respondents were asked whether they engaged in these activities, the average number of partners per week in each activity and the average number of times per week with and without a condom. The respondents were also asked about the gender of the sexual partner for each activity. The use of condoms in the previous 6 months, reasons for not using condoms and changes in condom use were measured by the condom use subset of the AIA questionnaire developed by the NIDA.[47] This instrument measures the use of condoms within the previous 6 months with primary partners and others and the reasons for not using condoms.

The assimilation to Anglo (US-dominant) culture was assessed by the 12-item five-point Likert-type acculturation scale developed by Marin et al.[48] This scale measures the acculturation to Anglo culture through the preference for language, media and social relationships. Social support was measured by the Support Questionnaire originally developed by Gottlieb[50] and modified by Zich and Temoshok.[51] The respondents were asked whether they were receiving different kinds of support, how often they received support and how effective was each type of support. To measure self-esteem, the 'general self' short form of Coopersmith's original Self-esteem Inventory (SEI) was used in this study.[52,53] Coopersmith's scale was modified based on the focus group interviews to be scored dichotomously by responding 'true' or 'false' to evaluative attitude statements towards the self.

**TABLE 1.** *Description and psychometric properties of instruments*

| Name of instrument | Source | Items | Cronbach's α | Previous reliability and validity |
|---|---|---|---|---|
| AIDS Knowledge and Awareness Survey | NCHS, NHIS[23,45,46] | Forty-two items Symptoms Transmission Sexual prevention Risk behaviors | 0.84 0.89 0.78 0.67 | Flaskerud and Uman[23] |
| Sexual behavior, AIA | NIDA[47] | Thirteen items Sexual activities Number of partners Gender of partner | | |
| Condom use, AIA | NIDA[47] | Fourteen items Use of condoms Reasons for not using | 0.77 | |
| Acculturation Scale | Marin et al.[48] | Twelve items Language Media Social relationships | 0.93 | Flaskerud and Nyamathi[21] Calvillo and Flaskerud[49] |
| Support Questionnaire | Gottlieb[50] Zich and Temoshok[51] | Seven items Received support How often How effective | 0.90 0.93 0.92 | Flaskerud and Nyamathi[44] Calvillo and Flaskerud[49] |
| Self-esteem | Chiu[52] Ryden[53] | Twenty-four items Attitude towards self | 0.76 | Flaskerud and Nyamathi[44] Calvillo and Flaskerud[49] |

The data were collected from the focus group participants through focused interviews with an open response format. The interviews focused on the quantitative findings[54,55] and a re-evaluation of the intervention protocol. The intervention protocol was presented in three categories: (1) the respondent's assessment of the cultural competence of the community health workers and the protocol (language, ethnicity, gender, knowledge and clarity of information provided), (2) women as health educators and health care providers in Latino families and (3) the CDC transmission categories. After each category was presented, the participants freely discussed their reactions and provided explanations and clarification.

## Data Analysis

Descriptive statistics were produced for all the variables. The relationships between the sociodemographic variables, acculturation, social support, self-esteem, knowledge and practice scores and risk behaviors were examined using Pearson product moment correlations ($r$) at pre-test, post-test and retest. The changes in knowledge of HIV transmission, symptoms and sexual prevention and changes in condom use and the reasons for not using condoms from pre-test to post-test to retest were analyzed by a one-way repeated measures analysis of variance (ANOVA) and dependent $t$-tests. The differences between the study group and comparison group on the pre-test–post-test scores were examined using a two-way repeated measures ANOVA (by time and by group). Multiple regression analyses were performed to determine the relationship of sociodemographic variables, pre-test knowledge and practices, level of acculturation, social support and self-esteem to post-test knowledge and practices.

The qualitative data were subjected to content analysis as described by Corbin and Strauss.[56] The data were grouped according to a systematic reduction of the data into sets

**TABLE 2.** *Pre-test, post-test and retest changes in HIV-related knowledge and behavior*

| HIV-related knowledge and behaviors | Pre-test<br>$x$ (SD) | Post-test<br>$x$ (SD) | Retest<br>$x$ (SD) | ANOVA<br>$F$ | df | $p$ |
|---|---|---|---|---|---|---|
| Knowledge of symptoms | 7.10 (2.4) | 9.37 (2.1) | 10.04 (1.72) | 47.87 | 2, 188 | 0.0001 |
| Knowledge of transmission | 5.84 (3.7) | 8.99 (2.9) | 9.69 (2.18) | 92.69 | 2, 188 | 0.0001 |
| Knowledge of sexual prevention | 2.15 (0.99) | 2.86 (0.63) | 3.03 (0.41) | 20.53 | 2, 184 | 0.0001 |
| Perceived risk of having AIDS | 3.30 (0.91) | 1.43 (0.71) | 0.84 (0.66) | 5.15 | 2, 186 | 0.02 |
| Perceived risk of getting AIDS | 3.39 (0.92) | 1.34 (0.72) | 0.95 (0.70) | 4.86 | 2, 186 | 0.03 |
| Reasons for not using condoms | 12.00 (3.378) | 7.00 (1.21) | 6.00 (2.44) | 6.11 | 2, 188 | 0.03 |
| Vaginal intercourse without condom in the previous 2 weeks | 1.50 (2.4) | 1.39 (1.5) | 1.36 (1.7) | 3.48 | 2, 187 | 0.04 |
| Sexual activity (previous 6 months) (%) | 75.5 | 76.0 | 72.0 | | | NS* |
| Single sexual partner (%) | 96.2 | 95.0 | 97.0 | | | NS |
| Vaginal intercourse only (%) | 86.7 | 87.2 | 89.4 | | | NS |

*NS, no significant change.

or categories suggested by the intervention protocol and the quantitative data. The qualitative data were used to help explain, clarify and evaluate the quantitative data and the intervention.

## RESULTS

### Knowledge

HIV knowledge was assessed on three scales: knowledge of symptoms, knowledge of transmission and knowledge of sexual prevention methods. There was a significant pre-test–post-test increase in knowledge on each of the scale scores that was retained or increased on retest. Table 2 displays the pre-test, post-test and retest means and standard deviations on each of these scales and the results of the repeated measures ANOVA. The dependent *t*-tests demonstrated significant differences on each scale between the pre-test and post-test and the pre-test and retest scores but not between the post-test and retest scores. Although the post-test–retest changes were not significant, there was a continuing mean increase in knowledge on each scale suggesting perhaps that the study intervention was sensitizing the subjects to additional HIV information messages. A random sample ($n = 50$) of the study subjects was selected and their pre-test–post-test changes in knowledge were contrasted with those of a comparison group who did not receive the intervention. A two-way repeated measures ANOVA demonstrated a significant improvement in knowledge over time by the study group but not the comparison group on each scale.

A least-squares regression analysis was used to determine the relationships between the sociodemographic characteristics (education, number of children, age, marital status and religion), level of acculturation, social support received, self-esteem and post-test knowledge on each scale, controling for pre-test knowledge. Table 3 includes only the significant explanatory variables. Fifteen percent of the variance in the post-test knowledge of AIDS symptoms could be explained by these variables ($F[9,458] = 4.13$, $p = 0.0001$). The pre-test knowledge of AIDS symptoms, self-esteem and age were the three significant explanatory variables ($\beta = 0.26$, 0.13 and 0.15, respectively). The explanation of the post-test knowledge of AIDS transmission was 16% ($F[9,458] = 5.40$, $p = 0.0001$). The significant explanatory variables were acculturation, self-esteem and age ($\beta = 0.19$, 0.18 and 0.14, respectively). Only 10% of the variance in the post-test

knowledge of sexual prevention could be explained by the independent variables ($F[9,459] = 3.40$, $p = 0.001$). The only significant explanatory variable was the years of education ($\beta = 0.26$). There were significant correlations between the explanatory variables of the three knowledge scales. Acculturation and education ($r = 0.54$, $p = 0.0001$), acculturation and self-esteem ($r = 0.17$, $p = 0.0005$) and education and self-esteem ($r = 0.28$, $p = 0.0001$) were significantly related. Age was not related to any of these.

## Risk Behavior and Practices

The respondents were asked about their perceived risk of having AIDS and their perceived risk of getting AIDS. At pre-test 17.6% of the subjects in the study group perceived their risk of having AIDS as high; this perception decreased to 7.6% on post-test and 4.5% on retest. Similarly, at pre-test 21.3% perceived their risk of getting AIDS as high; this perception decreased to 8.4% on post-test and 6% on retest. There were significant pre-test–post-test and pre-test–retest changes for both the perceived risks of having and getting AIDS (refer to Table 2). The pre-test–post-test changes in the comparison group were not significant. In the comparison group, 18.2% of the subjects perceived their risk of having AIDS as high at pre-test and 19.0% at post-test. The risk of getting AIDS was perceived as high by 25.2% of the comparison group subjects at pre-test and 24.9% at post-test. The risks of having AIDS and getting AIDS were highly correlated ($r = 0.83$ and $p = 0.0001$).

For both the study group and the comparison group at pre-test, the perceived risk was attributed to the belief that the primary partner had other sexual partners (30.4%), various kinds of casual transmission (mosquitoes, swimming pools, toilet seats, furniture and eating utensils) (22.3%), blood transfusion (18%), blood donation (7%), multiple partners (3.7%), partner using/sharing needles (2%), subject sharing needles (0.6%) and other unspecified (16%). At post-test, the perceived risk continued to be attributed to the belief that the primary partner had other sexual partners (30%) for both the study and comparison groups, whereas there was a significant pre-test–post-test difference between the two groups in all the other attributions of risk.

A least-squares regression analysis was used to examine the relationship of the sociodemographic variables, acculturation, social support received, self-esteem and knowledge of AIDS symptoms, transmission and sexual behaviors to the perceived risk of having AIDS and getting AIDS on post-test, controling for the pre-test perception. Fifteen percent of the variance in the post-test risk of having AIDS was explained ($F[12,470] = 3.38$ and $p = 0.0008$). The explanatory variables were the post-test knowledge of transmission ($\beta = 0.33$), the post-test knowledge of sexual prevention ($\beta = 0.23$) and acculturation ($\beta = -0.23$). Using the same independent variables, 17% of the variance in post-test the perceived risk of getting AIDS was explained ($F[12,464] = 2.65$ and $p = 0.01$). The significant explanatory variables were the post-test knowledge of transmission and sexual prevention ($\beta = 0.28$ and 0.31, respectively) (refer to Table 3). Several items on the AIDS knowledge of transmission scale dealt with misperceptions about transmission. The items on the knowledge of sexual prevention scale dealt with the number of partners and barrier methods.

The perception of the risk of having AIDS was not related to the actual HIV antibody serostatus. Of the 508 women tested for the HIV antibody at pre-test, only one tested positive. At the time of retest, this finding remained the same. Many of the women (66%) had been tested for the HIV antibody previously, at the time of immigration. However, HIV education and counseling was not part of that experience.

The subjects were also queried on the variety and frequency of their sexual behaviors, their use of condoms in the previous 6 months and their reasons for not using condoms. In answer to questions concerning the frequency of sexual activity, the large majority

TABLE 3. *Significant explanatory variables for post-test knowledge and behavior*

| | Knowledge of symptoms | | Knowledge of transmission | | Knowledge of sexual prevention | | Perceived risk of having AIDS | | Perceived risk of getting AIDS | | Needle cleaning | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Dependent variable** | | | | | | | | | | | | |
| Test of regression model | $F_{(9458)} = 4.13$ $p = 0.0001$ | | $F_{(9458)} = 5.40$ $p = 0.0001$ | | $F_{(9959)} = 3.40$ $p = 0.001$ | | $F_{(12\,470)} = 3.38$ $p = 0.0008$ | | $F_{(12\,464)} = 2.65$ $p = 0.01$ | | $F_{(8213)} = 9.34$ $p = 0.0001$ | |
| Variance explained | $R^2 = 0.15$ | | $R^2 = 0.16$ | | $R^2 = 0.10$ | | $R^2 = 0.15$ | | $R^2 = 0.17$ | | $R^2 = 0.16$ | |
| **Significant explanatory variables** | | | | | | | | | | | | |
| | $\beta$ | $p$ | $\beta$ | $p$ | $\beta$ | $p$ | $\beta$ | $p$ | $\beta$ | $p$ | $\beta$ | $p$ |
| Pretest knowledge of symptoms | 0.26 | 0.0001 | — | | — | | — | | — | | — | |
| Self-esteem | 0.13 | 0.04 | 0.18 | 0.004 | | | | | | | | |
| Age | 0.15 | 0.017 | 0.14 | 0.02 | | | | | | | | |
| Acculturation | — | | 0.19 | 0.002 | — | | — | | — | | — | |
| Years of education | — | | — | | 0.26 | 0.0004 | −0.23 | 0.01 | — | | — | |
| Post-test knowledge of symptoms | — | | — | | — | | — | | — | | −0.33 | 0.0001 |
| Post-test knowledge of transmission | — | | — | | — | | 0.33 | 0.0001 | 0.28 | 0.002 | — | |
| Post-test knowledge of sexual prevention | | | | | | | 0.23 | 0.003 | 0.31 | 0.005 | — | |

(75.5%) of the respondents at pre-test reported sexual activity in the previous 6 months. However, 87.2% reported no sexual activity in the previous week. The reports of the frequency of sexual activity did not change significantly at post-test or retest. For the variety of sexual activity, 96.2% reported sexual activity with a single partner and for 86.7% the activity was limited to a single variety of sexual behavior, vaginal intercourse in the missionary position. The reports of the variety of sexual activities did not change significantly at post-test and retest (see Table 2).

A least-squares regression analysis was used to examine the relationship of the independent variables to both the frequency and variety of sexual activities at post-test. The tests of the two regression models were not significant $(F[12,479] = 1.05$ and $p = 0.40$ and $F$ $[12,473] = 1.33$ and $p = 0.24$, respectively). Significant correlations occurred between the increased frequency of sexual activity and a higher level of acculturation $(r = 0.26$ and $p = 0.0001)$ and a greater number of years of education $(r = 0.14$ and $p = 0.002)$ and being married $(r = 0.09$ and $p = 0.03)$. An increased variety of sexual activity was significantly related to a higher level of acculturation $(r = 0.26$ and $p = 0.0001)$ and a greater number of years of education $(r = 0.14$ and $p = 0.002)$. The frequency and variety were highly correlated $(r = 0.78$ and $p = 0.0001)$. The knowledge scores (transmission and sexual prevention) had no explanatory value for sexual activity.

The majority (77.1%) of the respondents who were sexually active had not used condoms in the previous 6 months at pre-test. Of these, 88% had not used condoms with their primary partner and 12% had not used condoms with another person. At retest the percent of respondents who had not used condoms in the previous 6 months had decreased to 64.5%. At pre-test the mean number of sexual intercourse acts without a condom in the previous 2 weeks was 1.5 times and at retest was 1.36. The respondents were asked also their reasons for not using condoms. The number of reasons at pre-test ranged from zero to 14 with a mean of 12.0 and decreased to seven at post-test and six at retest. The main reasons for not using condoms involved partner resistance (47.9%) at pre-test. There were significant pre-test–post-test and pre-test–retest decreases in the frequency of sexual intercourse acts without a condom in the previous 2 weeks $(F(2,187) = 3.48$ and $p = 0.04)$ and in the number of reasons for not using condoms $(F(2,188) = 6.11$ and $p = 0.03)$ among the study group participants (refer to Table 2). For the comparison group the pre-test–post-test changes were not significant on either measure.

As part of the intervention, the participants were offered free condoms and taught how to use them and how to talk to a partner about using them. It is noteworthy that despite the reported increase in condom use and decrease in the reasons for not using a condom, the main reason given for increasing condom use was to prevent pregnancy (20.4%). The number of children in the household was inversely related to the number of reasons for not using a condom at post-test $(r = -0.22$ and $p = 0.002)$. Both the frequency $(r = 0.14$ and $p = 0.04)$ and variety $(r = 0.14$ and $p = 0.3)$ of sexual activities were directly related to the number of reasons for not using condoms at post-test.

A least-squares regression analysis examined the relationship of the sociodemographic variables, acculturation, social support received, self-esteem and post-test knowledge of transmission and sexual prevention to both measures of condom use practices. The test of the regression model was not significant for either condom use or the reasons for not using condoms $(F = (11,473) = 0.89$ and $p = 0.52$ and $F(11,467) = 1.46$ and $p = 0.17$, respectively). When the post-test condom users were compared to non-condom users, there were no significant differences between the two groups in the post-test knowledge of prevention score or knowledge of sexual prevention score $(t(488) = 0.52$ and $p = 0.60$ and $t(453) = 0.49$ and $p = 0.63$, respectively). The condom users and non-condom users differed significantly at post-test only in years of formal education $(t(472) = 2.08$ and $p = 0.04)$. The post-test knowledge scores (transmission or sexual prevention) had no explanatory relationship to condom use or the number of reasons for not using condoms.

Finally, the respondents were asked about their drug use and needle use practices. One hundred percent denied illegal injection drug use and 93% denied illegal drug use of any kind. As part of the intervention, the subjects were taught not to share injection equipment and to clean equipment with bleach through demonstration and return demonstration. All the subjects were able to demonstrate skill achievement and a significant pre-test–post-test–retest increase in knowledge of bleach use to prevent HIV transmission ($F(2,189) = 51.92$ and $p = 0.0001$). However, towards the end of the study, an exploratory interview of 216 of the respondents was conducted at post-test or retest about their practices of injecting prescription medications and vitamins in the home. They were also asked whether they were reusing injection equipment, how they were cleaning it and whether they were sharing equipment. It should be noted that, of the 216, 43.5% were injecting medications in the home, 20.8% were reusing equipment and 15.7% were sharing. The majority of those injecting (43%) were cleaning equipment with water and then alcohol. The only significant explanatory variable of household injection was the level of education ($\beta = -0.326$ and $p = 0.0001$) ($F(8,213) = 9.34$, $R^2 = 0.16$ and $p = 0.0001$) (refer to Table 3).

## Evaluation of the Intervention Protocol

Both the quantitative data analysis and qualitative data obtained from the focus group members provided information for evaluating the intervention protocol. The protocol was based on cultural competence, women as traditional health educators and care givers and the CDC transmission categories.

The focus group members provided several suggestions for effective HIV education for Latinos. They agreed that to be most effective HIV education for Latinos should be provided by persons who shared the ethnicity and language of the participants. However, it is noteworthy that their suggestions concerning gender differed from the approach taken in this study. The suggestions included gender-segregated education in schools for children with same sex health educators. Beginning at the teenage years and continuing through to adulthood, they recommended gender-integrated HIV education for teenagers in groups in schools and for adult couples in groups in community centers and agencies, churches and health centers. They recommended that the health educators should include both a male and female in gender-integrated groups. Their reasoning was that men and women had to hear the same message at the same time in order to prevent mispercep-tions about transmission and/or frank distortions of information. The focus group members said that misperceptions and distortions were often used to minimize the risks from sexual transmission. The pre-test quantitative data revealed many misperceptions about HIV related to casual transmission.

A major rationale behind the intervention programme was that women are traditional health educators in the family and that the HIV education and prevention programme would have a ripple effect to their families. It should be emphasized that the focus group members said that this presumption might not be accurate because of the role of women in Latino society. According to the participants, teenage sons and daughters 'will not listen to their mothers' and they will not accept health education from mothers because mothers are considered 'old fashioned and dumb', conservative and not as knowledge-able as teenagers. Similarly, husbands or partners will not accept health education and advice from their wives/partners because of women's lesser status and expected submiss-ive role. Giving advice and education assumes an equal status and an assertive role. Again, the women recommended HIV education in gender-integrated groups, particularly couples' groups. They reasoned that receiving HIV education in couples' groups would give the women the chance later to bring it up and talk about it to their male partner.

Finally, the intervention protocol was based on the transmission categories established by the CDC: sexual transmission, parenteral transmission and perinatal transmission.

Several of the quantitative findings raise important questions about teaching about HIV from the perspective of these behavioral categories. A knowledge of the effectiveness of condoms to prevent HIV infection did not influence behaviors, which were instead based on avoiding pregnancy.[54,57,58] Similarly, a knowledge of sharing needles and the use of bleach to prevent HIV transmission did not influence the sharing and cleaning of needles to inject home medications and vitamins.[55,58] It should be considered seriously that teaching from discrete behavioral categories does not facilitate a transfer of knowledge from one situation to another. Instead, teaching a conceptually coherent causal mechanism (i.e. blood/other body fluid exchange) might permit a knowledge of the risk to be generalized to other situations.[59,60]

## DISCUSSION

The major findings of our study were that participants made significant improvements in HIV knowledge and reported condom-use practices from pre-test to post-test that were retained on retest. The comparison group subjects did not make significant pre-test–post-test improvements on any of these measures. The consistent explanatory variables for the knowledge change were a higher level of acculturation, more years of formal education and higher self-esteem. The change in the perception of risk was best explained by the post-test knowledge of transmission and sexual prevention and by the level of acculturation.

The self-reported condom use improved significantly from pre-test to post-test and was retained on retest and the reasons for not using condoms decreased significantly. The respondents also demonstrated skill development in the use of condoms. However, the main reason for the change in condom use was to avoid pregnancy. The greater number of reasons for not using condoms was related to increased variety and frequency of sexual activity. HIV knowledge of transmission and sexual prevention did not influence the change in condom use. Other investigators have reported similar findings.[24,57,58] The relationships between condom use, pregnancy and sexual activity have been noted previously, particularly for Latina women.[24,57] In addition, several other investigators have failed to find an association between knowledge and sexual behavior for a variety of reasons, including gender, status and role relationships.[24,57,61]

The self-reported variety and frequency of sexual activity was quite limited and conservative for the large majority of respondents and did not change from pre-test to post-test to retest. More years of formal education and higher levels of acculturation (a greater assimilation to US dominant culture) were related to greater variety and frequency. The HIV knowledge scores were not related to sexual activity. Van Oss Marin *et al.*[57] have reported similar findings among Latina women.

There were significant pre-test–post-test changes in knowledge of the use of bleach to clean needles and prevent HIV transmission. The respondents also demonstrated skill development in the use of bleach. However, future programme planners should note well that the participants continued to reuse and share needles for home medication injection and to clean them with water and alcohol.

The subjects demonstrated consistent improvement in knowledge and in some reported practices. Despite this, the changes in practices that were made did not necessarily reduce the risk of HIV infection or transmission and were not related to the demonstrated knowledge and skills improvement. As noted above, several other investigators have reported similar findings where an improvement in knowledge had no sustained relationship to a change in behaviors or practices.[16,24,54,55,57,58,61] These kinds of results have promoted the Citizens Commission on AIDS[61] to call for new approaches to prevention which focus on reframing the AIDS message.

The evaluation of the intervention protocol in this study revealed problem areas related to cultural norms and suggestions for programme changes that might better

facilitate risk reduction practices. These included issues of gender, power and role relationships embedded in cultural values and practices. Secondly, an assessment of the CDC transmission categories as a conceptual framework for teaching suggested the possible lack of a coherent causal model that would permit the transfer of risk knowledge from one situation to another. It is important to note that teaching from the CDC categories presents information in a fragmented way that interferes with generalizing. The findings have several limitations as well as implications for future research and prevention programmes.

The limiting factors include the gender, ethnicity, level of acculturation and other sociodemographic characteristics of the respondents. The sample size was large; however, convenience sampling from a single setting in Los Angeles and a lack of random assignment to the study and comparison groups limits the generalizeability. The sample was similar to other Latina WIC populations in Los Angeles but the respondents included more immigrants, more persons of Central and South American ethnicity and those with a lower median household income than the general Latino population in Los Angeles County.[5,6] An additional limitation is the nature of the self-reported data and the use of multiple tests of ANOVA in analyzing the data. The combination of both a quantitative and qualitative analysis strengthens the study design and, although the group was small, the use of a comparison group supports the validity of the findings.

Future studies should consider the use of a more representative sample and the inclusion of mixed gender couples in the intervention. Other investigators have also emphasized these features of teaching.[18,30] On the other hand, Amaro[24] recommended a greater emphasis in HIV prevention programmes on female gender, lack of power and unequal role relationships. She advocated that HIV programmes emphasize the psychology of women's development and focus on power through interaction and relational connectedness. HIV prevention and education programme planners should seriously consider the use of a coherent causal model for teaching about transmission.[59,60] The use of such a model may facilitate the transfer of knowledge of risk from one situation to another. In addition, HIV prevention and education programmes for Latinos should continue to address the misperceptions about HIV transmission and treatment. These beliefs continue to influence the perception of risk and may influence the actual risk by minimizing the risks of sexual transmission. Recent reports have shown increasing rates of sexual transmission of HIV in Latinos, particularly among men who have sex with men.[62] Many of these men also have sex with women thereby increasing sexual transmission to women as well.[2,3,24,54] Finally, health educators should continue to pursue culturally competent approaches which support and enhance cultural norms and social roles in HIV prevention.

## ACKNOWLEDGEMENT

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