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Mano a Mano Mujer: An Effective HIV Prevention for Chilean Women

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Abstract

The impact of a professionally-facilitated peer group intervention for HIV prevention among 400 low income Chilean women was examined using a quasi-experimental design. At three months post-intervention, the intervention group had higher HIV-related knowledge, more positive attitudes towards people living with HIV, fewer perceived condom use barriers, greater self-efficacy, higher HIV reduction behavioral intentions, more communication with partners about safer sex, and decreased depression symptoms. However, they did not have increased condom use or self-esteem. More attention to gender barriers is needed. This intervention offers a model for reducing HIV for women in Chile and other Latin American countries.

As of the end of 2009, over 33.3 million people worldwide were living with HIV, with 2.6 million new infections, and 1.8 million HIV related deaths (Joint United Nation Programme

on HIV/AIDS [UNAIDS], 2010). Nearly half of all persons living with HIV today are women. Once considered a predominantly homosexual and male condition, current data demonstrate that HIV has spread to the general population, and women are one of the most vulnerable groups in terms of its acquisition (UNAIDS, 2010). Although Chile and other Latin American countries have had relatively low HIV rates compared to other regions, the global decline in new HIV infections from 2000–2008 reported by the World Health Organization did not occur in the Latin American region (UNAIDS & World Health Organization [WHO], 2009). The number of new HIV infections continues to rise in Chile, reflecting the limited effectiveness of Chile's public health prevention strategies (Chilean Commission on AIDS [CONASIDA], 2003; Department of Epidemiology, & Chilean Ministry of Health [DIPLAS-MINSAL], 2006; Ferrer et al., 2009). Once considered a predominantly homosexual and male condition in Chile and other Latin American countries, HIV infection has started spreading to the general population. The rapid rise in HIV cases among women is particularly alarming. Between 1986–1990, the ratio of males to females living with HIV was 7:1, but the ratio recently dropped to 4:1 (Chilean Ministry of Health, 2009). The Chilean Ministry of Health estimates that 15% of all persons living with HIV (PLHIV) are female, most of whom are young women 20–39 years old (Chilean Ministry of Health, 2009).

Despite the fact that HIV prevention is now a serious health issue for women in Chile (CONASIDA, 2003; DIPLAS-MINSAL, 2006), no previous studies have been published describing HIV prevention among Chilean women. The purpose of this paper is to describe the impact of an innovative HIV prevention intervention on HIV-related knowledge, attitudes, and behaviors for Chilean women.

Developing effective HIV prevention for women requires an understanding of the complex dynamic of women's vulnerability to HIV, which is driven by both biological and sociocultural factors, especially gender inequality, poverty, and the perception of not being at risk for HIV (Cianelli, Villegas, Gonzalez-Guarda, Kaelber, & Peragallo, 2010; Ferrer, Issel, & Cianelli, 2005). For Hispanic women, the cultural barrier of traditional gender roles expressed through *machismo* and *marianismo* and the associated cultural acceptance that men will engage in high-risk sexual behaviors, has been identified by some authors as a culturally-specific factor that makes it difficult for women to discuss, negotiate, and persuade their partners to engage in safer sex practices (Carrier, 1989; Cianelli et al., 2008; Peragallo et al., 2005). However, other authors highlight machismo as a protective factor in which a man is expected to treat women with respect, take responsibility for the well-being of the family, sacrificing his own needs, and working hard to provide for his loved ones, and pride himself on being a good husband, father and son. These more positive aspects of machismo are often overlooked, yet have important implications for HIV prevention (Casas, Wagenheim, Banchemo, & Mendoza-Romero, 1994; Glass & Owen, 2010). Thus, the role of the cultural value of machismo in HIV warrents additional study. The cultural values of Chile related to gender roles have also been affected by early Spanish colonial domination, destroying or weakening Native American culture in most parts of Chile, followed by immigration from many different countries in the twentieth century. Other factors that may affect low income Chilean women's ability to practice HIV prevention include their economic dependency on their partners, globalization that has spread awareness of global differences and increased availability of provocative advertisements and entertainments, global economic trends, and the changing role of women in Chilean society).

The only qualitative study that had been published of Chilean low-income women's HIV prevention needs identified that these Hispanic culturally-specific barriers interact with poverty and environmental factors to create contextually-specific inequalities (Cianelli, 2003; Cianelli, Ferrer, & McElmurry, 2008a). An effective intervention for low-income

Chilean women must address male dominance, intimate partner violence, economic dependence, and male partner's substance use and high risk sexual behaviors.

Culturally tailored interventions based on social-cognitive learning, such as peer groups, are among the most effective programs to promote behavioral change for HIV prevention for both women and men (Dancy, Kaponda, Kachingwe, & Norr, 2006; Darbes, Crepaz, Lyles, Kennedy, & Rutherford, 2008; Hendriksen, Pettifor, Lee, Coates, & Rees, 2007; Jemmott, et al., 2007; Kerrigan, Telles, Torres, Overs, & Castle, 2008; Medley, Kennedy, O'Reilly, & Sweat, 2009; Sikkema et al., 2005; Vergidis & Falagas, 2009). The social-cognitive learning theory of Bandura (1982; 1989) identifies the performance of a behavior as a function of outcome expectancies (expectation of more positive than negative outcomes) and self-efficacy (confidence in the ability to perform the behavior). It is the building of positive outcome expectancies and self-efficacy through rehearsal, role modeling, and support for the specific new behavior that is the unique contribution of social learning theory to HIV/AIDS prevention. Additional support for the effectiveness of several key elements of peer group interventions also comes from recent meta-analyses of HIV prevention interventions based on social-cognitive learning and other theories (Albarracin, Albarracin, & Durantini, 2008; Herbst et al., 2007b; Neumann et al., 2002; Noar, 2008). A meta-analysis of 20 randomized clinical trials with Hispanics in either the United States or Puerto Rico, eight of which were for women only, found that these interventions were successful in reducing risk of sexual transmission (Herbst et al., 2007b). More successful interventions used non-peer facilitators, included four or more sessions, taught condom use or problem-solving skills, addressed barriers to condom use, abstaining, and/or peer norms, and showed evidence of cultural tailoring and/or discussion of the cultural value of machismo. Albarracin et al. (2008) conducted a large meta-analysis comparing outcomes and factors associated with effectiveness for exclusively or predominately Latino or Latin American participants compared to interventions for other ethnic groups. They found that Latino groups benefited less from the intervention than other target groups, with less improvements in both knowledge and condom use, and with more success in condom promotion for male groups. Latino male groups increased condom use more than female groups.

Several meta-analyses of studies mainly conducted in the US with ethnically diverse populations had similar findings, with greater efficacy in reducing sexual risk behaviors associated with skills-training and other active learning strategies (Albarracin et al., 2005; Noar, 2008), intervention delivery in small groups (Albarracin et al., 2008; Herbst et al., 2007b; Neumann et al., 2002; Noar, 2008), and culturally tailored content (Albarracin et al., 2008; Herbst et al., 2007b; Neumann et al., 2002; Noar, 2008). There was general support for greater impact when groups were more homogeneous by gender, ethnicity, and other factors (Albarracin et al., 2005; Noar, 2008), and gender-specific groups were more effective for Hispanic groups (Albarracin et al., 2005).

However, there were discrepant findings regarding intervention delivery by experts rather than lay leaders, with some reviews supporting greater efficacy of peer leaders (Neumann et al., 2002; Noar, 2008), while the largest meta-analysis (Durantini, Albarracin, Mitchell, Earl, & Gillette, 2006) found that experts (including health educators and clinicians) were more effective. Regarding Latino and Latin American participants specifically, results were also conflicting. Herbst et al. (2007b) and Albarracin et al. (2005) found that interventions for Latinos and Puerto Ricans were more effective with non-peer leaders. Albarracin et al. (2008) found some evidence that lay facilitators were more effective for Latino groups, but noted that these results were not as robust as other findings.

In summary, previous research suggests that Chilean women urgently need HIV prevention programs and that culturally tailored peer group interventions based on social-cognitive

learning can be effective for Chilean women. However, no HIV prevention intervention specifically for low-income Chilean women has been previously reported.

To address this gap in previous research, we developed and tested the Mano a Mano-Mujer (Hand to Hand-for Women) professionally-assisted peer group intervention for women 18–49 years old. Mano a Mano- Mujer is based in previous study conducted by Peragallo et al. (2005) in United States with Latino women (SEPA) and in the work conducted in Malawi (Mzake ndi Mzake) with community adults (Kaponda et al., 2009; Norr et al., 2006). The intervention is guided by a conceptual model that integrates social-cognitive learning theory described above, contextual tailoring, and the World Health Organization's (WHO) primary health care model of health worker-community collaboration. Social-cognitive learning, identified in previous research as effective for Latin Americans and Latinos, guides the learning modalities used. Contextual tailoring of the intervention was based on our prior work on low income Chilean women's HIV prevention needs (Cianelli et al., 2008) as well as the effective HIV prevention intervention for Latino women living in the United States (Peragallo et al., 2005). Specific cultural factors addressed include the cultural values of *machismo*, *marianismo*, and *familism*. The facilitation of the peer groups was also modified from a group member volunteer model to a professionally-assisted peer group model. This approach is congruent with the deeply held value of “*respeto*” in Latino culture, which places a high value on learning from an expert respected authority (Andres-Hyman, Ortiz, Anez, Paris, & Davidson, 2006; Peragallo et al., 2005). Previous research has found conflicting evidence on the benefits of peer versus expert facilitators (Albarracin et al., 2008; Durantini et al., 2006; Herbst et al., 2007a). The primary health care model guided the delivery of the intervention, using nurses and the local clinic to organize and conduct the intervention. The Chilean healthcare system includes public and private sectors, meaning that people have access to public and private health insurance depending on their financial ability. Using the primary health care model to deliver the intervention is appropriate because most low-income families use public health insurance. Their health care is provided within the public health sector, which is based on the WHO primary health care model. This strategy for delivering HIV prevention interventions was adapted from previous work in Malawi with community adults (Kaponda et al., 2009; Norr et al., 2006) and has been used successfully in Chile with health workers (Ferrer et al., 2009). The purpose of this paper is to describe the impact of this innovative HIV prevention intervention on HIV-related knowledge, attitudes and behaviors for Chilean low-income women.

Methods

Study Design

A quasi-experimental design was used to test the adapted intervention. Two participating communities were randomized to the intervention or the delayed-intervention control condition. Individual-level randomization was not used to avoid contamination between intervention and control groups. This was of special concern because the women lived within their communities where they frequently participated in other organizations and met informally to discuss what was happening in the community.

Setting and Sample

The research project was conducted in two communities in the southeast area of the Metropolitan Region of Santiago, Chile. Santiago has the largest concentration of people living with HIV in the country, and the southern sector of the city is one of the most affected areas (Chilean Ministry of Health, 2009). The communities selected for this study have a combined population of over 600,000 people (Chilean Institute of Statistics [INE], 2007). Both communities are predominantly low-income. These communities were invited to

participate in the research project because of their high risk profiles, the potential benefits for the community which their participation could offer, and their similar socio-economic status. A coin was tossed to determine the intervention and delayed-intervention control communities.

Ten health care centers, five in each community, were selected as focal sites for participant recruitment. Recruitment was done by trained female research team members. Using a recruitment script, recruitment was carried out in waiting rooms of the participating health care clinics. Additional recruitment also occurred at community organization meetings and community events. Research team members approached women in these settings, introduced themselves, and asked women if they were interested in learning more about HIV. Eligibility criteria for participation included being a Chilean woman, residing in one of the two communities selected, between 18 to 49 years old, and reporting sexual activity within the past 6 months. Inclusion criteria were reviewed with women interested in participating in the study. Once eligibility was established, contact information was collected and a time and date was established for the baseline interview. Participants were compensated 2,000 Chilean pesos (\$5 US) for travel expenses each time they filled out a questionnaire or attended an intervention session.

Women were recruited in small groups over time to facilitate project management. A final sample size of 398 subjects at 3 months post-intervention was needed for adequate power (effect size = .25, alpha < .05, one-tailed test of significance, .80 statistical power = .80), allowing for potential differences by recruitment period. In total 835 women were screened and 496 (59.4%) met eligibility criteria and provided written consent to participate in the study. Of the 496 participants 244 were in the intervention community and 252 in the control community.

The three-month retention rate was 80.8 % overall, 75% for the intervention group (182 women) and 86.5% for the control group (218 women). Multiple strategies for retention were used: obtaining recruitment contact information for at least 2 friends or relatives, offering interviews in multiple sites or places where the participant felt comfortable; using multiple mail, telephone, and drive-by contact strategies (only for women who authorized this type of approach); offering compensation for participants' time and interview-related expenses, and making sure that the interview was a pleasant experience by showing interest and respect, and offering refreshments. These follow-up strategies were successful in minimizing attrition from both the intervention and control groups.

Intervention

Mano a Mano-Mujer is an HIV prevention intervention for Chilean low-income women. The intervention is guided by the conceptual framework described above that integrates the social-cognitive model of behavioral change, contextual tailoring, and the World Health Organization's primary health care model. The intervention consists of six two-hour sessions delivered in small groups with an average of 8 to 10 women.

The sessions cover HIV and AIDS in the community and in Chile, sexually transmitted infections (STI), prevention of HIV and AIDS (abstinence, mutual fidelity and condom use), negotiation and communication with the partner, prevention and control of domestic violence, substance abuse, and the importance of family. A trained female health educator facilitated the sessions. Interventions took place in community spaces that were easily accessible to the participants. In the delivery of the intervention role plays, participatory sessions, videos, and discussions were used to build self-efficacy and communication skills.

Procedure

The study was conducted between September 2004 and July 2009. The Pontificia Universidad Católica School of Nursing Institutional Review Board (IRB) approved the study protocol prior to its implementation. After recruitment and informed consent, women were interviewed by trained female research team members using a standardized interview protocol and a structured interview (questionnaire). Interviews were used because participants had low literacy levels. The interviews were conducted in the healthcare centers in private rooms or offices. The average length of the interview was one hour. Most interviews were conducted at the health center, but some took place in other areas such as community centers or libraries. The place of interview was determined by availability of space and the preference of the research participant.

After the baseline, the intervention was offered in the intervention community. Three months after the intervention was complete, the 3-month follow-up interviews were conducted using the same procedures for both intervention and delayed control participants. After the follow-up interviews were completed women in the delayed control community had the opportunity to attend intervention sessions.

Variables and Operational Measures

The interview contained closed-ended items for assessing a) socio-demographic factors (age, marital status, education, income, religion, employment status and health insurance), b) HIV related knowledge, c) attitudes (positive attitudes to people living with HIV, perceived barriers to condom use, self-efficacy for HIV prevention behaviors, HIV reduction behavioral intentions), d) HIV Risk Reduction Behaviors (partner communication, condom use), and e) mental health resources (self-esteem, depression symptoms). The majority of the questions and scales have been used in previous studies with Hispanic women conducted by Peragallo (2005) and Cianelli (2008). Table 1 presents a summary of outcome measures, sample items, scoring and internal consistency reliability coefficient alphas where applicable.

HIV Related Knowledge—This variable was measured using a 12-item scale created by Heckman et al. (1996; Sikkema et al., 1996) that included questions about HIV transmission, prevention and consequences plus three questions specific for Chile used previously with Chilean populations (Cianelli, 2003). Each correct answer was given 1 point, resulting in a range of 0–15. Higher scores indicated higher level of HIV related knowledge ($\alpha = .75$).

Attitudes

Positive attitudes towards people living With HIV (PLWHIV): This variable was measured using a 7-item scale created by the research team (Cianelli, 2003) to assess non-stigma attitudes towards people living with HIV and used previously with Chilean populations. Answers expressing positive attitudes to PLWHIV were given 1 point. Scores could range from 0–7, with higher scores indicating more positive attitudes towards people living with HIV.

Perceived barriers to condom use: This variable was measured using a 4 item scale designed by (Sikkema et al., (1996). Participants responded using a 4 point Likert scale (strongly disagree to strongly agree; strongly agree). The range of scores was 4–16, with a higher score indicating more perceived barriers to condom use ($\alpha = .74$).

Self-Efficacy for HIV prevention behaviors: This variable was measured as a 7 item self-assessment of confidence in the ability to accomplish behaviors relevant to HIV prevention. This measure was used previously with Chilean population (Cianelli, 2003) and with an

Hispanic population in the U.S. (Peragallo et al., 2005). Participants responded using a 4 point Likert scale (strongly disagree to strongly agree; strongly agree= 4). The total range of scores was 7–28, with a higher score indicating more perceived self-efficacy for HIV prevention behaviors ($\alpha = .68$).

HIV reduction behavioral intention: This variable has 4 items designed to measure the intention to change behaviors related to HIV prevention (Sikkema et al., 1996). Participants responded using a 4 point Likert scale (strongly disagree to strongly agree; strongly agree). The total range of scores was 4–16, with a higher score indicating more HIV reduction behavioral intention ($\alpha = .72$).

HIV risk reduction behaviors

Partner communication: This variable was measured using the Health Protective Sexual Communication Scale (Catania, 1995) that has 10 items to measure whether the participants had discussed topics related to HIV prevention and concerns with their primary sexual partner. Participants responded with yes or no. The total score was the number answered yes, range = 0–10 with a higher score indicating more partner communication ($\alpha = .82$).

Condom Use: Condom use was analyzed separately for sexually active women. Any reported use of (male) condoms was coded as 1; none was coded as 0.

Mental Health Resources

Self-esteem—This variable was measured using the 10-item Rosenberg self esteem scale (1965) assessing the level of individual's feelings of worth or importance over the past week. Participants responded using a 4 point Likert scale (strongly disagree to strongly agree; strongly agree). The total range of scores was 10–40, with a higher score indicating more self esteem ($\alpha = .81$).

Depression symptoms—This variable was measured using the Center for Epidemiological Studies Depression 20-item scale (CESD) used to detect depression symptoms over the past week. Participants responded with a 4 point Likert scale (less than 1 day to 5–7 days /most or all the time). The total range of scores was 10–40, with a higher score indicating more depression symptoms ($\alpha = .89$).

Statistical Analysis

Completed questionnaires were entered into an SPSS database (version 19) for analysis with 100% verification. At baseline, descriptive statistics were compared to summarize demographic variables and to identify any significant baseline differences between the intervention and control groups. Differences between groups were assessed using *t*-tests for continuous variables and χ^2 analyses for categorical variables. Because the intervention was offered in small groups, differences in outcome by group were examined first. There were no significant differences by group. Therefore it was decided not to use multi-level models.

To test the degree of change in each outcome, multiple regression analyses (ordinary least squares regression for continuous outcomes and logistic regression for the categorical outcome of condom use) were used. Baseline scores and socio-demographic information (education, per capita income, age, religion, health care coverage, and living with a partner) were controlled for in the regression.

Results

Demographic characteristics of the intervention and control groups are presented in Table 2. Most of the women were between 20 and 40 years, with an average age of 33 and 32 years in the intervention and control groups respectively. Women in the intervention group had significantly lower education levels than the control group. In the intervention group 33% had only primary school education, compared to 16% in the control group. Only 57% had secondary schooling in the intervention group, compared to 66% in the control group. They had moderately low income, with a monthly average income per capita of 40,000 Chilean pesos (about 80 US dollars) in the intervention group and 55,000 pesos in the control group. Three quarters lived with a partner, and over half were Catholic. The only other significantly different characteristic was health insurance. For both the intervention and control groups, the majority had public health insurance, but over a fifth (22.5%) of the intervention group had no coverage compared to only 8.3% of the control group. Although only two demographic factors differed significantly, some of the outcome variables are related to demographic factors. Therefore multivariate regressions included all demographic factors.

The results for the outcome variables are presented in Table 3. The intervention and control group scores (means or percentages) for each outcome variable were examined to test whether they were significantly different at baseline and three month post-intervention. The multiple regression (last four columns) examined change associated with the intervention outcome variables after controlling for baseline levels of the interventions and the demographic factors.

HIV knowledge was higher in the intervention group compared to the control group three months after the intervention. The women in the intervention start off knowing less than the control group about HIV transmission and prevention, but after the intervention they were more knowledgeable. They also had more positive views toward persons living with AIDS. This difference was robust with multivariate controls: the beta coefficient for the intervention effect was statistically significant controlling for baseline levels and demographic factors.

Attitudes related to HIV prevention also became more favorable in the intervention group after the intervention. The intervention group had significantly less favorable attitudes toward PLWHIV than the control group at baseline, but significantly more favorable attitudes toward PLWHIV at 3-months post intervention. Attitudes toward condoms, self-efficacy for safer sex and HIV risk reduction intentions increased significantly for the intervention group but not for the control group. All of these more favorable attitudes remained significant in the multivariate analyses.

Change was examined in two behaviors: communication with partner about safer sex, and condom use (if sexually active). The intervention and control groups did not differ in their communication with their partners about safer sex at baseline, but the intervention group had significantly more partner communication than the control group after the intervention. This difference remained significant in multivariate analysis when controlling for baseline levels and demographic factors.. However, the use of condoms increased only slightly in the intervention group and the difference was not significant.

There were mixed outcomes for women's mental health. The intervention group reported fewer depressive symptoms at the final assessment, and this difference was sustained in the multivariate analysis. However, there was no statistically significant difference between the intervention and control groups in the measure of self-esteem.

Discussion

At three months post-intervention, low income Chilean women who participated in the *Mano a Mano-Mujer* intervention had significantly higher HIV-related knowledge, more positive attitudes towards people living with HIV, fewer perceived barriers to condom use, greater self efficacy, higher HIV reduction behavioral intentions, more communication with male partners about safer sex, and decreased depression symptoms. However, women did not have increased condom use or self-esteem. This study's findings are similar to those reported in research with Latino women in the U.S. (Peragallo et al., 2005; Vasquez, Mejia, Gonzalez, & Mitrani, 2006; Gonzalez, 2007).

The cultural tailoring of *Mano a Mano-Mujer* facilitated women's engagement in the program. Women commented that they enjoyed coming to the sessions, attendance was high and they liked the opportunity to talk openly about issues not usually addressed. At the end of the sessions, the women expressed their desire to continue participating in the program. This high acceptability may have been related to the relevancy of topics discussed, the culturally sensitive components, and for the delivery mode used, all based on piloting of the intervention. *MM-Mujer* actively engaged the participants and enhanced their individual skills to use prevention strategies to avoid or effectively negotiate risky situations. Within the Latino culture, it is common to find that women and men do not openly talk about sex (Marin, 2003). The prevalent custom is that one has sex but does not speak about it. This intervention provided the women with an opportunity to discuss these issues and to develop skills that help them discuss sex with their partner.

A study in a single country cannot make a definitive identification of unique cultural or socio-economic factors affecting HIV prevention barriers for women because of the lack of comparison cases. However, Latino cultural barriers to HIV prevention appeared to be important factors affecting the lack of significant change in condom use in this study. Changing sexual behavior is widely recognized as challenging for Latinos, because of the culturally based values that permit men to have multiple partners and restrict women's ability to protest their partner's behavior or to claim control of their own sexual behaviors (Carrier, 1989; Cianelli et al., 2008; Peragallo et al., 2005). A previous review article noted that interventions for Latinos were less likely to have positive results for increasing condom use than interventions with non-Latino groups. Moreover, interventions with Latinos had more difficulty increasing condom use for female groups than male groups (Albarracin et al., 2008). Low income Chilean women also face difficulties in controlling their sexual health related to their poverty and economic dependence on their partners (Cianelli, 2003). Most of the women in this study are not engaging in high-risk behaviors themselves and are put at risk primarily by their partner's past and current relationships with other partners. This cultural context may mean that condom use is not a realistic option for many women without corresponding change among their male partners.

Another possible factor related to the lack of change in sexual behavior may be the relatively short follow-up. Knowledge and attitudes can be changed fairly quickly and are not dependent on cooperation from others. However, only three months between the intervention and the assessment may not have allowed women sufficient time to negotiate with their partners. It may be that these women, who have already begun talking more about safer sex with their partners, will have safer sexual behaviors over a longer time period. A full assessment of the effectiveness of this change requires longer follow-up.

Despite the lack of increased condom use, the intervention was successful in important ways. The observed increases in knowledge, positive attitudes necessary for reducing stigmatization and for practicing safer sex, and the behavioral change of talking with one's

partner about safer sex issues are important. The cultural context in which these women live highlights the importance of promoting partner communication as a strategy for HIV prevention (Villarruel, Cherry, Cabriaes, Ronis, & Zhou, 2008). Neither condom use nor mutual fidelity can be achieved effectively without sexual communication among partners. Many participants said that they had never spoken with their partner about sexuality, HIV or other sexually transmitted infections prior to the intervention. Moreover, women reported that they were the caretakers of their families but did not know how to talk about sexuality with their children before participating in the intervention. Promoting discussion of sexual health with partners and other family members is perhaps one of the most powerful skills that the intervention delivered to the participants. At the three month follow-up, the women who participated in this intervention demonstrated considerable interest in condom use and the number of women who used condom increased, although this difference was not significant. If adoption of HIV prevention behaviors is viewed as a process, participants in the intervention made considerable progress toward that goal. Changing women's sexual behaviors will probably be a slow process in Chilean society, but women in this study have at least taken the first steps as shown by their changes in knowledge, attitudes, self-efficacy and behavioral intentions.

The decrease in depressive symptoms for women in the intervention group is especially noteworthy. Depression has been related to the development and maintenance of risky sexual behaviors (Pao et al., 2000; Shrier, Harris, Sternberg, & Beardslee, 2001). When a woman has many depressive symptoms, it interferes with daily life and normal functioning and causes distress for both the woman and those who care about her. The decrease in depression symptoms may allow women to take more interest in their health including protective measures for HIV prevention.

There are number of limitations, in addition to the short interval between intervention and follow-up, that must be considered in evaluating the results of this study. The outcome measures were based on self-report. Previous research has shown that social desirability may reduce respondents' willingness to report socially disapproved sexual behaviors although self-reported data are useful because under-reporting affects both intervention and control groups (Plummer No reference et al, 2004, Ross No reference et al., 2007; Smith and Watkins, No reference 2005). The Chilean women who participated in this study were from a low income setting, which limits the generalizability of findings to other socio-economic groups of women in Chile.

Implications

Working with low income women and their families is a key element for HIV prevention in Chile and in Latin America. The *Mano a Mano Mujer* intervention provided significant benefits for women. This intervention offers a model for reducing HIV for women in Chile and other Latin American countries. Based on the results of this study, we suggest that future research should explore the efficacy of extending the HIV prevention to men, either through couples-based intervention or separate simultaneous intervention with women and men in the same community. Also, there is a need for better diagnosis and treatment of mental health needs of women, partially related to their culturally reinforced subordinate position in relation to their male partners. Reducing depression is important both for women's general health and as a factor in enabling them to engage in healthy sexual behaviors. The societal norm of *familism* in Latino culture stipulates that women are the caregivers of their family's health education. Interventions for Chilean women and their partners have the potential to extend to the family and community societal structure, and assist in the containment of the incipient HIV epidemic in Chile.

Findings from this study provide further documentation for the urgent need for more HIV prevention intervention in Chile, especially for low income women and their partners. The Latin America region as a whole and Chile specifically have not experienced the declines in the incidence of new HIV infections seen elsewhere throughout the world, clear evidence of the need for more effective HIV prevention efforts. HIV prevention and the related issue of sexual health should be addressed broadly in communities, schools, churches and families. Health care providers need to take the lead and facilitate these programs.

An example of such a broad-based approach is the *Mano a Mano* HIV prevention research program at the School of Nursing at the Pontificia Universidad Católica de Chile (PUC), with research collaboration with the University of Illinois at Chicago and the University of Miami, established to address HIV prevention needs in Chile. The program has tested HIV prevention interventions tailored to the needs of the Chilean population, including health workers (Ferrer et al., 2005), medical and nursing students (Ferrer et al., 2009), and the intervention for low-income women reported here. An intervention for men is currently being evaluated. The *Mano a Mano* interventions are the first interventions specifically tailored for the Chilean context that have been shown to be effective in changing knowledge, attitudes and behaviors. PUC's *Mano a Mano* HIV prevention research program is a national model for building evidence-based interventions that can be effective in addressing the HIV epidemic throughout Chile.

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Table 1**Outcomes and Operational Measures**

Outcome Variable	Operational Measure and Sample Items	Reliability Coefficient
HIV Related Knowledge	Heckman 12-item HIV-knowledge scale about HIV transmission, prevention and consequences, plus 3 new questions specific for Chile (a couple can protect themselves from getting infected with HIV by both partners being sexually faithful; not having sex is a way to protect yourself from the AIDS virus; using a condom is a way to prevent the transmission of HIV/AIDS); scored as the total number correct, range: 0–15. (Heckman, et. al., 1996; Sikkema, Heckman & Kelly, 1996).	$\alpha=.75$
Attitudes		
Positive Attitudes toward PLHIV	7- item scale to assess positive attitudes toward people living with HIV (e.g., a person living with HIV/AIDS: should be punished for past behaviors; should be accepted in public places such as churches, schools, or parks); scored as the sum of non stigmatizing answers, with higher scores indicating positive attitudes towards people living with HIV. (Cianelli, 2003).	$\alpha=.78$
Perceived barriers to condom use	4- item scale (adapted from Sikkema et al., 1996) regarding beliefs about condoms use (e.g. sex is not as good with a condom; using condoms means you don't trust the other person); scored as sum of responses on a 4 point Likert scale response (strongly disagree = 4 ; sort of disagree = 3; sort of agree = 2; strongly agree = 1), range: 4–16.	$\alpha=.74$
Self-Efficacy for HIV prevention behaviors	7- item scale assessing confidence in the ability to accomplish behaviors relevant to HIV-prevention (e.g., if I decided that the best is to use a condom I can convince my partner to use it; it will be easy to me to convince my partner to use a condom), Scored as the sum of responses on a 4 points Likert scale response (strongly disagree; sort of disagree; sort of agree; strongly agree), Range: 7–28	$\alpha=.68$
HIV reduction behavioral intention	4-item scale assessing intentions to change behaviors related to HIV prevention adapted from Sikkema et al., 1996 (e.g., If I want to have sex with a male/female partner, first I will talk with him about using a condom); scored as sum of responses on a 4 point Likert scale response (strongly disagree = 4 ; sort of disagree = 3; sort of agree = 2; strongly agree = 1), range: 4–16.	$\alpha=.72$
HIV Risk Reduction Behaviors		
Partner communication	Number of 10 topics discussed with main or primary partner over the past 6 months (e., g. have you asked your partner: how he felt about using condoms, the number of past sex partners he had) ;adapted from Catania et al., 1995; scored 1 point for each item answered yes, range: 0–10.	$\alpha=.82$
If used condoms	For sexually active women, if they had used condoms at all in the past 3 months, scored 0 = no condom use; 1 = used condoms.	
Mental Health Resources		
Self Esteem	10-item Rosenberg Self Esteem Scale (e.g. I feel that I am a person of worth, at least on an equal plane with others, I am able to do things as well as most other people), (Rosenberg, 1965), scored as sum of responses on a 4 point Likert scale response (strongly disagree = 4 ; sort of disagree = 3; sort of agree = 2; strongly agree = 1), range: 10–40.	$\alpha=.81$
Depression symptoms	20-item Center for Epidemiological Studies Depression Scale (CES-D) assessing depression symptoms over the past week (e.g. I was bothered by things that don't usually bother me, I had trouble keeping my mind on what I was doing), 4 responses (1=less than 1 day; 2=1–2 days/ some or a little of the times ; 3=3–4 days/occasionally a moderate amount of time; 4=5–7 days / most or all the time), scored as, range: 20–80.	$\alpha=.89$

Table 2**Socio-Demographic Characteristics of the Sample**

	Intervention (N = 182)	Control (N = 218)
Age (in years)		
Mean	33.0	32.0
(SD)	(8.6)	(9.7)
Years of education (%) *		
Elementary	33.0	16.0
High School	57.0	66.0
Technical	8.2	14.2
University	2.2	3.7
Household Monthly Income		
(Per Capita in Chilean pesos)	40,000	55,000
Mean (US dollars)	80.0	110.0
(SD)	32.9	38.4
If Living with Partner (%)	75.0	72.0
Religion		
Catholic	55.0	61.5
Evangelic	25.3	15.1
None	10.4	11.9
Other	9.3	11.5
Healthcare Insurance (%) *		
Public	76.4	87.6
Private	1.1	4.1
No coverage	22.5	8.3

*
p>.05

Table 3

Intervention Effects on HIV-related Knowledge, Attitudes & Behavior

	Comparison of Means or Per Cents between Intervention & Control (n=400)								Multiple Regression (OLS) Coefficient for Intervention- Control ^a				
	Baseline				Three Months Follow-up								
	Control (n=218)	Intervention (n=182)	t	df	Control (n=218)	Intervention (n=182)	t	df	B	Std. Error	t	df	
<i>HIV Knowledge</i>	Mean (s.d.)	9.36 (2.20)	8.59 (2.56)	-3.21 **	360	11.02 (3.02)	12.11 (2.95)	3.64 ***	398	1.24	.32	3.91 ***	387
<i>Attitudes toward PLWH</i>	Mean (s.d.)	4.76 (1.12)	4.45 (1.19)	-2.65 **	398	4.68 (1.22)	5.49 (1.10)	6.98 ***	396	1.04	.11	9.83 ***	387
<i>Behavior Risk Perception</i>	Mean (s.d.)	2.97 (1.44)	2.84 (1.33)	-.95	398	2.64 (1.14)	2.71 (1.21)	.56	398	.03	.11	.25	387
<i>Perceived Barriers to Condom Use</i>	Mean (s.d.)	9.61 (3.35)	10.09 (3.49)	1.38	398	9.12 (3.42)	8.79 (3.1)	-.99	398	-.82	.31	-2.68	387
<i>Intentions to Reduce HIV Risk Behaviors</i>	Mean (s.d.)	12.45 (3.58)	12.27 (3.66)	-.49	398	12.43 (3.31)	13.28 (3.18)	2.61 **	398	1.10	.33	3.33 **	387
<i>Partner Communication</i>	Mean (s.d.)	3.30 (2.63)	2.99 (2.55)	-1.18	398	3.20 (2.84)	4.41 (2.91)	4.42 ***	398	1.25	.26	4.77 ***	387
<i>Self-efficacy for HIV Prevention</i>	Mean (s.d.)	20.43 (4.80)	20.156 (4.18)	-.58	397	20.95 (4.28)	21.70 (4.22)	1.78 *	398	1.20	.41	2.93 **	3870
<i>Condom Use (if Sexually Active Only; n = 373)</i>	%	18.32	22.22	.94	371	21.78	28.66	1.52	371	.058	.045	1.30	361
<i>Depressive Symptoms</i>	Mean (s.d.)	21.82 (11.06)	23.27 (11.77)	1.27	398	22.28 (11.76)	21.91 (10.44)	-.34	397	-2.24	1.00	-2.24 *	387
<i>Self-esteem</i>	Mean (s.d.)	30.51 (5.23)	29.64 (5.72)	-1.58	398	30.98 (5.25)	30.95 (4.84)	-.06	398	.58	.48	1.29	387

^aControlling for baseline value of predicted variable and for age, education, religion, per capita income, health coverage, and living with partner.

* p<.05, t-test of significance

** p<.01, t-test of significance

*** p<.001, t-test of significance