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Impact of a Social Influence Intervention on Condom Use and Sexually Transmitted Infections among Establishment-Based Female Sex Workers in the Philippines: A Multilevel Analysis

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Abstract

We assessed the relative impact of structural and social influence interventions on reducing sexually transmitted infections (STIs) and HIV risk behavior among female sex workers in the Philippines ($N = 897$). Four conditions included Manager influence, Peer influence, Combined Manager/Peer influence, or control. Intervention effects were assessed at the establishment level in multilevel models due to statistical dependencies among women employed within the same establishments. Control membership predicted greater perceived risk, less condom use, less HIV/AIDS knowledge, and more negative condom attitudes. Combination participants reported more positive condom attitudes, more establishment policies favoring condom use, and fewer STIs. Manager-only participants reported fewer STIs, lower condom attitudes, less knowledge, and higher perceived risk than peer-only participants. Because interventions were implemented at the city level, baseline/follow up city differences were analyzed to rule out intervention effects due to pre-existing differences.

Key Words: Female commercial sex workers, HIV/AIDS risk, social influence intervention, STIs, condom use
Impact of a Social Influence Intervention on Condom Use and Sexually Transmitted Infections among Establishment-Based Female Sex Workers in the Philippines: A Multilevel Analysis

Female Commercial Sex Workers (FCSWs) are at high risk of transmitting HIV/STIs. This is particularly true in Asian countries such as the Philippines. For instance, a large recent survey showed an exceptionally high prevalence rate of chlamydiosis among Filipino FCSWs ranging from 27% to 36% (World Health Organization [WHO], 2002). According to the survey, the principal mode of transmission was heterosexual contact (WHO, 2002). Because there is no vaccine or cure, HIV prevention depends on one’s ability to modify risky behaviors. With FCSWs, risk reduction typically means consistent and appropriate condom use. However, safe sex practices may be difficult to maintain when one’s livelihood depends on customers who expect or demand sex without a condom.

HIV prevention has traditionally focused on using cognitive-behavioral individually oriented approaches to induce beneficial changes in the individual’s attitudes and knowledge, and behaviors regarding HIV, with little attention to important structural-environmental factors which also account for individual behaviors (O’Leary, Holtgrave, Wright-DeAguero, & Malow, 2003). However, individualized prevention strategies may be less than optimal in changing risky behaviors in situations such as those of commercial sex workers (Bandura, 1982, 1987; Ford, Wirawan, Fajans, Meliawan, MacDonald, & Thorpe, 1996; O’Leary & Martins, 2000; Pleck, Sonenstein, & Ku, 1990). Social-structural factors such as extreme poverty, which characterizes Filipino FCSWs, and a lack of support by employers as well as customers may impede safe sex practices; satisfying the customer’s desire for sex without a condom may have become almost mandatory in maintaining one’s livelihood and reducing conflicts with employers, despite the
FCSW’s personal perception of risk. Peers may also exert an influence on safe sex behaviors when FCSWs are based within establishments. Therefore, economic, peer influences, and employment/employer-related factors may have become a major barrier against consistent condom use (Morisky et al., 1998; Outwater et al., 2000).

In contrast, a perception of a supportive attitude by one’s employer towards condom use has had a direct influence on more condom use (Morisky, Stein, et al., 2002). These findings and other accumulating evidence support the importance of structural factors such as working conditions and perceptions of employers’ attitudes in promoting sexual health and safer sex behavior, and further reinforce the notion that individual factors by themselves may be insufficient to produce long-term reduction in risky behavior (O’Leary et al., 2003).

Consequently, attention has been directed at integrating structural environments with individually focused interventions particularly among vulnerable populations such as FCSWs. The Thai 100% condom initiative is a successful example of such an intervention. This initiative targets all Thai brothel-based commercial sex workers on their consistent condom use (Hanenberg & Rojanapithayakorn, 1998). Other projects have also yielded great success in improving condom use among female sex workers (Hanenberg, Rojanapithayakorn, Kunasol, & Sokal, 1994). In a study in the Dominican Republic, environmental-structural factors proved to be a major predictor of consistent condom use among female sex workers (Kerrigan et al., 2003). The Sonogachi study in India identified significant improvements in condom-use behavior among groups of sex workers assigned to peer education interventions (Basu et al., 2004). In a study in Madagascar, 1000 sex workers were randomly assigned to two study arms: peer education supplemented by risk-reduction counseling by a clinician versus condom promotion by peer educators only. Follow-up results at six months indicated significant reductions in STI for
sex workers assigned to the peer education plus risk-reduction counseling, compared to increases in STI for the peer education only group (Feldblum, Hatzell, Van Damme, Nasution, Rasamindrakotroka, & Grey, 2005).

Our prior research in the Philippines indicates that condom policies and other contextual (e.g. structural/environmental) factors in the establishments appear to interact with individual cognitive (e.g., decision-making) factor in influencing change in risky behavior among FCSWs (Morisky et al., 1998; Morisky, Chiao, Stein, & Malow, 2005; Morisky, Pena, Tiglao, & Liu, 2002; Morisky, Stein et al., 2002; Tiglao, Morisky, Tempongko, Baltazar, & Detels, 1997). For instance, employers’ actual support for condom use and their perceived support were shown to influence condom use behaviors among individual FCSWs significantly (Morisky, Stein et al., 2002). The women were more likely to practice condom-use behavior associated with their work when their employers encouraged these behaviors. Furthermore, the relationship remained robust even after statistical adjusting for the variability associated with salient individual and worksite characteristics. The more FCSWs perceived that they had their employers’ support, the more likely they were to use condoms during sex (Morisky, Stein et al., 2002).

Because social influence models have not been often studied in the HIV prevention area, we present an evaluation of how the model’s constructs operated in an intervention in a “real-world” community-based setting. In the current study, four communities were randomly assigned to one of three intervention groups or a control group which varied in targeting personal factors (perceived risk to HIV, AIDS knowledge, and attitudes toward condoms) and structural factors (establishment attitudes concerning condom use, as well as other establishment characteristics inherent in the workplace, such as policies and rules about using condoms, and
condom availability). For our outcome measure, we examined the relationship between using varying social influence-oriented interventions and subsequent STI reduction and condom use.

It was hypothesized that a social influence intervention would have a significant effect on promoting condom use and reducing STI infection. We varied the types of influence by including a manager-only condition, a peer-influence only condition, and a combined manager and peer influence condition. Because the women were clustered within establishments a multilevel approach was used to assess personal, structural and intervention effects in the prediction of condom use and STI infections.

*Conceptual Framework*

The interventions are based on a blend of social cognitive theory at the individual level and social influence theory at the organizational level. According to Social Cognitive Theory (Bandura, 1987), behavior change is enhanced by training individuals to exercise influence over their own behaviors and their social environment. This situation is best achieved by intervening not only for heightened awareness and knowledge but also by enhancing resources and social support. Bandura has conceptualized the basic elements of social cognitive theory to consist of personal determinants in the form of cognitive, affective, and biological factors, behavior and the environment (1987). This theoretical framework was applied to HIV/AIDS-related behaviors by exposing participants to interventions designed not only to promote safer sex guidelines, but also to develop individual skills and self-beliefs that would enable risk reduction in the face of counteracting influences (Bandura, 2004).

The second theoretical framework used in this research consists of power and social influence. The social psychological study of power and influence finds its origin in the groundbreaking work of Kurt Lewin (Lewin, 1941), who considered power the possibility of
inducing force on someone else, or, more formally, as the maximum force person A can induce on person B divided by the maximum resistance that B can offer. This conceptualization of power and social influence was further developed by French and Raven (1959), who defined influence as a force one person (the agent) exerts on someone else (the target) to induce a change in the target, including changes in behaviors, opinions, attitudes, goals, needs, and values. Social power was subsequently defined as the potential ability of an agent to influence a target. Raven further classified the six bases of power to include reward, coercive, legitimate, referent, expert and informational power (Raven, 1965).

Method

Participants

Face-to-face interviews were conducted with 986 Filipinas working for establishments in which they were required to attend Social Hygiene Clinics (SHC) either weekly or bi-monthly, depending on the schedule of the clinic. They worked at nightclubs, disco bars, beer gardens, and karaoke bars. Originally, 1025 women were approached for interviews and 39 refused to participate. Also excluded from the current multilevel analysis were 75 women who stated that they had never had vaginal, anal, or oral sexual experiences, 2 women who were missing several data points, and 12 women who worked alone in their establishments. This procedure left a total of 897 women. The surveys were extensively pre-tested in small focus groups in the Philippines for appropriateness to the educational levels of the women, and for cultural relevance and sensitivity. Most surveys were conducted in the SHC although a few were conducted in business establishments or residences. The 897 FCSWs ranged in age from 15 to 41 years (mean age = 22.5 years). They averaged 9 years of education, and 10% were married. See Figure 1 for a flowchart depicting the participation process.
Cluster information

Among the 897 women there were 103 establishments within which the women were clustered. These clusters ranged in size from 2 to 47. The average cluster size was 8.7 women per cluster.

Measures

The survey was designed to include items that would reflect several underlying latent constructs hypothesized as important in predicting condom use and other health outcome indicators of safe sex (STIs), especially constructs of most relevance to FCSWs (Morisky et al., 1998; Morisky, Pena et al., 2002; Morisky, Stein et al., 2002; Tiglao et al., 1997). Preliminary exploratory factor analyses of the data was conducted on subsets of the theoretical important measured variables using maximum likelihood factor analyses with direct quartimin oblique rotation. Items that loaded highly together were used as manifest indicators of their proposed underlying constructs. Generally, cutoff scores of .40 or higher were considered acceptable. The latent constructs were developed as follows:

Perceived Risk: This construct was indicated by 2 scaled items that asked 1) how worried she is about getting AIDS ranging from (1) not at all worried to (5) extremely worried; and 2) her chances of getting AIDS ranging from (1) none to (5) very great.

AIDS Knowledge: A Knowledge index was constructed with 4 variables in order to have multiple indicators for this index (Little, Cunningham, Shahar, G., & Widaman, 2002). Two variables were means of correct responses to 10 factual items scaled 0-1 (Knowfacts1, knowfacts2). Each parcel contained 5 items that were combined at random (e.g., Do you think people can catch AIDS by blood transfusion? Do you think people can catch AIDS by drug use/sharing needles?) Items were rescaled if necessary so that higher scores indicated correct responses.
The other two variables were based on a 9-item index that assessed their knowledge of risk behaviors which was scaled 1 to 5 ranging from 1 = no risk to 5 = a great risk (e.g., How risky is it to have sexual intercourse with someone who injects drugs? How risky is sexual intercourse with someone you don’t know very well without using a condom?). Two variables were constructed from the 9 items with the means of 5 and 4 items respectively ($knowrisk1$, $knowrisk2$). These parcels were constructed randomly as well. Items were rescaled if necessary so that higher scores indicated correct responses.

**Establishment Practices**: Items in this latent construct were concerned with rules and communications from the establishment in which they were working. These were yes/no items (yes = 1 and no = 0). 1) Whether a co-worker at her establishment tried to convince her to use a condom with a customer; 2) whether her establishment has a rule that all workers must use condoms when having sex with customers; 3) whether condoms are available at her establishment for the workers who work there; and 4) whether her boss ever talked to her about using condoms.

**Condom Attitude**: Three indicators represented endorsement of positive ideas about condom use based on a series of scaled statements about condom use ranging from strongly agree (1) to strongly disagree (5). These were parcels created from the means of 6 items (2 per parcel). Typical items were: “Condoms can prevent STIs if used properly,” and “Condoms are easy to use.”

**Outcome Variables: Condom Use**: The first outcome variable was whether they had used a condom the last time they had sex with a customer (0 = no, 1 = yes). Previous research ruled out a potential social desirability bias by a non-significant relationship with the Marlow-Crown scale of Social Desirability (Morisky, Ang & Sneed, 2002). As an indicator of safe sexual
practices, the number of STIs they had in the past 6 months was assessed. Accuracy of these responses was bolstered by the fact that FCSWs were tested regularly at the clinic where they also were interviewed. Self-reports were collected at pre- and post-intervention.

Intervention status indicators: 3 orthogonal polynomials were constructed to reflect possible intervention group membership. Contrast coding was as follows: 1) Control group membership was given a score of 3, all others –1; 2) Combination group membership was indicated by giving combination group members a 2, control group members a 0, and others –1. 3) Peer vs. manager group membership was scored by giving peers a value of –1, manager a value of 1, all others were assigned a 0.

Analyses

The EQS structural equations program (Bentler, 2005) was used to estimate a two-level model using a maximum likelihood (ML) approach (Bentler, 2005; Bentler & Liang, 2002). If individual subjects are nested within meaningful clusters and used in a single aggregated database, observations may not be independent. In this case, standard statistical methods are not applicable and special adjustments are needed to compute standard errors and goodness of fit chi-square tests (Muthén & Satorra, 1995). This can be achieved by modeling both levels, and adjusting for non-independence of observations within the modeling procedure. The between levels portion of the multilevel model in this study was of particular interest in assessing the impact of the intervention. Effect of intervention status could not be analyzed in the within subjects portion of the model because, of course, all FCSWs within a cluster (establishment) had the same value for their intervention status because the intervention was implemented at the city level.
We initially determined whether a multilevel model was appropriate by assessing the intraclass correlations among the indicator variables. The intraclass correlation coefficient reflects the degree of similarity or correlation between subjects within a cluster. In this current case, the cluster is women working within one establishment. The intraclass correlation is estimated as the ratio of between cluster variance divided by the sum of within and between cluster variance on a given variable. If significant nonzero intraclass correlations are obtained, the assumption of independent observations is violated (Muthén, 1994).

Goodness-of-fit of the models was evaluated with the Bentler-Liang Likelihood Ratio Statistic (BLLRS), the Comparative Fit Index (CFI), and the root mean square error of approximation (RMSEA) (Bentler, 2005). The CFI, which ranges from 0 to 1, reports the improvement in fit of the hypothesized model over a model of complete independence or lack of relationship among the measured variables, and adjust for sample size. Values equal or greater than .95 are desirable and indicate that close to 95% of the covariation in the data is reproduced by the hypothesized model (Hu & Bentler, 1999). The RMSEA is a measure of lack of fit per degrees of freedom, controlling for sample size, and values less than .06 indicate a close fitting model (Ullman & Bentler, 2003).

An initial confirmatory factor analysis (CFA) tested the factor structure (measurement model) of the hypothesized model and also provided correlations among all of the factors and the orthogonal polynomials representing group membership. Once the factor structure was confirmed, a predictive structural model was tested to assess the influence of intervention group membership, Perceived Risk, Knowledge, Establishment Practices, and Condom Attitudes on the outcomes of using a condom use during the last sexual encounter and incidence of STIs. The main interest was the between-groups model. Nonsignificant paths and covariances were
dropped gradually using the suggested model-evaluation procedure of MacCallum (1986). Predictive paths from the intervention status orthogonal polynomials were not dropped to keep orthogonality intact.

To assess possible pre-existing differences between the cities (city membership was confounded with intervention status), a supplementary analysis contrasted selected behaviors and attitudes measured in the same manner before and after the intervention by city using multisample structural equation modeling and comparisons of latent means at the city level (Bentler, 2005). Because the same women were not available at the baseline and at the post-test, longitudinal assessments of change were not possible. We also compared the cities before the intervention using multisample modeling and latent means analysis using the control city as the reference group.

**Intervention and procedures**

Four large cities (pop. > 200,000) located approximately 250 miles south of the Philippines capital (Manila), served as intervention sites. Research staff met with the Regional Medical Officer, the City Health Officer and the owner/manager of each establishment to discuss the objectives and other aspect of the project including the meaning of being randomized to the intervention or control group comparison condition. All organizations agreed to participate. Human subject approval was obtained from the Institutional Review Board of UCLA and the University of the Philippines. The four participating sites were randomly assigned to one of the intervention groups (peer counseling, manager training, or the combination of peer counseling and manager training) or to a standard control group.

The peer counseling intervention was implemented in all participating establishments in Site 1 (Legaspi City). In consultation with the manager/owner, two FCSWs from each
establishment were selected and trained during a 5-day period at a nearby location. Travel allowances and a daily stipend were provided to defray expenses and lost work time. Content areas of the training program included basic information on STI and HIV, modes of transmission, interpersonal relationships with peers and clients in the work establishment, sexual negotiation, role playing and modeling, and normative expectancies. The peer educators in each site met monthly with the site coordinator and discussed issues related to sexual negotiations with customers, where these negotiations took place, establishing limits regarding sexual behavior, alcohol influence, and condom use negotiations with the customer.

The manager training intervention in Site 2 (Cagayan de Oro City) consisted of the same topics as the peer counselors with additional training on their social influence role as a manager/supervisor by providing positive reinforcement of their employee’s healthy sexual practices. Managers were trained to implement a continuum of educational policies, beginning with current practices, and gradually increasing to greater levels of involvement. These policies consisted of meeting regularly with their employees, monitoring their attendance at the Social Hygiene Clinic, providing educational materials on HIV/AIDS prevention, reinforcing positive STI prevention behaviors, attending monthly manager’s advisory committee meetings, promoting AIDS awareness in the establishments (through posters, pamphlets, and brochures), providing educational materials to customers, making condoms available to FCSWs as well as to customers, and having a 100% oral and written condom use policy. Managers and floor supervisors assigned to the manager training intervention met with the site coordinator each month throughout the duration of the program. Topics discussed by the managers/supervisors included retention of FCSW, protocol to be followed when recruiting FCSW already working in a local establishment, role of manager/supervisor in the reinforcement of safe sexual behaviors,
starting an insurance fund for FCSW who could not afford a complete medical regimen, and the establishment of educational policy in the establishment (Morisky, Pena et al., 2002).

The combined intervention of peer counselors and manager training was implemented in two contiguous cities located in Site 3 (Lapu-Lapu and Mandawe City). They received all of the training and attended monthly meetings as described above. Site 4, the control site was located in Ilo-Ilo City. All sites are geographically dispersed throughout the southern Philippines.

Results

City comparisons

Within cities: The same women were not consistently available at baseline and again at follow up. Thus, comparisons were done at the city level. Questions that were worded the same and were available at baseline and follow up were used in analyses contrasting Knowledge, Establishment Practices, Condom Attitudes, condom use during the last sexual episode, and self-reported STI. Women in all cities reported greater level of HIV/AIDS knowledge at follow up, which might be due to a historical trend based on educational efforts throughout the Philippines. Women in the control cities at follow up reported higher knowledge than at baseline ($p < .001$), lower Establishment Practices ($p < .001$), lower Condom attitudes ($p < .01$) and less condom use during the last sexual episode at follow up than at baseline ($p < .001$). Women in the Peer Influence condition reported considerably more Knowledge ($p < .001$), lower Establishment Practices ($p < .01$), and better Condom Attitudes ($p < .001$) at follow up. Women in the Manager group reported considerably more Knowledge ($p < .001$), lower Establishment Practices ($p < .01$), and were more likely to have used a condom the last time ($p < .001$). Women in the combination group reported considerably more Knowledge ($p < .001$), better Establishment
Practices ($p < .05$), a better Condom Attitude ($p \leq .001$), and were more likely to have used a condom last time ($p \leq .001$).

*Across cities at baseline:* We performed a 4-group multisample analysis using the control group as the reference group. It was unlikely that the groups would be exactly alike beforehand but it was important that the control group not be the most disadvantaged in terms of behaviors and attitudes before the interventions were implemented. Indeed, the Peer intervention city women reported higher knowledge ($p \leq .001$), lower Establishment Practices ($p \leq .001$), and condom attitudes ($p \leq .001$), and were much less likely to have used a condom during the last sexual episode ($p \leq .001$). The women in the Manager intervention reported no difference in Knowledge, no difference in Establishment Practices, a significantly lower Condom Attitude ($p \leq .001$) and less condom use the last time they had sex with a partner ($p \leq .05$). The women in the Combination group cities reported less knowledge ($p < .05$), lower Establishment Practices ($p \leq .001$), lower Condom Attitudes ($p < .05$), and were less likely to have used a condom last time ($p \leq .01$). Thus, there was no pre-existing advantage for the Combination group. Rather, it appears to be the most disadvantaged.

Further supplemental analyses were conducted to assess self-reported condom use behavior and STI at pre- and post-intervention among the participating study sites. As noted in Table 3, statistically significant differences were found between the study sites with respect to condom use at last sexual encounter, for both pre and post-intervention. Table 4 presents self-reported STI at similar points in time. At pre-intervention, no significant differences were found among the four study groups but significant differences were noted at post-intervention for the manager training group ($p < .05$) and the combined intervention group ($p < .001$).
Confirmatory Factor Analysis

The fit indexes for the initial CFA were excellent, BLLRS $\chi^2 (181, N = 897) = 325.64$, CFI = .98, RMSEA = .03 (90% confidence interval = .025 to .035). All of the factor loadings of the measurement model were significant ($p < .001$). Table 1 reports the between level factor loadings, and the intraclass correlations. The intraclass correlations were substantial indicating that the associations among women within establishments could not be ignored, and that a multilevel analysis was appropriate. The correlations mean that women within the clusters were more alike than women across the clusters.

Table 2 presents the correlations among the latent variables in the between levels analysis. For the substantive latent variables, several correlations among them were quite large. Higher Perceived Risk was associated with less Knowledge, more Establishment Practices, and having used a condom at last sexual encounter. More Knowledge was associated with more positive Condom Attitudes. Establishment Practices were highly associated with positive Condom Attitudes and having used a condom at last sexual encounter. Positive Condom Attitudes were highly associated with having used a condom at last sexual encounter.

Associations with intervention status were also of great interest. Control group membership was associated with higher Perceived risk, less Knowledge, lower Condom Attitudes, and less likelihood of using a condom at last sexual encounter. Combined group membership was associated with more Knowledge, having better Establishment Practices, better Condom Attitudes, fewer STIs, and more likelihood of using a condom at last sexual encounter. In the manager only vs. peer only contrast, those with the manager intervention were more likely to report higher Perceived Risk, lower Condom Attitudes, and fewer STIs.
Structural Model

Figure 2 presents the final structural model in the multilevel between-groups analysis. The fit indexes of the final single model are very good: BLLRS $\chi^2 (204, N = 897) = 340.89$, CFI = .98, RMSEA = .03 (90% confidence interval = .022 to .032). Those that were in the combined intervention group reported fewer STIs in the past 6 months. They also reported more pro-condom Establishment Practices, and better Condom Attitudes. Those in the control group were less likely to use a condom the last time they had sex with a customer. They also reported greater Perceived Risk, less Knowledge, and poorer Condom Attitudes. In the Manager vs. Peers contrast, those in the manager-only group reported lower Condom Attitudes, less Knowledge, higher Perceived Risk, and fewer STIs.

There was also a very large significant effect of Establishment Practices on condom use the last time (regression coefficient = .90). In the bivariate analysis reported above (CFA), combination group membership was also highly associated with use of condom the last time (correlation = .47). The very large effect of establishment practices on condom use captured the greatest amount of variance and prevented a significant direct effect of combination group membership on condom use last time. However, the indirect effect of combination group membership mediated through Establishment Practices was very strong ($p \leq .001$; standardized regression coefficient = .46).

Discussion

The four conditions of this research design included: a peer influence condition, a manager influence condition, a combined peer/manager influence condition, and the control condition. The combined group had the most positive outcomes. Results of the path model
indicated that participants in the combined peer/manager condition were significantly more likely to reduce HIV sexual risk, in that they showed more positive attitudes toward condom use, and also reported that their establishments were more likely to promote condom use. Such establishment policies in turn were extremely strong predictors of condom use. They also reported significantly fewer STIs than other study participants. In bivariate analyses, they also reported more likelihood of using a condom the last time they had sex, and had more knowledge than other study participants. These results are consistent with those found in the study of Koniak-Griffin, Lesser, Nyamathi, Uman, Stein, & Cumberland (2003) which used social cognitive theory in an HIV prevention intervention with U.S. adolescent mothers, and the findings of van Empelen, Kok, van Kesteren, van den Borne, Bos, & Schaalma (2003) regarding HIV prevention studies with injection drug users, which suggests that interventions grounded in Social Cognitive Theory or Diffusion of Innovations are likely to provide successful outcomes.

Those with either a peer-only influence intervention or a manager-only intervention demonstrated improvement over the control group but did not show consistent improvement in all areas. It was interesting that those with the manager-only intervention had fewer STIs even though they had more negative condom attitudes and less knowledge about HIV/AIDS. Those women with the peer-only intervention had better attitudes and greater knowledge but perhaps had not had the impetus to apply those attitudes and knowledge to actual behavior change without the input of their manager.

Consistent with a participatory action research (PAR) approach (see Morisky, Ang, Coly, & Tiglao, 2004), our multilevel intervention was based on a thorough needs assessment at the individual, community and organization levels. This included in-depth interviews and focus group discussions with key informants and stakeholders (both in bars and city health
departments). Our intervention design addresses individual level changes (beliefs and attitudinal changes within the bar workers and managers) and social structural/environmental changes (increased access to condoms, policy changes within the establishments). This intervention transcends the typical micro-level, individual education to increase condom use among FCSWs. It involves a macro-level, structural approach via peer education among and for FCSWs (Swendeman, Thomas, Chiao, Sey, & Morisky, 2005). Further, consistent with the study of Fang, Stanton, Li, Feigelman, and Baldwin (1998) among African American adolescents, it includes bar managers as an added layer of influence in facilitating HIV risk reduction among female bar workers. This was also accomplished through two important social influence constructs conceptualized by Raven (1965), namely referent and informational power on the part of both establishment managers and peer educators.

Training establishment owners/managers and floor supervisors to influence their employee’s social hygiene, beyond viewing what transpires as business transactions, entailed that those in supervisory positions would: (1) oversee registration and attendance of their employees in a Social Hygiene Clinic; (2) provide STI educational materials and training related to HIV risk reduction; (3) distribute condoms to employees and customers; and (4) create and establish a 100% condom use policy by all employees.

Limitations of Study

While theoretically driven, and, perhaps most importantly, a step toward developing macro-level, structurally relevant HIV interventions which may be sustainable and generalizable beyond CSWs in the Philippines, there are some notable limitations. Valid inference was premised on assuming a reasonable similarity among the four-targeted cities, each of which was exposed to one of the four intervention conditions. We acknowledge that city is confounded
with intervention status. Controlled experiments, where subjects can be randomly assigned to receive interventions, are desirable but are often infeasible or overly burdensome, especially in our research settings. Therefore, the cluster randomized design adapted in this study is often used by others as the only feasibility and practical method of inquiry. While they are typically less intrusive and less costly, they require bolder assumptions, which are important but usually not testable. As Rogers, Ying, Xin, Fung, and Kaufman (2002) suggest, geography, by itself, can introduce variables related to CSW and bar manager attitudes, beliefs, values and relative status that, in this instance, went uncontrolled. Cities may well differ in significant political, economic social and cultural facets, which might affect the outcomes with respect to risky sexual behavior and condom use. Our analyses of the cities before the intervention indicated various differences among the cities. Noteworthy, the control city was, if anything, superior in many ways to the other cities before the intervention. Our comparison among the baseline city variables indicated this. However, at the follow up, the women in the control city actually had a decrement in the positive behaviors under study except for Knowledge, which showed an increase. As indicated above, all of the cities showed an appreciable increase in Knowledge, although the increase was not as great for the control city. Furthermore, the combined treatment city was, if anything, the worst at baseline yet demonstrated the greatest advantage after the intervention.

**Suggestions for Future Research**

Whereas health department employees were consulted in designing the intervention, extending the macro-level, structural approach may benefit from greater direct involvement by community agencies as well as other sectors of local government, to promote condom use in such establishments (Parkhurst & Lush, 2004). Before bar managers and owners will commit fully to a macro-level, structural approach encouraging condom use among their FCSWs and
clients, both the message and the behavior of a variety of governmental agencies must be non-ambiguous. Research on the public policy aspects of coordinating such support, via city ordinances, inspections, certificates, etc., is central to extending the macro-level approach to a city’s environmental and structural support systems. Such research efforts would be consistent with the recommendations of the Kerrigan et al. study (2003) with FCSWs in the Dominican Republic as well as the even broader suggestions of Riedner et al. (2003) in their study of female bar workers in Tanzania. The latter called for improved access to affordable health care, including STI services. While the above studies promote condom use among FCSWs and bar owners, Chillag et al. (2002) have recommended that sociocultural, organizational and individual client factors also need to be addressed in designing and implementing community-level HIV prevention interventions. Further research in this area, leading to a greater understanding of these factors, is warranted.

Finally, future studies might consider the possible role of the mass media in creating a supportive environment for those at risk with respect to HIV and STI. In addition to increasing basic AIDS knowledge, and presenting important factual information about the importance of condom use, media messages might also help legitimize appropriate condom use through normative expectancies.

**Conclusion**

This study moved toward a more encompassing, macro-level approach via inclusion of establishment managers, FCSW peer groups, and public health officials in risk reduction interventions. The combined manager/peer education approach showed greater impact in facilitating desirable outcomes than any other experimental condition.
However, for condom use to become commonplace among Filipino FCSWs, the financial penalty for their use must be minimized and that will require educational programs targeted toward acceptance of condoms by clients, civic organizations and governmental agencies. As recently discussed by Liao, Schensul, and Wolffers (2003) in their study of Chinese hospitality workers, a female bar worker’s need for money will overshadow concerns about her personal health until and unless clients, and others, become far more accepting of condom use. Establishment owners must also believe the benefits of condom use outweigh the costs, and actively promote their use. With support from an employer, and acceptance by a client, a FCSW can more comfortably use condoms and lower, to a substantial degree, the probability of contracting an STI.
Author Note

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References


Table 1. Means, standard deviations, ranges, between-level factor loadings, and intraclass correlations (ICC) of variables in the Confirmatory Factor Analysis.

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<tr>
<th>Variables</th>
<th>Mean (Standard Deviation)</th>
<th>Factor loading between-level</th>
<th>ICC</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Perceived Risk (1-5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chances you get</td>
<td>2.51 (1.50)</td>
<td>.97</td>
<td>.15</td>
</tr>
<tr>
<td>How worried</td>
<td>3.39 (1.51)</td>
<td>.89</td>
<td>.12</td>
</tr>
<tr>
<td>II. Knowledge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Know facts 1 (0-1)</td>
<td>0.83 (0.17)</td>
<td>.86</td>
<td>.11</td>
</tr>
<tr>
<td>Know facts 2 (0-1)</td>
<td>0.66 (0.19)</td>
<td>.83</td>
<td>.12</td>
</tr>
<tr>
<td>Know risk 1 (1-5)</td>
<td>4.05 (0.56)</td>
<td>.95</td>
<td>.23</td>
</tr>
<tr>
<td>Know risk 2 (1-5)</td>
<td>4.34 (0.58)</td>
<td>.56</td>
<td>.07</td>
</tr>
<tr>
<td>III. Establishment Practices (0-1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Co worker convince</td>
<td>0.37 (0.48)</td>
<td>.83</td>
<td>.19</td>
</tr>
<tr>
<td>Condom rules</td>
<td>0.47 (0.48)</td>
<td>.98</td>
<td>.52</td>
</tr>
<tr>
<td>Condom available</td>
<td>0.35 (0.47)</td>
<td>.95</td>
<td>.64</td>
</tr>
<tr>
<td>Boss talk re: condoms</td>
<td>0.42 (0.49)</td>
<td>.94</td>
<td>.43</td>
</tr>
<tr>
<td>IV. Condom Attitudes (1-5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude 1</td>
<td>3.93 (0.69)</td>
<td>.88</td>
<td>.19</td>
</tr>
<tr>
<td>Attitude 2</td>
<td>4.09 (0.63)</td>
<td>.72</td>
<td>.06</td>
</tr>
<tr>
<td>Attitude 3</td>
<td>3.74 (0.87)</td>
<td>.84</td>
<td>.11</td>
</tr>
<tr>
<td>V. Number of STIs (0-2)</td>
<td>0.28 (0.55)</td>
<td>1.00</td>
<td>.10</td>
</tr>
<tr>
<td>VI. Used condom last time (0-1)</td>
<td>0.32 (0.47)</td>
<td>1.00</td>
<td>.51</td>
</tr>
</tbody>
</table>
Table 2. Between level correlations among latent variables and intervention status variables.

<table>
<thead>
<tr>
<th></th>
<th>I.</th>
<th>II.</th>
<th>III.</th>
<th>IV.</th>
<th>V.</th>
<th>VI.</th>
<th>VII.</th>
<th>VIII.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Perceived Risk</td>
<td>-----</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II. Knowledge</td>
<td>-.54***</td>
<td>-----</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III. Establishment Practices</td>
<td>.53***</td>
<td>-.03</td>
<td>-----</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV. Condom Attitudes</td>
<td>.02</td>
<td>.48***</td>
<td>.66***</td>
<td>-----</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V. Number of STIs</td>
<td>-.03</td>
<td>-.08</td>
<td>-.06</td>
<td>.10</td>
<td>-----</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VI. Used condom last time</td>
<td>.48***</td>
<td>.16</td>
<td>.90***</td>
<td>.65***</td>
<td>-.25*</td>
<td>-----</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VII. Control group</td>
<td>.41***</td>
<td>-.85***</td>
<td>-.04</td>
<td>-.48***</td>
<td>-.04</td>
<td>-.19*</td>
<td>-----</td>
<td></td>
</tr>
<tr>
<td>VIII. Combination group</td>
<td>-.07</td>
<td>.20*</td>
<td>.51***</td>
<td>.68***</td>
<td>-.30***</td>
<td>.47***</td>
<td>-.12</td>
<td>-----</td>
</tr>
<tr>
<td>IX. Peers vs. Mgrs.</td>
<td>.51***</td>
<td>-.14</td>
<td>-.06</td>
<td>-.33**</td>
<td>-.21*</td>
<td>.03</td>
<td>-.04</td>
<td>-.07</td>
</tr>
</tbody>
</table>

* p ≤ .05; ** p ≤ .01; *** p ≤ .001.
Table 3. Self-reported condom use at last sex with a customer before intervention and after intervention among female commercial sex workers (FCSWs) in four study sites of the Philippines

<table>
<thead>
<tr>
<th></th>
<th>Legaspi: Peer Education</th>
<th>Cagayan de Oro: Manager Training</th>
<th>Cebu: Combined</th>
<th>Ilo-Ilo: Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Intervention †</td>
<td>14.4%</td>
<td>20.1%</td>
<td>35.2%</td>
<td>45.6%</td>
</tr>
<tr>
<td>Post-Intervention ‡</td>
<td>15.9%</td>
<td>24.1%</td>
<td>50.8%</td>
<td>20.1%</td>
</tr>
</tbody>
</table>

† $\chi^2 (3) = 51.4; \ p \leq .001$; ‡ $\chi^2 (3) = 103.2; \ p \leq .001$

Table 4. Self-reported sexually transmitted infections before intervention and after intervention among female commercial sex workers (FCSWs) in four study sites of the Philippines.

<table>
<thead>
<tr>
<th></th>
<th>Legaspi: Peer Education</th>
<th>Cagayan de Oro: Manager Training</th>
<th>Cebu: Combined</th>
<th>Ilo-Ilo: Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Intervention</td>
<td>44.3</td>
<td>28.4</td>
<td>31.8</td>
<td>43.6</td>
</tr>
<tr>
<td>Post-Intervention</td>
<td>37.9</td>
<td>19.2</td>
<td>10.6</td>
<td>41.7</td>
</tr>
<tr>
<td>Difference</td>
<td>-6.4</td>
<td>-9.2*</td>
<td>-21.2***</td>
<td>-1.9</td>
</tr>
</tbody>
</table>

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$. 
Figure Captions

Figure 1: Flow diagram of participation in the study by female commercial sex workers in the randomized intervention cities.

Figure 2: Significant regression paths among variables in the between levels structural model. Intervention groups contrast coded as follows: 1) Control group = 3, all others = –1; 2) Combination group membership = 2, control group = 0, others –1. 3) Manager = 1, peer = -1, all others = 0.

Regression coefficients are standardized (’ = p < .05, ′′ = p < .01, ′′′ = p < .001).
Cities randomized to 1 of 4 conditions

1025 establishment-based female commercial sex workers screened post-intervention.

39/1025 refusals (4%)

986/1025 (96%) surveyed

75/986 (8%) not sexually active.
2/986 (< .01%) missing data.
12/986 (1%) the only member of a cluster

897/986 (91%) working in 4 cities

Peers only city
N = 148/897
16%

Manager only city
N = 198/897
22%

Manager + Peers city
N = 415/897
46%

Control city
N = 136/897
15%