

Environmental-structural factors significantly associated with consistent condom use among female sex workers in the Dominican Republic

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Objective: To examine the influence of environmental-structural factors in promoting consistent condom use (CCU) among female sex workers (FSW) and their regular paying partners in the Dominican Republic.

Methods: A cross-sectional survey was conducted with 288 FSW recruited from 41 sex establishments in Santo Domingo from March to June 1998. Sex workers were asked about their sexual behavior, self-efficacy at negotiating safe sex, perceived intimacy with their most recent regular paying partner, and the physical, social and policy environment of the establishment where they worked. Factor and reliability analysis were utilized to develop aggregate measures for self-efficacy (Cronbach's Alpha 0.60), intimacy (Cronbach's Alpha 0.80), and environmental-structural support (Cronbach's Alpha 0.72).

Results: Controlling for sociodemographic characteristics of participants in multivariate analyses, environmental-structural support for condom use and HIV/sexually transmitted infection (STI) prevention was a significant predictor of CCU (OR 2.16; CI 1.18–3.97) among FSW and their regular paying partners. Safe sex self-efficacy (OR 2.80; CI 1.31–5.97) and low perceived intimacy with the most recent regular paying partner (OR 7.20; CI 3.49–14.83) were also significantly associated with CCU in multivariate analysis.

Conclusion: Environmental-structural support for condom use and HIV/STI prevention is a significant predictor of CCU among FSW in the context of regular paying partnerships. Environmental-structural factors, in addition to relational and individual cognitive factors, should be assessed and addressed by behaviorally guided theory, research and interventions related to HIV/STI prevention and female sex work.

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Introduction

Throughout the 1980s and early 1990s HIV prevention

was strongly influenced by cognitive theories of behavior change that emphasized individual knowledge, attitudes, beliefs and skills related to HIV/AIDS [1]. In

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recent years, attention has increasingly been focused on the role of environmental-structural factors and the transmission and prevention of HIV. In the HIV prevention literature, environmental-structural factors typically refer to elements outside the control or the cognition of individuals, such as social norms, material and human resources, and policies and legislation that facilitate or constrain individual behavior [2]. Much of this conceptual shift can be attributed to several key papers published in the mid to late 1990s, which questioned the long-term effectiveness of prevention models based solely on individual-cognitive theories of behavior change, and highlighted the importance of integrating environmental-structural factors into the conceptual frameworks utilized to explain and address HIV-related vulnerability [2–5]. Since that time, many papers and reports have been published affirming the urgent need for further research in this area [6–10].

Much of the HIV-related intervention research available to date concerning environmental-structural factors has been conducted within the context of female sex work [11]. Perhaps the most well-known structural intervention within this context is the Thai 100% condom program, which began in 1991 and centers around a government-sponsored policy requiring that condoms be used in all brothel-based commercial sex acts [12]. Evaluation data made available from the Thai government showed dramatic improvements in the rates of consistent condom use (CCU) among female sex workers (FSW) and their clients from 1989 to 1993 [13]. Subsequent evidence has also confirmed a decline in the incidence of HIV among Thai military recruits who reported frequenting commercial sex establishments [14–17]. Whereas recent publications and discourses have begun to address some of the potential limitations of the original Thai 100% condom program [18–20], the initial success of this structural intervention inspired several related intervention research initiatives in other areas of Thailand, other countries in South-East Asia and recently in the Dominican Republic [21–25].

HIV/AIDS and female sex work in the Dominican Republic

According to the most recent surveillance data available, the current national HIV prevalence among FSW in the Dominican Republic is approximately 7%, with rates reaching 12% within certain regions of the country [26]. Estimates of the number of FSW in the Dominican Republic range from 60 000 to 100 000 women in a country of approximately eight million people [27] [Centro de Orientación e Investigación Integral (COIN), 2000, personal communication]. The majority of female sex work in the Dominican Republic is establishment-based, with the large majority of sex establishments being ‘indirect’, bars and discos, where women are paid by the establishment to be

waitresses or dancers in addition to having sex with clients, rather than ‘direct’ establishments or brothels, where women typically only earn income by exchanging sex for money [28–30]. The non-governmental organization (NGO) COIN, with whom the current research was conducted, has been engaged in HIV prevention in the female sex industry of the Dominican Republic since 1989, and has facilitated the development of a network of sex worker peer-educators in Santo Domingo and several other regions of the country. These peer educators have conducted both individual and small group information, education and communication sessions using specialized educational materials and community mobilization activities in order to increase HIV-related protective behavior over the past decade [31–35].

Seeking to continue to strengthen and expand its programming, COIN began to explore the possibility of adapting the Thai 100% condom program to the sociocultural reality of the Dominican Republic in the mid-1990s by conducting formative ethnographic research. Study results revealed significant support on the part of participants, including sex workers and establishment owners, for both government and establishment-based policies and support systems to promote and monitor the use of condoms within sex establishments. One of the most influential barriers to CCU within commercial sex documented by that study was the development of trust and intimacy between sex workers and their regular paying partners [25,30]. Other local and international literature has also documented significantly lower rates of CCU among FSW and their regular paying partners [33,34,36–40]. Such findings motivated the focus of the current study, which sought to test the association between environmental-structural factors and CCU among FSW specifically in the context of their regular paying partnerships, in which an increased risk of HIV infection may exist.

Methods

Sample and selection criteria

From March to June 1998, a cross-sectional survey was conducted with 288 establishment-based, FSW in Santo Domingo, Dominican Republic. Participant selection criteria included sex workers who reported that at least one of their last three sexual partners had paid to go out on a date with them at least three times. Participants were recruited from 41 sex establishments selected at random from a list of 91 establishments in Santo Domingo that met the study site selection criteria. Sites included both direct and indirect sex establishments, where clients are charged a fee by the establishment to go out with a woman who works there. All potential study sites were required to have a

minimum of five women working on the premises and a minimum average of five clients visiting the establishment per night.

Recruitment, consent and incentives

A brief screening questionnaire, including key socio-demographic and behavioral variables, was conducted with all women working in each of the participating sex establishments before determining participation in the main survey. Sex workers who met the selection criteria were asked if they might be interested in participating in a survey that would last approximately 1 hour, dealing with her experiences in the sex industry and her relationship with her most recent regular paying partner. If the woman expressed interest, an appointment was made for the following day. At that time, study interviewers met with each woman individually, in a private setting within or around the establishment. An informed consent form was read to each candidate, describing the potential risks and benefits of the research, informing them that the survey was completely anonymous, and assessing their interest in participating. Participants were offered US\$3.50 compensation for their participation. All participants were interviewed by female Dominican interviewers, who had previous experience working with FSW. All five of the interviewers participating in the study received a one week training in survey methods and research ethics. Field supervisors were always onsite to monitor both data collection and ethical procedures. Human subject reviews were carried out and approvals received in both the United States, through the Johns Hopkins University, as well as in the Dominican Republic, through the National HIV/AIDS/STI Control Program, before the commencement of data collection.

Measures

The survey instrument was developed on the basis of both preliminary research and a review of the existing literature, and sought to include individual, relational, and environmental-structural factors. Individual-cognitive variables such as self-efficacy in negotiating safe sex were adapted from scales developed by Family Health International and the World Health Organization [41]. Relational and environmental-structural variables were generated largely from the results of formative qualitative research conducted with sex workers and their clients in the Dominican Republic [25,30]. Literature related to the measurement of intimacy among couples [42,43], and environmental-structural support for condom use and HIV prevention among sex workers [24] was also consulted. NGO staff and sex worker peer educators served as expert reviewers of all instrument drafts. Before the initiation of official data collection, all instruments were pre-tested. Factor analysis using the principal components method with varimax rotation and reliability analysis were both conducted with

all potential items for each of the three aggregate measures developed.

Self-efficacy

Four individual items were included in the final aggregate measure of self-efficacy regarding safe commercial sex, including participants' perceived level of difficulty to: reject clients who refuse condom use; reject clients who offer more money in order not to use condoms; use condoms with clients after having drunk a significant amount of alcohol; or use condoms with clients when sexually excited (Eigenvalue 1.86; Cronbach's Alpha 0.60).

Intimacy

Nine individual items were included in the final aggregate measure of relationship intimacy, including participants' perceived level of: personal or intimate discussion with partner; trust; affection; love; how well the woman believes that she knows this partner; whether she believes the partner could become her husband one day; whether she believes that he could 'get her out of' the sex industry one day'; whether the woman wants to move in with this partner; whether she wants to have children with this partner (Eigenvalue 3.59; Cronbach's Alpha 0.80).

Environmental-structural support

Nine individual items were included in the final aggregate measure of the physical, social and policy environment supporting condom use and HIV/sexually transmitted infection (STI) prevention. This measure included both individual perceptions of their environment and observed establishment-level variables. Reported items included participant's perceived level of: access to condoms in the establishment; quality of condoms available in the establishment; communication from establishment employees about the importance of condom use when they first began to work at the establishment; communication of a clear policy that condoms are to be used at all times on dates with clients by the establishment owner; on-going reminders from establishment employees regarding condom use; encouragement from owner/manager to attend monthly STI check-ups required by the government; and establishment-based monitoring checks performed by government health inspectors regarding condom supplies and STI clinic attendance. In addition, study interviewers physically observed whether condoms were available at each establishment and whether the establishment had an updated government health certificate posted at the time of the survey (Eigenvalue 3.06; Cronbach's Alpha 0.72).

Consistent condom use

The primary dependent variable of the study is CCU between FSW and their most recent regular paying partner. CCU was measured using as a five-point

Likert scale, e.g. 'Have you always, almost always, sometimes, almost never, or never used condoms with this partner?'

Sociodemographics

The variables measured included: age; education; marital status; number of children; place of birth; time working in sex establishment; whether or not the FSW receives fixed salary from establishment; average monthly income; average amount charged per date; number of client dates per week; number of sexual partners in the past month; and length of relationship with most recent regular paying partner.

Data entry and analysis

Data analysis was conducted with two software packages: SPSS 7.5 for Windows (univariate and bivariate) and STATA Intercooled Version 6.0 (multivariate). For univariate analysis, frequencies and medians of all variables and measures were produced. Continuous independent variables were examined for normalcy, and were categorized on the basis of distributions at the median. The dependent variable was dichotomized into consistent (always) versus non-consistent (less than always) condom use. At the bivariate level of analysis, both chi-square tests of association and logistic regression was conducted between the dependent variable and each of the indepen-

dent variables and aggregate measures. Multivariate analysis was conducted using binary logistic regression to determine the predictors of CCU. Standard errors from the final multivariate model were adjusted for potential clustering or non-independence of the outcome among women from the same sex establishment using robust variance estimates [44,45]. Multivariate models were produced that both included and excluded cases with missing information. No significant differences were detected in the results of these two models; therefore, 38 cases containing missing data were then excluded from the final multivariate analysis presented herein.

Limitations of the research

The main limitation of the current study is the cross-sectional research design that limits our ability to establish causal associations. In order to establish a causal relationship between the environment and condom use, a prospective study is needed that follows sex workers over time, and assesses whether and how their sexual behavior changes as they move between establishments that vary in terms of levels of environmental-structural support. Additional limitations of the research include the fact that the majority of variables comprising the environmental-structural support measure are based on individuals' perceptions of their environment, rather than observed, establishment-level data.

Table 1. Characteristics of the sample, their sexual relationships and work environment (N = 288).

Variable	Percentage in each category or median and range
Demographic characteristics	
Age in years	25.0 (18.0, 47.0)
Years of school completed	7.0 (0.0, 16.0)
Place of birth	
Santo Domingo	31.2
Other city or town	38.9
Rural area	29.9
Married or living in union	25.0
Number of children	2.0 (0.0, 8.0)
Occupational characteristics	
Months working in current establishment	12.0 (1.0, 192.0)
Receives fixed salary from establishment	87.2
Total average monthly income	US\$233.33 (86.67, 866.67)
Average charge per date with client	US\$23.33 (10.0, 100.00)
Sexual behavior	
Average number of dates per week with clients	2.0 (1.0, 7.0)
Total number of sexual partners in last two months	3.0 (0.0, 30.0)
Consistent condom use with most recent regular paying partner	60.1
Individual-cognitive	
Safe sex self-efficacy	4.0 (0.0, 4.0)
Relational	
Relationship intimacy	3.0 (0.0, 9.0)
Length of relationship in months	5.0 (.10, 96.0)
Environmental-structural	
Environmental-structural support for condom use and HIV/STI prevention	3.0 (0.0, 9.0)

STI, Sexually transmitted infection.

Results

Characteristics of the sample, their sexual relationships and work environment

Univariate analyses

As described in Table 1, most of the FSW participating in the survey were young women, less than 30 years of age, with low levels of formal education, having completed 7 years of school on average. Approximately 70% of participants were either from Santo Domingo or small towns outside the capital. One-quarter of the women reported being currently married or living in union, whereas the majority reported having at least two children.

The large majority (87.2%) of the women interviewed worked in indirect sex establishments, where they received a fixed monthly salary from the establishment for activities other than sex work, such as waitressing or dancing. The women's median monthly income from both salary and dates with clients was US\$233. Participants reported charging US\$23 per client date on average. The median length of time of having worked in the current sex establishment was one year.

The median number of dates with clients per week was 2.0, whereas the median number of all types of sexual partners in the past 2 months (paying and non-paying) was 3.0. Sixty per cent of participants reported using condoms consistently with their most recent regular paying partner. The median length of relationship between participating FSW and their most recent regular paying partner was 5 months, with the length of relationship ranging from just a few days to over 8 years.

Participating sex workers scored high on the self-efficacy at negotiating safe commercial sex scale. The majority stated that they strongly believed in their ability to negotiate safe sex with clients in all of the contexts presented to them (median 4.0/four-item scale). More variation was found with regard to sex workers' perceived intimacy towards their regular paying partners (median 3.0/nine-item scale) and perceived and observed environmental-structural support for condom use and HIV prevention within the current sex establishment where they worked (median 3.0/nine-item scale).

Consistent condom use among female sex workers and regular paying partners

Bivariate analyses

As shown in Table 2, the bivariate relationship between CCU and each of the individual, relational and environmental-structural variables examined in the study was first assessed. Age was the only demographic variable significantly associated with CCU; younger women (< 25 years) were more

likely to use condoms consistently with their regular paying partner than older women. With regard to occupational characteristics, not receiving a fixed salary from the establishment, having a monthly income over US\$232, and charging more than US\$22 per date were all significantly associated with increased rates of CCU. Both the average number of dates with clients per week (more than two), and the total number of paying and non-paying sexual partners reported in the past 2 months (more than three) were significantly associated with higher rates of CCU. The length of relationship with regular paying partners (< 5 months) was also associated with CCU.

All three of the aggregate measures developed for the study (safe sex self-efficacy, relationship intimacy and environmental-structural support for condom use and HIV/STI prevention) were significantly associated with CCU. The rate of reported CCU among sex workers with high safe sex self-efficacy was 66.9% versus 52.2% among those with low self-efficacy [odds ratio (OR) 1.85; 95% confidence interval (CI) 1.13–3.02]. The rate of CCU among sex workers with low perceived intimacy with their regular paying partner, 76.7%, was significantly less than those with high perceived intimacy, 41.3% (OR 4.68; CI 2.43–8.98). The rate of CCU varied significantly between women working in establishments with high levels of environmental-structural support for condom use and HIV/STI prevention, 69.9%, compared with those working in establishments with low levels of environmental-structural support, 48.0% (OR 2.52; CI 1.54–4.13).

Multivariate analyses

All variables found to be significantly associated with CCU in bivariate analyses were entered into a multivariate logistic regression model. Average monthly income was dropped from the final multivariate model because of collinearity with the variable indicating whether the participant received a fixed monthly salary from the sex establishment. As shown in Table 3, the final regression model was statistically significant [$\chi^2(9) = 86.73$; $P < 0.0001$]. Based on the model, 70.2% of women were correctly classified into their actual condom use categories.

Four variables remained significant in multivariate analysis: the amount charged per date with client; safe sex self-efficacy; relationship intimacy and environmental-structural support for condom use; and HIV/STI prevention. Sex workers who worked in establishments with high levels of environmental-structural support for condom use and HIV/STI prevention (OR 2.16; CI 1.18–3.97) were significantly more likely to use condoms consistently with regular paying partners. In addition, participants were more likely to use condoms

Table 2. Bivariate associations: individual, relational and environmental-structural factors and consistent condom use among female sex workers and regular paying partners (N = 288).

Variable	Percentage of CCU	Unadjusted OR	95% CI
Years of age			
18–25	68.7	2.12**	1.30–3.46
26+	50.7		
Years of school completed			
0–7	55.8		
8+	64.9	1.46	0.91–2.36
Place of birth			
Capital	65.6	1.40	0.86–2.27
Other	57.6		
Civil status			
Married	68.1	1.58	0.90–2.78
Single	57.4		
Number of children			
0–2	61.8	1.26	0.74–2.14
3+	56.2		
Months working in establishment			
0–12	61.7	1.16	0.70–1.93
13+	58.1		
Receives fixed salary			
Yes	57.0		
No	81.1	3.23**	1.37–7.65
Total average monthly income			
US\$87–232	50.0		
US\$233+	66.1	1.94**	1.12–3.38
Average charge per date			
US\$10–22	53.4		
US\$23+	67.1	1.78*	1.10–2.87
Average client dates per week			
0–2	55.5		
3+	67.9	1.69*	1.02–2.78
Sexual partners in past 2 months			
0–3	52.0		
4+	68.8	2.08**	1.28–3.38
Safe sex self-efficacy			
Low (0–3)	52.2		
High (4)	66.9	1.85*	1.13–3.02
Relationship intimacy			
Low (0–3)	76.7	4.68***	2.43–8.98
High (4–9)	41.3		
Length in months of relationship			
0–5	70.6	2.40***	1.47–3.93
6+	50.0		
Environment-structural support			
Low (0–2)	48.0		
High (3–9)	69.9	2.52***	1.54–4.13

CCU, Consistent condom use; CI, confidence interval; OR, odds ratio.
 P value: * < 0.05; ** < 0.01; *** < 0.001.

Table 3. Multivariate logistic regression model: individual, relational and environmental-structural determinants of consistent condom use among female sex workers and regular paying partners (N = 250).

Variable	Adjusted OR	95% CI
Years of age: < 25	1.47	0.77–2.80
Does not receive fixed salary from sex establishment	1.28	0.53–3.05
Charge per client date: > US\$23	1.99*	1.10–3.59
Average dates with clients per week: > 2	1.85	0.90–3.80
Sexual partners in past 2 months: > 3	1.19	0.52–2.69
Safe sex self-efficacy: High	2.80**	1.31–5.97
Relationship intimacy: Low	7.20***	3.49–14.83
Length of relationship in months: > 5	1.64	0.84–3.20
Environmental-structural support: High	2.16*	1.18–3.97

CI, confidence interval; OR, odds ratio.
 P value * < 0.05; ** < 0.01; *** < 0.001.

consistently with their most recent regular paying partner if they charged more than US\$22 per date with clients on average (OR 1.99; CI 1.10–3.59), had a strong sense of self-efficacy in the context of commercial sex negotiations (OR 2.80; CI 1.31–5.97), and perceived low levels of relationship intimacy with that partner (OR 7.20; CI 3.49–14.83).

Discussion

The results of this research provide empirical data to help support the current consensus in the public health literature emphasizing the importance of environmental-structural factors and the adoption of HIV-related protective behaviors. Although our findings confirm the importance of environmental-structural factors, they also demonstrate that multiple levels of factors are at play in the process of HIV-related sexual decision-making. Significant predictors of CCU among FSW were found at the individual (e.g. safe sex self-efficacy), relational (e.g. relationship intimacy) and environmental-structural levels (e.g. environmental-structural support for condom use and HIV/STI prevention). Therefore, our findings confirm the need for existing or future behavioral theories that guide HIV/STI prevention research and interventions to integrate individual, relational and environmental-structural factors into their conceptual frameworks.

The current study's findings also have important implications for the development of HIV/STI prevention interventions in the context of female sex work. The items of the environmental-structural support measure that were found to be significantly associated with CCU in multivariate analysis included elements of the physical, social and policy environment of female sex work. Therefore, interventions should seek not only to ensure access to quality condoms in sex establishments but also to promote institutional and community-based solidarity among sex workers, establishment owner/managers and other establishment employees in order to increase condom use and prevent HIV/STI. In addition, establishment-based condom use policies clearly articulated by owner/managers may be an important intervention element. The findings also suggest an important potential role for governmental health departments, monitoring that sex establishment owners make condoms and other HIV prevention resources available to sex workers and clients. Such strategies help to create an enabling environment, which emphasizes shared, rather than individual, responsibility for protective behavior within the context of female sex work.

At the relational level, lower levels of relationship intimacy were associated with CCU between sex

workers and regular paying partners in multivariate analysis. This finding concurs with findings from previous qualitative research conducted in the Dominican Republic and in other settings, whereby both sex workers and clients describe the courtship-like process by which trust or affection are established over time and how that often leads to decreased condom use [25,30,37]. Findings from the present study also showed that sex workers had an average of two client dates per week, but a total of only three sexual partners in the past 2 months, suggesting that the majority of these sexual partners were regular paying partners. These findings confirm the urgent need to develop specialized educational materials and intervention strategies to address the potential increased risk of HIV/STI transmission between FSW and their regular paying partners.

At the individual-cognitive level, safe sex self-efficacy was also a significant predictor of CCU in multivariate analysis, and thus should continue to be promoted in future HIV/STI prevention interventions through strategies that have demonstrated success in the context of female sex work, such as peer education [46–48]. Low levels of variation were found in sex workers' reported self-efficacy at negotiating safe commercial sex in this study, whereas the majority of participating sex workers already felt very comfortable with their ability to negotiate potential barriers to safe sex. This finding is probably the result of the long-standing peer education intervention implemented by the collaborating NGO in the area in which the research was conducted. On the basis of the study findings one would recommend sustaining this important intervention, but given the already high levels of self-efficacy, it is clear that other complementary strategies, such as environmental-structural interventions, are also needed in order to increase CCU with regular paying partners with whom current condom use rates are significantly lower than with new clients [49].

In summary, environmental-structural factors are significant predictors of CCU among FSW and their regular paying partners. However, the determinants of CCU among FSW and their regular paying partners are multi-faceted and include environmental-structural, relational and individual-cognitive factors. Therefore, integrated intervention strategies are needed that combine individual behavior change strategies with environmental-structural interventions in order to facilitate and reinforce protective behavior and reduce HIV-related vulnerability within female sex work.

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