CHANGES IN CONDOM USE OVER TIME AMONG FEMALE SEX WORKERS AND THEIR MALE NONCOMMERCIAL PARTNERS AND CLIENTS

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Abstract

Female sex workers (FSWs) often report inconsistent condom use with clients and noncommercial male partners, yet changes in condom use with various partner types during participation in observation studies remains underexplored. This longitudinal study of 214 FSWs and their male, noncommercial partners in the Mexico-U.S. border region, where HIV prevalence among FSWs continues to be high, utilized negative binomial regressions to examine changes in condom use with intimate partners and clients (regular and nonregular) over 24 months. Condom use decreased over time among couples in Ciudad Juarez, but there was no change in condom use among couples in Tijuana. FSWs' condom use with regular and nonregular clients significantly increased over time, which is consistent with previous research finding behavioral changes when participating in observational studies. Findings suggest the need for continued efforts to promote condom use among FSWs and their noncommercial male partners in addition to clients.

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HIV and sexually transmitted infections (STIs) are continued public health concerns along the Mexico-U.S. border, an area in which drug trafficking routes, sex work, and substance use often converge (Beittel, 2011; Bucardo, Semple, Fraga-Vallejo, Davila, & Patterson, 2004; Sirotin et al., 2010). HIV prevalence in Tijuana and Ciudad Juarez, two of the largest Mexico-U.S. border cities, is estimated to be between 1% and 6% among female sex workers (FSWs) and may be as high as 12% among FSWs who inject drugs (FSW-IDUs; Iñiguez-Stevens et al., 2009; Strathdee et al., 2008). These prevalence levels are substantially higher than the 0.2–0.3% prevalence observed in the general Mexican population aged 15–49 years (CENSIDA, 2014). A recent behavioral intervention targeting FSWs in this region successfully increased condom use among FSWs and their clients (Patterson et al., 2008). However, these effects did not extend to FSWs and their main, noncommercial male partners (e.g., spouses and boyfriends; Ulibarri et al., 2012), which lead to longitudinal research on the social epidemiology of HIV/STIs among FSWs and their intimate male partners in these cities. During this observational research, which was conducted over a 24-month follow-up period, Bazzi et al. (2015) documented HIV incidence among these couples to be 1.12 per 100 person years (py), and combined STI incidence (excluding HIV) to be 15.2 per 100 py. A total of 145 new STI infections were detected over the course of the study, and 8 out of 413 initially HIV-negative participants seroconverted. However, this study did not describe changes in condom use among these couples over time, nor did it examine FSWs' self-reported condom use with their clients.

Observational studies, which provide valuable information regarding health behaviors, also have the potential to change participants' behaviors even in the absence of direct intervention. There is a growing body of literature documenting behavioral reactivity from participating in research among substance users and transactional sex workers (Gunn, Roth, Center, & Wiehe, 2015; Kurtz, Surratt, Buttram, Levi-Minzi, & Chen, 2013). Recently, Gunn et al. (2015) found that study participation improved mental health among U.S. transactional sex workers participating in a daily-diary and weekly interview study of substance use and HIV/STI risk. The authors attributed this unintended mental health benefit to positive interactions with study staff and opportunities to discuss lived experiences. Researchers studying both substance use and sexual risk behaviors have also noted behavioral changes in response to comprehensive interviews and assessments, attributing these changes to consciousness raising, focused attention, self-monitoring, and self-awareness that may result from study questions that promote reflection on previous behaviors (Clifford & Maisto, 2000; Clifford, Maisto, & David, 2007; Epstein et al., 2005; Kurtz et al., 2013; Lightfoot, Rotheram-Borus, Comulada, Gundersen, & Reddy, 2007).

FSWS' CONDOM USE WITH CLIENTS AND INTIMATE PARTNERS

Interventions to prevent HIV/STI acquisition among FSWs have met some success promoting condom use with clients and reducing STI acquisition (Aung, Paw, Aye, & McFarland, 2014; Hong & Li, 2008; Patterson et al., 2008; Shahmanesh, Patel, Mabey, & Cowan, 2008; Shannon et al., 2015; Tinajeros et al., 2012). However, condomless sex with clients may not be the only source of HIV/STI risk for FSWs (Travasso, Mahapatra, Saggurti, & Krishnan, 2014). Many FSWs report having noncommercial male partners (Deering et al., 2011; Hong & Li, 2008; Mishra et al., 2013), with whom condom use is

infrequent (Hong & Li, 2008; Travasso et al., 2014; Ulibarri et al., 2012; Voeten, Egesah, Varkevisser, & Habbema, 2007). A study by Lowndes et al. (2000) in Benin, Africa found a greater percentage of FSWs' boyfriends were HIV positive compared to their clients (16.1% vs. 8.5%). Additionally, the line between client and intimate partner is often blurred, as some clients transition into non-paying partners (Stoebenau, Hindin, Nathanson, Rakotoarison, & Razafintsalama, 2009).

Changes in condom use with clients and noncommercial, intimate male partners, remain underexplored among FSWs participating in observational research studies. Understanding behavioral changes within these different types of sexual partnerships carries important methodological implications for understanding HIV and STI risk among participants of observational studies. Information about FSWs' condom use over time with different types of sexual partners may be helpful in designing randomized control trials of HIV/STI prevention interventions with this population. This information will help identify any needs for continued research on the factors that influence condom use over time among FSWs and their different partner types, identify the possible need for specialized prevention interventions that differentiate between noncommercial partners and clients, and demonstrate the possible advantages of improving behavior by undergoing comprehensive social and health risk assessments.

CURRENT STUDY

We sought to examine condom use over time among FSWs and their different types of male partners (intimate, regular/repeat and nonregular clients) in Proyecto Parejas (the Couples Project), a prospective, social epidemiological study of HIV/STI risk among FSWs and their intimate (noncommercial) male partners in Tijuana and Ciudad Juarez, Mexico. Based on previous longitudinal research with FSWs in Tijuana and Ciudad Juarez, which found condom use with noncommercial partners to be less consistent than condom use with clients (Ulibarri et al., 2012), we hypothesized that FSWs and their intimate partners would report infrequent, yet stable, rates of condom use over time with each other. Having self-reported behavioral data from both female and male partners in these relationships represents a departure from previous research focusing on FSWs' self-reports only, and is a major strength of this couple-based research study design.

In regards to clients, previous research by Lindsay et al. (2015) found more unprotected sex acts with regular versus nonregular clients among FSWs who inject drugs (FSW-IDU) in this region. Qualitative research with couples in Proyecto Parejas identified typologies of FSWs' commercial relationships, noting that FSWs described closer emotional bonds and higher levels of trust for their regular clients, who they perceive to be less risky (Robertson, Syvertsen, Amaro, et al., 2014). Based on these qualitative and quantitative studies with this population, we further hypothesized that FSWs would report more consistent condom use over time with non-regular clients, while condom use with regular clients, with whom women are closer, would be less consistent. In testing these hypotheses, our findings could yield methodological implications for observational and intervention research focused on preventing HIV/STI transmission among FSWs and their commercial and noncommercial partners.

METHOD

PARTICIPANTS

Participants in the prospective Proyecto Parejas study included FSWs (n = 214) and their noncommercial male partners (n = 214) in Tijuana and Ciudad Juarez, Mexico. A total of 196 couples (196 females and 189 males) were included in the analysis for this paper out of the total of 214 couples. We used data from couples who had at least one follow up visit together over the 24-month period (196 couples). At the end of the second year, we had data from 148 couples (43 couples in Tijuana; 105 in Ciudad Juarez), representing an overall attrition rate of 69%. Eligibility criteria for women included being 18 years old, reporting exchanging sex for money, drugs, shelter, or food within the last 30 days, being in a non-commercial relationship with an intimate male partner for 6 months, and having had sexual relations with that partner in the last 30 days. In line with the aims of this social epidemiological study, eligibility criteria for women also included reporting lifetime use of heroin, cocaine, crack, or methamphetamine and agreeing to receive antibiotic treatment for any identified STIs. Female participants were excluded if they reported any intentions to move within the next 24 months, terminate their intimate relationship, or were concerned about experiencing extreme IPV as a result of participation (Syvertsen et al., 2012). Eligibility criteria for men included being 18 years old and being in a verified relationship for 6 months with an eligible FSW.

PROCEDURES

FSWs were recruited through targeted sampling in areas frequented by sex workers such as bars, motels, streets, and alleys. In addition, snowball sampling enabled female participants to refer other FSWs to the study. We recruited couples through the female partner first to allow for individual consideration about participation in regards to the sensitive interview topics, such as drug use and sex work. After initial screening, women could decide if they wanted to invite their male partner to be screened for the study. All participants went through a two-step screening process: (1) initial eligibility screening, and (2) couple verification screening (for more details, see Syvertsen et al., 2012). All eligible couples signed informed consents and completed quantitative baseline surveys administered by gender-matched interviewers. Couples were interviewed over five time periods: baseline and every 6 months over 24 months. At each visit, participants underwent biological assessments for HIV and STIs. Participants received their rapid test results the same day, and confirmatory test results within 30 days. Participants with confirmed HIV infection were referred to public clinics for free medical care and treatment. Participants who tested positive for other STIs received free treatment based on U.S. and Mexican guidelines (see Bazzi et al., 2015 for HIV/STI testing procedures and results). Participants received $20 for the completion of each interview. Institutional review boards at the University of California, San Diego, the Hospital General and El Colegio de la Frontera Norte in Tijuana, and the Universidad Autónoma de Ciudad Juárez approved all study protocols.

MEASURES

The current study utilized data from baseline and four follow-up interviews conducted with FSWs and their noncommercial male partners. Demographic characteristics were assessed

by a series of questions regarding age, education, marital status, children, and income. To assess the dependent variable of couples' protected sex acts with each other, we asked FSWs and their noncommercial male partners at each of the five study visits to report the number of times they engaged in vaginal and anal sex in the past month. We then asked each partner for how many of these sex acts they used a condom. We calculated the proportion of protected sex by taking the number of reported protected sex acts divided by the total number of reported vaginal and anal sex acts. To address possible discrepancies in responses between couples, the proportion of protected sex among FSWs and their noncommercial male partners was calculated as an average between numbers reported by both the female and the male of the couple (Kenny, Kashy, & Cook, 2006).

Additionally, FSWs were asked to report the number of times they engaged in vaginal and anal sex with regular and nonregular clients, and of the total number of times they used a condom. Similarly to the couples' protected sex dependent variable, we constructed the dependent variables of FSWs' protected sex with regular and nonregular clients by calculating the proportion of protected sex with each client type by taking the number of reported protected sex acts with regular and nonregular clients (respectively) divided by the total number of reported vaginal and anal sex acts for each client type.

DATA ANALYSIS

First, we examined descriptive statistics (frequencies, means, standard deviations) for all variables of interest, including socio-demographics, couples' total number of reported vaginal and anal sex acts with and without condoms in the past month (and the derived proportion of sex with condoms) for each time period, and FSWs' reported vaginal and anal sex acts with and without condoms with regular and nonregular clients. We also examined graphs of condom use over time for couples by study site (city). Next, to identify statistically significant changes over time in the proportions of sex with condoms within couples and for FSWs with their different client types, we used repeated measures negative binomial regressions via generalized estimating equations. Negative binomial regression is appropriate for count data (i.e., number of sex acts; Hayat & Higgins, 2014; Zeileis, Kleiber, & Jackson, 2015) characterized by over-dispersion and thus failing to meet the stricter conditions for Poisson regression. We assessed all outcomes, proportions of sex with condoms with each partner type: (1) noncommercial partners, (2) regular clients, and (3) nonregular clients, separately across all five time-points. To model the rate of protected sex over follow-up, we used the number of sex acts with condoms as the response variable, and the logarithm of the total number of sex acts was an offset variable. Analyses were also stratified by site.

RESULTS

SAMPLE CHARACTERISTICS

The mean age of participants was 35.6 years ($SD = 9.4$), females 33.7 ($SD = 8.7$); males 37.7 ($SD = 9.6$), and average educational attainment was 7.2 years ($SD = 2.6$), females 6.9 ($SD = 2.5$); males 7.6 ($SD = 2.7$). Mean relationship duration was 4.6 years ($SD = 4.3$). Nearly all couples (98%) reported living together and being married or in a common law

relationship at baseline. The mean number of children participants had was 2.9 ($SD = 1.7$), females 3.1 ($SD = 1.7$); males 2.7 ($SD = 1.8$). In regards to income, 38% of the women and 54% of the men reported earning less than $2500 pesos a month ($200 U.S./month). Additional baseline socio-demographics, relationship characteristics, and behavioral profiles have been previously detailed (Robertson, Syvertsen, Ulibarri, et al., 2014).

CONDOM USE

The mean number of sex acts, mean number of sex acts with condoms, and proportions of sex acts with and without condoms were calculated for couples and for FSWs' regular and nonregular clients at baseline and four follow-up visits (see Table 1). The baseline ratios of protected sex acts to total sex acts with intimate partners in Tijuana and Ciudad Juarez were low ($M = .17$, $SD = .30$; and $M = .17$, $SD = .30$, respectively). However, the baseline ratios of FSWs' protected sex acts to total sex acts were higher with regular clients (Tijuana: $M = .45$, $SD = .47$; Ciudad Juarez: $M = .63$, $SD = .40$, respectively) and highest with nonregular clients (Tijuana: $M = .70$, $SD = .41$; Ciudad Juarez: $M = .79$, $SD = .25$, respectively).

Low power precluded an assessment of the rate of condom use over time with intimate partners; however we examined the trends. Although there was no change in the proportion of condom use over time in Tijuana, we identified a trend toward decreasing condom use over time in Ciudad Juarez ($p < 0.1$, see Figure 2). Conversely, the proportion of condom use that FSWs reported with regular and nonregular clients increased significantly over time (see Figures 1 and 2). With regular clients, the proportion of condom use was 1.09 times larger during each follow-up visit compared to previous visits, 95% confidence interval [CI] [1.02, 1.17], $p = .02$, and 1.07 times larger in Ciudad Juarez, CI [1.03, 1.11], $p = .001$. Similarly, with nonregular clients, the proportions of condom use were 1.08 and 1.05 times larger in Tijuana and Ciudad Juarez, respectively, CI [1.02, 1.14], $p = .01$, and CI [1.02, 1.07], $p < .0001$. In order to examine whether being diagnosed with HIV or an STI could affect condom use, we included any incident HIV/STI diagnosis in our models; however, this did not have a statistically significant effect, so these variables were not retained in our final models.

DISCUSSION

The current study examined changes in condom use among FSWs and their noncommercial male partners and clients in Tijuana and Ciudad Juarez over a 24-month period. Consistent with previous findings that FSWs in these cities report inconsistent condom use with intimate partners (Ulibarri et al., 2012), we identified infrequent condom use within these intimate partnerships (as reported by both women and male partners) at baseline. The present analysis also demonstrated that condom use did not significantly change over time among these couples in Tijuana; however, there was a trend towards decreasing condom use among couples in Ciudad Juarez that did not reach statistical significance ($p < 0.1$). These results are consistent with previous research among FSWs in India and Mexico in which condom use with noncommercial male partners is low, steady over time, and difficult to change through interventions (Ramesh et al., 2010; Ulibarri et al., 2012), suggesting the need for alternative prevention strategies to replace or supplement condom use, including pre-exposure prophylaxis in oral or topical microbicide form combined with enhanced

HIV/STI risk communication skills and male involvement in prevention and health promotion efforts (Roberson et al., 2013).

Interestingly, despite the fact that Proyecto Parejas was not an intervention study, FSWs' condom use with clients (both regular and nonregular) significantly increased over time. This finding implies that involvement in an observational study that provided regular HIV/STI testing and counseling (every 6 months) and access to condoms and prevention information may have altered participants' sexual risk behaviors. The HIV/STI testing and counseling alone may have led FSWs to think about their risk behaviors. Additionally, the behavioral assessments (including questions on condom use and other sexual and drug-related risk behaviors) may have encouraged self-reflection or increased motivation for improved sexual safety. As behavioral changes have been identified in other observational studies of mental health, substance use, and sexual risk among populations including FSWs (Gunn et al., 2015; Kurtz et al., 2013), additional research using qualitative or cognitive interviewing methods is needed to identify the precise reasons why and mechanisms through which research participation contributes to behavior change.

Our findings are consistent with previous HIV/STI intervention research showing that FSWs are able to increase condom use with clients but experience important barriers to increasing condom use with non-commercial partners, which tends to remain steady over time (Hong & Li, 2008; Patterson et al., 2008; Shahmanesh et al., 2008; Tinajeros et al., 2012; Ulibarri et al., 2012). In our sample, FSWs' condom use was less prevalent with intimate partners compared to nonregular and regular clients; further, FSWs' condom use with regular clients was less prevalent compared to nonregular clients. Possibly, as familiarity with noncommercial partners increased, condom use decreased. Research in this and other populations has shown that the high trust and intimacy that define relationships with intimate partners, as well as regular clients, render condom use less likely over time (Robertson, Syvertsen, Amaro, et al., 2014). Types of relationships and the emotional significance of using condoms are two key factors that may influence condom use, which is often viewed as a physical as well as emotional barrier or sign of emotional distance or detachment (Rhodes & Cusick, 2000). Research focusing specifically on FSWs has identified condom use as a distinguishing factor between work and personal life (Castañeda, Ortíz, Allen, García, & Hernandez-Avila, 1996; Syvertsen et al., 2013). Studies with couples have also identified the use of condoms as emotional barriers, as unprotected sex with an intimate partner signifies intimacy and trust (Burton, Darbes, & Operario, 2010; Murray et al., 2007). Our results highlight the necessity for HIV/STI prevention interventions for FSWs and their commercial and noncommercial partners to take into consideration the different emotional influences on safer sex practices. Further research, likely with larger samples, is also needed to explore how participation in couple-based observational studies may reinforce or amplify this pattern of increasing social and emotional intimacy and decreasing condom use. If it is the case that couples become less likely to use condoms as their duration of research participation increases, more studies of the of alternative prevention strategies, such as the microbicide acceptability study conducted by Robertson et al. (2013), may be warranted.

However, our findings also suggest that continued condom promotion with clients is needed, as FSWs were not using condoms with all types of clients consistently (i.e., condom use

ranged from 52–78% with regular and non-regular clients). FSWs forgo condoms with clients for numerous reasons, including lack of access to condoms, clients' refusal to use condoms, financial incentives to have condomless sex (Luchters et al., 2013), and client type: condom use varies with nonregular verses regular clients (Lahuerta, Torrens, Sabidó, Batres, & Casabona, 2013) and when clients become noncommercial (nonpaying) partners (Robertson, Syvertsen, Amaro et al., 2014; Stoebenau et al., 2009). In addition to condom promotion, additional important areas of focus for prevention include reduction of sexual violence, access to antiretroviral therapy, and the decriminalization of prostitution, which a recent review indicated would have significant effects in reducing HIV incidences (Shannon et al., 2015).

Our findings must be carefully interpreted in light of several important limitations. First, the eligibility criteria of Proyecto Parejas, including required relationship durations of 6 months and the exclusion (and referral to services) of couples reporting severe levels of interpersonal violence, likely limit the generalizability of our findings (Syvertsen et al., 2012). Similarly, FSWs who were concerned about negative reactions from their male partners as a result of participating in this research may have opted out of study screening because we placed the decision on whether to invite male partners to participate under women's control. We may have observed a trend towards decreasing condom use over time within intimate partnerships in Ciudad Juarez and not Tijuana because relationships were more stable and there was slightly higher retention of couples and male partners in Ciudad Juarez. The higher attrition rate in Tijuana may have introduced bias if FSWs in Tijuana who were not retained over the 24-month study period may have systematically differed from FSWs who were retained in ways that are related to their relationships or condom use behavior. Although we were not able to account for every lost participant, outreach workers involved in intensive street-tracking did make numerous attempts to locate participants and learned that several participants in Tijuana were incarcerated, enrolled in residential drug-treatment centers, moved, or died. We do not know the exact number of couples who broke up, but the one couple lost in Ciudad Juarez broke up; thus, we believe that only a minority of attrition was due to relationship factors. Nevertheless, we cannot say with certainty why we observed changes in condom use over time in this observational study; additional research is needed to understand why condom use changed over time with some types of partners and not others and explore the mechanisms through which research participation can effect behavioral change.

CONCLUSIONS

Our study, which identified changes in condom use among FSWs participating in an observational study, carries implications for future research and confirms the need for careful assessment of the impact of research participation on subjects' behaviors and subsequent health and wellbeing. Our results confirm previous studies' findings that FSWs likely have complex motivations for using condoms within specific types of relationships, and highlights the ways that condom use can change over time even in the absence of an intervention. Although condom promotion is a successful strategy for some types of relationships, further research may want to explore the structural factors (e.g., availability,

drug use, IPV, economic considerations) that account for differences in condom use particularly in diverse socio-economic and geographic contexts.

Acknowledgments

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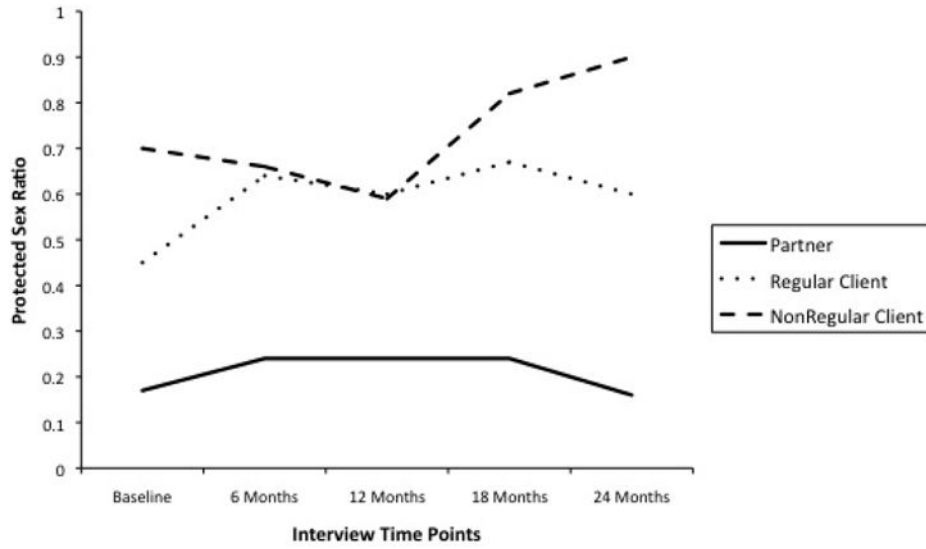
FIGURE 1.

Proportion of protected sex acts, taking the number of reported protected sex acts divided by the total number of reported vaginal and anal sex (past 30 days), over five time periods in Tijuana, Mexico. Proportions of protected sex significantly increased over time with both regular and nonregular clients, however, there was no change with noncommercial male partners.
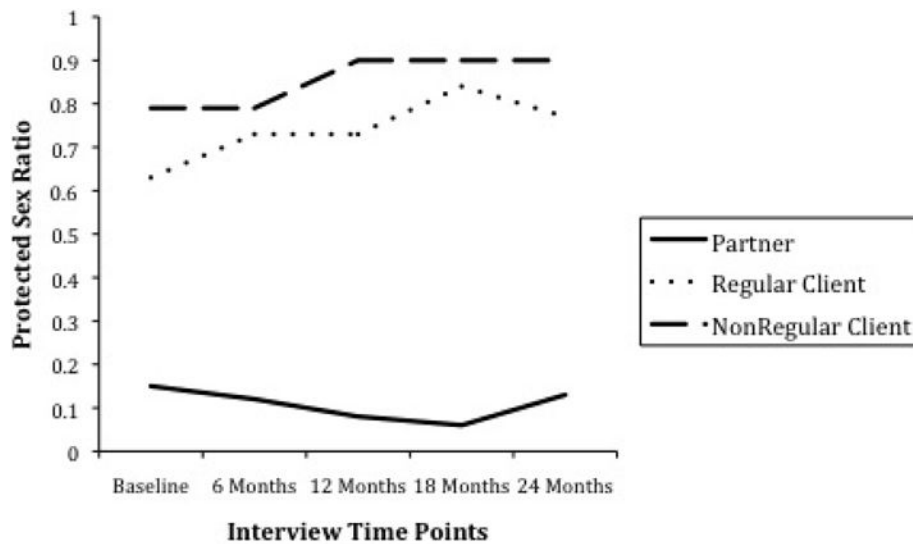
FIGURE 2.
Proportion of protected sex acts, taking the number of reported protected sex acts divided by the total number of reported vaginal and anal sex (past 30 days), over five time periods in Ciudad Juarez, Mexico. Proportions of protected sex significantly increased over time with both regular and nonregular clients, however, protected sex decreased with noncommercial male partners.

TABLE 1

Protected Sex Acts (Past 30 Days) Over Five Time Periods for Couples and for FSWs' Regular and Nonregular Clients by City (Tijuana and Ciudad Juárez)

	Baseline		6-month		12-month		18-month		24-month	
	TJ	CJ	TJ	CJ	TJ	CJ	TJ	CJ	TJ	CJ
Couples	n = 89	n = 104	n = 77	n = 102	n = 55	n = 103	n = 45	n = 100	n = 37	n = 105
Mean number of sex acts	17.35 (10.35)	17.26 (11.67)	12.17 (8.01)	10.53 (5.76)	12.17 (13.00)	12.70 (7.27)	11.00 (14.72)	12.59 (7.04)	9.89 (9.57)	11.90 (6.35)
Mean number of protected sex acts	3.24 (7.03)	2.49 (5.42)	2.59 (4.55)	0.95 (2.43)	2.73 (8.38)	0.97 (3.73)	2.33 (6.34)	0.36 (1.47)	0.97 (2.25)	0.76 (1.98)
Ratio of protected sex acts to total sex acts	0.17 (0.30)	0.15 (0.28)	0.24 (0.31)	0.12 (0.26)	0.24 (0.37)	0.08 (0.23)	0.24 (0.40)	0.06 (0.20)	0.16 (0.32)	0.13 (0.30)
Regular Clients	n = 89	n = 85	n = 63	n = 80	n = 57	n = 76	n = 32	n = 56	n = 33	n = 45
Mean number of sex acts	45.74 (116.53)	30.76 (96.43)	16.98 (15.33)	19.78 (34.44)	31.44 (62.22)	15.92 (12.14)	36.44 (65.10)	14.73 (9.93)	36.91 (119.41)	16.02 (29.66)
Mean number of protected sex acts	19.69 (87.07)	10.32 (11.63)	9.76 (12.98)	11.64 (8.14)	9.47 (11.26)	11.96 (9.46)	15.94 (24.50)	12.54 (9.96)	7.82 (12.95)	9.58 (6.04)
Ratio of protected sex acts to total sex acts	0.45 (0.47)	0.63 (0.40)	0.64 (0.43)	0.73 (0.35)	0.60 (0.45)	0.73 (0.41)	0.67 (0.44)	0.84 (0.31)	0.60 (0.48)	0.77 (0.39)
Nonregular Clients	n = 38	n = 93	n = 57	n = 80	n = 38	n = 70	n = 22	n = 48	n = 29	n = 37
Mean number of sex acts	37.13 (85.30)	35.61 (31.74)	24.07 (25.47)	20.59 (14.04)	8.95 (7.74)	19.49 (13.01)	30.18 (45.60)	17.88 (7.44)	39.04 (110.26)	21.11 (16.00)
Mean number of protected sex acts	31.74 (85.74)	27.90 (26.61)	11.70 (17.10)	16.45 (14.04)	4.95 (6.38)	17.57 (10.74)	27.14 (45.87)	16.19 (7.42)	37.00 (110.07)	18.08 (10.92)
Ratio of protected sex acts to total sex acts	0.70 (0.41)	0.79 (0.25)	0.66 (0.45)	0.79 (0.26)	0.59 (0.46)	0.90 (0.22)	0.82 (0.36)	0.90 (0.24)	0.90 (0.28)	0.90 (0.22)

Note. TJ = Tijuana; CJ = Ciudad Juárez. Standard deviations are reported in parentheses after the means.