Condom use within non-commercial partnerships of female sex workers in southern India

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Backg nd: Al ho gh female e o ke (FSWs) epo high le el of condom e i h comme cial e clien , pa ic la f e a ge ed HIV p e en i e in e en ion ha e been implemen ed, condom e i of en lo i h non-comme cial pa ne . The e i limi ed nde anding ega ding he fac o , ha infl ence condom e i h FSWs' non-comme cial pa ne , and of ho p og am can be de igned o inc ea e condom e i h he e pa ne . The main obec i e of hi d e e, he efo e o de c ibe FSWs' elf-epo ed non-comme cial pa ne , along i h in e pe onal fac o cha ac e i ing hei non-comme cial pa ne hip, and o e amine he fac o a ocia ed i h con i en condom e e (CCU) i hin non-comme cial pa ne hip.

Me h d : Thi d e ed da a colle ed f om c o -ec ional e ionnai e admini e ed o 988 FSWs in fo di ic in Ka na aka a e in 2006-07. We e ed bi a ia e and m l i a iable logi ic eg e ion anal i , o e amine he ela ionship be een CCU (i.e., 'al a ' compa ed o 'ne e' 'ome ime ' o 'f e en ') i h non-comme cial pa ne of FSWs (incl ding he e ponden ' h band o main cohabi ing pa ne [if no ma ied] and hei mo ecen non-pa ing pa ne [ho i nei he a h band no he main cohabi ing pa ne and i h hom he FSW had e i hin he p e io ea]) and in e pe onal fac o de c ibing he e pa ne hip, a ell a ocial and en i onmen al fac o. Weigh ing and i e me hod e e ed o acco n fo he cl e ampling de ign.

Re l : O e all, 511 (51.8%) FSWs epo ed ha ing a h band o cohabi ing pa ne and 247 (23.7%) epo ed ha ing a non-pa ing pa ne CCU i h he e pa ne a lo (22.6% and 40.3% e pec i el). In m l i a iable anal i , he odd of CCU i h FSWs' h band o cohabi ing pa ne e e 1.8-fold highe fo FSWs ho e pa ne kne he a a e o ke (adj ed odd a io [AOR]: 1.84, 95% confidence in e al[CI]: 1.02-3.32) and almo 6-fold highe if he FSW a n ma ied (AOR: 5.73, 95%CI: 2.79-11.76]. CCU i h FSWs' non-pa ing pa ne dec ea ed b 18% fo each one- ea inc ea e in he d a ion of he ela ionship (AOR: 0.82, 95%CI: 0.68-0.97).

C cl i : Thi d e ealed impo an pa e n and in e pe onal de e minan of condom e i hin non-comme cial pa ne hip of FSWs. In eg a ed i c i al and comm ni -d i en HIV/STI p e en ion p og am ha foc on gende and ed ce e o k igma ho ld be in e iga ed o inc ea e condom e i in non-comme cial pa ne hip.

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Information about the non-commercial partners of female sex workers (FSWs) in the context of HIV and other sexually transmitted infection (STI) epidemiology

Indeed, as suggested in a systematic review of studies in sub-Saharan Africa and Asia, HIV preventive interventions focusing on behaviour change are more effective at increasing condom use within commercial compared to non-commercial partnerships of FSWs [10]. The evidence for increased condom use with non-commercial partners after interventions have been implemented is not conclusive. Some studies show increases in condom use [4,11], while others do not [12-14]. Limited research has been conducted to elucidate the reasons for low condom use within non-commercial partnerships of FSWs and how this can be addressed by HIV programming.

Understanding condom use in non-commercial partnerships is complex. The sex partners of FSWs are usually categorized as commercial/paying versus non-commercial/non-paying. Non-commercial partners can include husbands, boyfriends or lovers, as well "men who have free sex" (e.g., police or others who use power or force) [15]. FSWs have varying degrees of emotional closeness, intimacy or other involvement with these partners, which may influence condom use. Condoms may be used less frequently with non-commercial partners compared to

partner that may influence CCU with non-commercial partners [1,23]. Common across the two partner groupings were the following variables: duration of the relationship; number of times had sex with the partner in a month; if the partner asks for anal sex; the partner's employment status; if the partner knows the respondent is a sex worker; and if the respondent believes her partner has sexual relationships with other women. For women with a husband or cohabiting partner, additional factors explored included: partner's age; age difference between the husband or cohabiting partner and the respondent; and the number of months stayed together in the past year. For women with a non-paying partner, additional factors included: if the respondent ever stays or lives with the partner (not necessarily in a formal cohabiting relationship); if the partner provides the respondent with economic support; if the respondent provides the partner with economic support; if the respondent is normally under the influence of alcohol during sex with the partner; and if the partner is normally under the influence of alcohol during sex with the respondent.

For each model of CCU, we also examined the impact of social and environmental factors related to the respondent. Social factors included age, marital status (married versus unmarried, including those FSWs of the *Devadasi* tradition, a form of temple-based sex work whereby women are dedicated through marriage to gods or goddesses [24-26]), age at first sex, age at first sex work and duration of sex work; environmental factors included district of residence, education (literacy), having sex work as sole income, and working environment, which was represented by type of solicitation (independent or through a middleman/pimp) as well as the place of solicitation of clients.

Statistical analysis

Statistical analysis was conducted using Stata Version 10.1 [27]. Continuous variables were categorized based on previous literature if they did not have a linear relationship with the logit of the binary outcomes [28]. In bivariate analyses, χ^2 tests were used to assess associations between social and environmental factors, and whether or not FSWs had each type of non-commercial partner, as well as associations between interpersonal, social and environmental factors and CCU. Multivariable logistic regression models were developed with CCU as the outcome, for each of the two types of partners. Inclusion into multivariable models for all potential covariates were based on significance at the P<0.10-level from bivariate analysis. Sampling weights were utilized in multiple regression models to account for the complex sampling design, using survey methods. Multicollinearity in multivariable models was assessed using the variance inflation factor (VIF) and tolerance statistics, corrected for the survey methods employed [29]. Adjusted odds ratios (AORs) and 95% confidence intervals (95% CIs) were reported for multivariable logistic regression. All *P*-values reported are two-sided.

Sample characteristics

Of the total sample of 988 FSWs, 208, 198, 369 and 213 women were recruited in Belgaum, Bellary, Bangalore and Mysore, respectively. The median age was 30 years (interquartile range: 25-35 years) and the median duration of sex work was 5 years (interquartile range: 2-10 years). Of the whole sample, 90.9% of women reported using some form of contraception for family planning (primarily female sterilization or condom use). Overall, 511/985 (51.8%) FSWs reported having a husband or cohabiting partner (with three non-response) and 247/987 (23.7%, with one non-response) reported having a non-paying partner. Of these samples, 506 FSWs had valid responses to condom use with the husband or cohabiting partner and 101 (22.6%) reported CCU with their partner; 247 FSWs had valid responses to condom use with the most recent non-paying partner and 92 (40.3%) reported CCU with their partner. Figure 1 describes the sex partnering patterns of FSWs, according to the types of partners reported by FSWs. All FSWs reported having occasional clients. The highest proportion of FSWs had both a husband or cohabiting partner and repeat clients (23.5%), followed by FSWs with only repeat clients (22.2%) and only a husband or cohabiting partner (16.7%) (Figure 1). The lowest proportion of the population had a husband or cohabiting partner and a non-paying partner (5.0%). Overall, 6.3% of FSWs had all four different types of partners and 11.3% of FSWs only had occasional clients (Figure 1).

Additional file 1 presents characteristics of FSWs according to whether or not they reported having a husband or cohabiting partner, or a recent non-paying partner with whom they had sex within the last year. Of FSWs who reporting having a husband or cohabiting partner 52.8% were currently married and 47.2% were unmarried (i.e., cohabiting). FSWs with and without a husband or cohabiting partner differed significantly in terms of district of residence. Compared to FSWs without a husband or cohabiting partner, FSWs with these partners were significantly more likely to be older when they initiated sex work, be literate, report sex work as their sole income, and have higher CCU with their most recent non-paying partner, with all repeat clients and all occasional clients. FSWs with and without a non-paying partner differed significantly in terms of district of residence. Compared to FSWs who did not have a non-paying partner, FSWs with a non-paying partner were

2 Bivariate relationships between interpersonal, social and environmental factors, and condom use[1].

	Husband or cohabiting partner			Most recent non-paying partner		
	Consistent condom use N=101	Inconsistent condom use N=405	P	Consistent condom use N=92	Inconsistent condom use N=155	P
	Proportion (N)/ Median (Mean)			Proportion (N)/ Median (Mean)		
Interpersonal						
Partner's						

Place of solicitation						
Home	17.4% (19)	26.0% (130)	0.004	26.1% (25)	29.4% (52)	0.053
Brothel	10.9% (9)	7.4% (45)		7.6% (10)	19.7% (33)	
Public places	71.7% (73)	66.6% (230)		66.4% (57)	50.9% (70)	

Bivariate relationships between interpersonal, social and environmental factors, and condom use with non-commercial partners of female sex workers in four districts in Karnataka state[1]

[1]n/a: question was not available for this type of non-commercial partner

use condoms consistently with their husband or cohabiting partner if the partner knew they were sex workers (AOR: 1.84, 95%CIs: 1.02-3.32). FSWs who were unmarried (i.e., had a main cohabiting partner rather than a husband or cohabiting partner) were significantly more likely to report using condoms consistently (AOR: 5.73 [2.79-11.76]). CCU with the non-paying partner was significantly associated with a shorter duration of the relationship (AOR: 0.82, 95% CIs: 0.68-0.97). CCU with both types of non-commercial partners was also significantly associated with district in multivariable analysis.

Discussion

The findings from this study have helped to elucidate how interpersonal characteristics of partnerships can influence condom use with non-commercial partners of

	Consistent condom use within different sexual partnerships			
	Husband or cohabiting partner		Most recent non-paying partner	
	AOR [95% CIs]	P	AOR [95% CIs]	P
INTERPERSONAL				
Age difference				
FSW older or same age	0.62 [0.22-1.73]	0.707		n/a
Male partner older (<5 years)	0.65 [0.24-1.72]	0.778		
Male partner older (5-9 years)	0.56 [0.19-1.63]	0.469		
Male partner older (10+ years)	1.0 (ref)			
Duration of relationship (years)	1.01 [0.96-1.06]	0.816	0.82 [0.68-0.97]	0.021
Ever has married or lived with partner (vs never married/lived with partner)		n/a	0.68 [0.13-3.56]	0.644
Partner asks for anal sex (vs partner does not ask for anal sex)	1.32 [0.65-2.66]	0.440	/	/
Partner knows respondent is a sex worker (vs partner does not know respondent is sex worker)	1.84 [1.02-3.32]	0.042	/	/
SOCIAL				
Marital status				
Currently married	1.0 (ref)		/	/
Unmarried	5.73 [2.79-11.76]			
Age at first sex (years)				
<15	1.0 (ref)	0.744	/	/
15+	1.12 [0.57-2.21]			
ENVIRONMENTAL				
District				
Belgaum	0.06 [0.01-0.28]	0.029	0.03 [0.00-0.05]	<0.001
Bellary	0.22 [0.10-0.52]	0.818	0.02 [0.00-0.27]	0.370
Bangalore	0.14 [0.06-0.31]	0.323	0.02 [0.00-0.15]	0.025
Mysore	1.0 (ref)		1.0 (ref)	
Literate (vs cannot read or write)	1.56 [0.84-2.89]	0.156	/	/
Place of solicitation				
Home	1.13 [0.54-2.36]	0.853	0.89 [0.39-2.01]	0.893
Brothel	1.46 [0.54-3.96]	0.507	0.70 [0.24-2.01]	0.579
Public places	1.0 (ref)		1.0 (ref)	

Multivariable (adjusted) odds ratios (AOR) and 95% confidence intervals (95%CIs): Multivariable relationships for the relationship between interpersonal, social and environmental factors and consistent condom use with non-commercial sex partners of female sex workers in four districts in Karnataka state[1,2,3]

[1]n/a: Means that the factor was not available for analysis for that type of non-commercial partner

[2] The symbol / means that the variable was not significant in bivariate analysis and thus not included in multivariable analysis

[3]Only variables that were significant for one of the two outcomes in bivariate were included in this table for brevity

women in sex work in southern India. Overall consistent condom use (CCU) with non-commercial partners was low and FSWs reported lower CCU with their husband or cohabiting partner than with their non-paying partner. Both FSWs and their non-commercial partners were found to be substantially connected to other types of partners through other sex partnerships. FSWs reported that a considerable proportion of these male partners had other sex partners. These partners included wives, FSWs or other types of female partners – both within and outside their local geographic settings (i.e., district of recruitment). These results highlight the vulnerability of FSWs to both acquisition and transmission of HIV/STIs within complex sexual networks, as well as the integral role of FSWs' non-commercial partners as bridge populations who may facilitate the transmission of HIV to female partners outside the context of sex work.

The longevity of the sexual partnerships with FSWs' non-paying partner appears to be particularly important in determining CCU, with a longer relationship duration being associated with lower CCU. A more nuanced understanding of what the duration of the relationship represents (e.g. increased trust, closeness or familiarity; decreased decision-making power or control) and how these can be addressed in HIV/STI prevention programming is needed. Although FSWs in southern India are highly economically vulnerable with few comparably well-paying employment prospects [30], factors representing the economic stability of the partner (e.g. employment status of the partner, or whether the partner provided economic support) were not significantly associated with CCU. Because the nature of non-commercial relationships is different from commercial relationships, and the economic support, if it exists, is often non-monetary, the decision to use a condom may be more influenced by interpersonal factors related to relationship intimacy (e.g., trust, emotional closeness, power or reproductive desires) than financial dependence. This is supported by studies of non-commercial partnerships of FSWs in other settings [1,31]. However, economic dependence on the male partner is associated with lower condom use in other settings [23,32] and studies of transactional sex arrangements have suggested that trade-offs within these relationships occur, such as increasing amounts of transfers of support (in terms of money, goods, gifts) in exchange for risky behaviour that is perceived as valuable to the male partner (such as sex without a condom) [23,33], even after adjusting for the duration of the relationship [23]. A better understanding of the type and amount of transfers within non-commercial partnerships of FSWs in southern India, both quantitatively and qualitatively could help to better characterize the influence of economic dependence (or co-dependence) on condom use.

While exposure to interventions has been found to be

(23% versus 40%, p=0.01). It may be more effective to design male-focused interventions specifically for other

social desirability bias [60]. However, our sample size was large, particularly for a marginalized and hidden population of FSWs, and the cluster sampling design was aimed to make the sample as representative as possible. Reported condom use was substantially lower with non-commercial rather than commercial partnerships, indicating that women may have been comfortable reporting higher-risk behaviour with these partners. At the same time, it may be more socially acceptable for women to report lower condom use with non-commercial partners, since women as well as men may associate condom use with infidelity or reduced trust. We were unable to control for fertility desires of respondents, which may affect levels of condom use with non-commercial sex partners [23]. However, since the majority of respondents reported using some kind of birth control for family planning purposes, this indicates that most women were not planning on becoming pregnant. Finally, developing questionnaires grounded in theoretical frameworks previously used in similar populations and settings could be helpful in explaining the reasons for condom use [46].

The results from this study have revealed important patterns and interpersonal determinants of condom use within non-commercial partnerships of women in sex work. Integrated structural and community-driven sexual and reproductive health and HIV/STI prevention programs that include a focus on gender and reduce social stigma surrounding sex work are needed in settings with high HIV prevalence among FSWs and their non-commercial partners.

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Addi i al file 1: Sa le cha ac e i ic f cial a d e i e al fac Sa le cha ac e i ic f cial a d e i e al fac : Sa le cha ac e i ic acc di g he e f c e cial a e f fe ale e ke (FSW) i f di ic i Ka a aka a e, i cl di g FSW ' h ba d ai c habi i g a e hei ece a a g a e (h i ei he a h ba d he ai c habi i g a e).

Ack ledge e
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