

Prevalence and Correlates of Non-Disclosure of HIV Serostatus to Sex partners among HIV-Infected Female Sex Workers and HIV-infected Male Clients of Female Sex Workers in India

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Abstract This study examines non-disclosure of HIV serostatus to sex partners among HIV-infected adults involved with transactional sex in Mumbai, India. Surveys were conducted with HIV-infected female sex workers ($n = 211$) and infected male clients ($n = 205$) regarding HIV knowledge, awareness of sex partners' HIV serostatus, alcohol use, transactional sex involvement post-HIV diagnosis and non-disclosure of HIV serostatus. Gender-stratified multiple logistic regression models were used for

analysis. Non-disclosure of one's serostatus to all sex partners was reported by almost three-fifths of females and two-fifths of males. Predictors of non-disclosure included lack of correct knowledge about HIV and no knowledge of sex partners' HIV serostatus. Among females, recent alcohol consumption also predicted non-disclosure. Among males, 10 + paid sexual partners in the year following HIV diagnosis predicted non-disclosure. Secondary HIV prevention efforts in India require greater focus on HIV disclosure communication and integrated alcohol and sexual risk reduction.

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Resumen Este estudio en adultos VIH positivos implicados en relaciones sexuales remuneradas en Mumbai (India) examinó la prevalencia de no revelación del estado serológico a parejas sexuales. Se entrevistó a 211 trabajadoras sexuales infectadas por el VIH y a 205 clientes de sexo masculino también infectados por el VIH en relación a educación sanitaria sobre el VIH, conocimiento del estado serológico de todas sus parejas sexuales, consumo de alcohol, número de relaciones sexuales remuneradas tras el diagnóstico del VIH, así como la no revelación del estado serológico. Se utilizaron modelos de regresión logística multivariada estratificados por sexo. La no revelación del estado serológico ocurrió en 3/5 de las mujeres y 2/5 de los hombres estudiados. Los predictores de no revelación fueron una escasa educación sanitaria sobre el VIH y el no conocimiento del estado serológico de la pareja sexual, así como el consumo reciente de alcohol entre las mujeres, y haber tenido >10 relaciones sexuales remuneradas en el año posterior al diagnóstico del VIH entre los hombres. Para la prevención secundaria del VIH en India será necesario un correcto abordaje de la revelación del estado serológico a parejas sexuales y una reducción del consumo de alcohol y de las prácticas sexuales de riesgo.

Keywords HIV serostatus non-disclosure · Female sex workers · Male clients · Alcohol use · India

Introduction

Disclosure of HIV serostatus to sex partners is viewed as a social and legal responsibility for HIV-infected individuals, particularly in the absence of condom use [1]. In many developing countries, high prevalence of non-disclosure, ranging from 17 to 86 % [2–7], is considered to be an important factor promoting transmission of HIV to sex partners [7]. Disclosure to sex partners, on average, occurs less in developing countries than in the developed world (49 vs. 79 %, respectively) [7].

Globally, research on HIV serostatus disclosure has primarily focused on HIV-infected adult men and women within HIV testing and treatment clinic settings [1, 2, 8–11], or to an extent among community samples of HIV-infected injecting drug users [12, 13] and men who have sex with men [14, 15]. Our search for literature suggests that little attention has been given to HIV serostatus disclosure to sex partners among HIV-infected female sex workers (FSWs) or HIV-infected male clients of FSWs. Studies conducted among married HIV-infected adults have found that individuals who are older [15, 16], with higher educational status [11, 17] and have no knowledge of their sex partners' HIV serostatus [18–20] are more likely not to disclose their HIV serostatus to their spouses. The research on this issue in India as of early 2012 has focused specifically on women. It found that greater fear of stigma, discrimination, disgrace to family and self, and a sense of futility are factors associated with increased risk for non-disclosure [8, 21].

In this study, we examine the prevalence of non-disclosure of HIV status to sex partners among HIV-infected individuals involved in transactional sex in Mumbai, India. In addition, we evaluate whether HIV knowledge, sexual partnerships and alcohol use are associated with non-disclosure of serostatus. Such research is particularly relevant for India, given the prominent role of transactional sex involvement in the Indian HIV epidemic as well as the high number of HIV sero-discordant couples in the general population [22–24].

Methods

Recruitment and Enrollment

The Transactional sex and Alcohol: Justification for a research initiative (TAJ) research team conducted surveys on HIV-infected FSWs and HIV-infected male clients of

FSWs in Mumbai, India (N = 416) from November 2008 to February 2009. Female participants (n = 211) were recruited from the ASHA Center, a community based organization in Mumbai, managed and run by a group of FSWs who provide support and linkage to care for HIV-infected sex workers and HIV-infected clients. The ASHA Center is associated with the HIV Positive People's Network in Maharashtra (NMP+), a non-governmental organization committed to the treatment and care of HIV-infected people in India. Male participants (n = 205) were recruited from three sites also affiliated with NMP+: the District Level Network Registry, a sub-network system that primarily reaches HIV-infected men and their wives; the HIV Center at the King Edward Memorial Hospital; and the ASHA Center.

HIV-infected outreach workers at the respective agencies reviewed client lists and selected every fifth individual from the list to be approached and screened for study participation. Those contacted were asked to come to their respective recruitment sites for eligibility screening for the research study. A total of 326 women and 418 men were contacted for study recruitment, of which 246 (75 %) women and 372 (89 %) men came for screening. Of these, 216 women and 210 men met the study's eligibility criteria: 18 years or older; HIV-infected; reporting sex trade involvement in the past year (i.e., selling sex for women, purchasing sex for men); and penile-vaginal or anal sex in the past 30 days. HIV infection was confirmed by medical records brought by the participants. Of those eligible for the study, 5 women and 5 men were unwilling to participate, providing the final sample size of 211 female and 205 male participants. Further details regarding recruitment have been previously reported [25].

Human Subjects Protections

This study was conducted as a partnership among Boston Medical Center, Boston University, Population Council, and the Network of Maharashtra by People Living with HIV/AIDS (NMP+). Procedures for this study were reviewed and approved by the institutional review boards of Boston University Medical Campus, NMP+ and the Indian Council of Medical Research, Government of India.

Assessment

Instruments were developed in English, translated into Hindi and then reviewed by a study investigator fluent in both languages. Discrepancies were resolved in consultation with the US investigators. Participants received a 45 min interviewer-administered survey in Hindi assessing demographics, alcohol use, HIV serostatus disclosure, sex risk behaviours, and health status. Participants were

provided with 100 rupees (\$2.50) as compensation for their time in this study.

Measures

Socio-demographic Covariates

A questionnaire was used to collect information on age, gender, marital status, place of origin, years of education, and employment status. Participants were also asked about their sexual partnerships in the past year via assessments on relationships with spouses, non-paying/unpaid sex partners, and paying/paid sex partners. These data were collected based on items modified or taken from the Demographic and Health Survey [23] and Population Council surveys [26].

Level of Transactional Sex Post-HIV Diagnosis

Transactional sex involvement post-HIV diagnosis was assessed by measures created for this study. Women were asked whether they were involved in daily transactional sex after knowing their HIV serostatus (yes/no). Men were asked whether they had 10 or more sex partners in a year after knowing their HIV serostatus (yes/no).

Alcohol Use

Two alcohol measures were examined in the analysis of non-disclosure of HIV serostatus: heavy alcohol use (yes vs. no) and any alcohol use (yes vs. no). The alcohol use questions in the survey were asked in various contexts in the past week, 30 days and past year. Daily consumption in the prior 7 days was collected using a validated calendar method, the Timeline Follow Back (TLFB), and was categorized as heavy, moderate, or abstinent [27]. The “heavy” category was derived from the National Institute on Alcohol Abuse and Alcoholism definition of amounts that risk consequences (>14 drinks per week or >4 drinks on a single occasion for men, and >7 per week or >3 on a single occasion, for women) [28].

HIV Knowledge

Respondents who answered each of the following items correctly were considered to have comprehensive and correct knowledge about HIV: a condom during sex generally lowers risk for HIV (correct response: agree); one can get HIV by sharing food utensils with an HIV-infected individual (correct response: disagree); HIV can be transmitted by a person who doesn’t show any symptoms of HIV or AIDS (correct response: agree); one can get HIV from mosquitoes (correct response: disagree) [29].

Knowledge of Partners’ HIV Serostatus

Participants were asked about their knowledge of the HIV serostatus of their sex partners, by sex partner type (spouse, non-paying/non-paid partners [other than spouse], paying/paid partners). Awareness of the spouse’s HIV status and any of the sex partners’ HIV serostatus (past 90 days) was determined from these questions.

Non-disclosure of HIV Serostatus

Non-disclosure of HIV serostatus was assessed based on the following question: “Thinking about all of the times that you’ve had sex since learning that you are HIV-positive, did you tell all of those people before you had sex with them that you have HIV?” Response categories were “Yes-I told all, Not all but some, No-no one.” Responses that indicated having disclosed to “no one” since becoming aware of their HIV-positive status were classified as non-disclosure. Responses that included having disclosed to some or all sex partners were classified as disclosure.

Data Analysis

All analyses described above were conducted separately for male and female participants due to the distinctly different profiles of these study populations [25]. Descriptive statistics (e.g. means, standard deviations, proportions) were used to describe socio-demographic characteristics, sex partnerships and level of transactional sex involvement post-HIV diagnosis, alcohol behaviors, HIV knowledge and knowledge of sex partners’ HIV serostatus, for the total sample and by disclosure status. Chi-square and Student’s *t* tests were performed as appropriate to further describe differences between disclosure status groups on the above described variables.

Identification of Factors Associated with Non-disclosure of HIV Serostatus

Non-disclosure of one’s HIV serostatus to all sex partners since awareness of HIV infection was the primary outcome of this analysis. Multiple logistic regression models adjusted for demographics (age, education, income) and time since HIV diagnosis in order to assess whether the following variables were associated with non-disclosure: married (yes/no), had sex with any non-paying/unpaid partners in the past year (yes/no), level of transactional sex involvement post-diagnosis (daily transactional sex involvement for FSW and 10+ transactional sex partners in a year for males), alcohol use (any alcohol use in past 30 days and heavy alcohol use at least once in past 30 days), correct knowledge of HIV transmission, and

knowledge of past 90 day sex partners' HIV serostatus. As the analysis looking at predictors of non-disclosure was exploratory, separate models were fitted for each independent variable of interest. The cell value for non-disclosure among not currently married individuals was 0, hence, models do not adjust for this factor. To avoid potential collinearity, prior to model creation we conducted Spearman correlation analyses for all independent variables and covariates and verified that no pair of variables had a correlation coefficient greater than 0.40. All analyses utilized two-sided tests and a significance level of 0.05. All analyses were performed using STATA (version 11.0).

Results

Sample Characteristics

Demographic characteristics of the participants have been reported elsewhere [25, 30]. The age range of female participants (22–49 years) and males (20–49 years) was similar. A minority of females (8 %) and males (37 %) reported that they were currently married.

Non-disclosure of HIV Serostatus

A total of 122/211 women (58 %) and 84/205 men (41 %) did not disclose their HIV serostatus to any of their sex partners (Table 1). More than 90 % (194/211) of women and 70 % (144/205) of men indicated that they were not aware of the HIV serostatus of any of their partners with whom they had engaged in sex over the past 90 days. Of the currently married sample, 39 % (7/18) of women and only 1 % (1/76) of men had not disclosed their HIV serostatus to their spouse. About 36 % (28/76) of married men and 78 % (14/18) of married women reported that they do not know the HIV serostatus of their married partner. While some were aware of their spouse's HIV serostatus, most non-spousal partners' serostatus was unknown.

Among women, there were no significant differences in socio-demographic and sexual behavior characteristics between those who did not disclose their HIV serostatus to any sex partners and those who disclosed to at least one partner (Table 2). Among those who did not disclose their HIV serostatus, about half of the women (48 %) reported alcohol use in past 30 days, compared to only 26 % of those who disclosed HIV serostatus (χ^2 statistic = 10.2, $p < 0.01$). Having correct knowledge about HIV was more common in women who did disclose their HIV serostatus (35 %) compared to the 10 % with correct knowledge about HIV among those who did not disclose their status (χ^2 statistic = 16.7, $p < 0.01$).

Among men, non-disclosers were younger (30 [SD = 4.2] vs. 34.5 years [SD = 5.6]; t statistic: 5.6, $p < 0.01$) (Table 2). A greater proportion of men who did not disclose their HIV serostatus to any sex partner reported sex with 10+ partners after knowing their HIV serostatus versus those who disclosed HIV serostatus (21 vs. 10 %, χ^2 statistic = 5.0, $p = 0.02$). Having correct knowledge about HIV was also more common in men who did disclose their HIV serostatus (26 %) compared to the 4 % with correct knowledge who did not disclose their status (χ^2 statistic = 17.4, $p < 0.01$).

Factors Associated with HIV Disclosure to Sex Partners

In the multiple logistic regression analyses among women, the following factors were significantly associated with non-disclosure to all sex partners: past year sex with unpaid sex partners (adjusted odds ratio [aOR] = 2.6, 95 % confidence interval [CI] = 1.1–6.4); past 30 day alcohol use (aOR = 2.8; 95 % CI = 1.5–5.3); poor HIV knowledge (aOR = 5.9, 95 % CI = 2.7–13.1); and lack of knowledge of sex partners' HIV status (aOR = 4.6, 95 % CI = 1.5–14.4) (Table 3).

In the multiple logistic regression analyses among men, the following factors were significantly associated with non-disclosure to all sex partners: having 10+ paid sex partners in the year subsequent to HIV diagnosis

Table 1 Proportion of HIV-infected FSWs and HIV-infected male clients of FSWs who had not disclosed their HIV-status to sex partners and proportion who did not know their partners' HIV status

	Women (N = 211)		Men (N = 205)	
	n (%)	95 % CI	n %	95 % CI
Not disclosed HIV status				
To any sex partner, ever	122 (57.8)	51.1–64.5	84 (41.0)	34.2–47.8
To Spouse, ¹ ever	7 (38.9)	17.3–64.3	1 (1.3)	0–7.1
No knowledge of sex partners' HIV status,				
About any sex partner in the past 90 days	194 (91.9)	88.2–95.6	144 (70.2)	63.9–76.6
About Spouse ¹	14 (77.8)	56.5–99.1	28 (36.0)	24.9–47.1

¹ Among currently married (n = 18 for women; n = 76 for men)

Table 2 Demographics, sex and alcohol behaviors, HIV knowledge, and knowledge of HIV status of partners, among Indian HIV-infected FSWs ($N = 211$) and HIV-infected male clients of FSWs ($N = 205$), stratified by disclosure of HIV-status to sex partners

Characteristics	Women			Men		
	Disclosure ($N = 89$) % (n) or Mean (SD)	No disclosure ($N = 122$) % (n) or Mean (SD)	p value (test statistic) [§]	Disclosure ($N = 121$) % (n) or Mean (SD)	No disclosure ($N = 84$) % (n) or Mean (SD)	p value (test statistic) [§]
Social and demographic characteristics						
Age (years)	30.7 (5.1)	30.5 (4.9)	0.77 (0.18)	34.5 (5.6)	30.4 (4.2)	<0.01 (5.61)
No formal education	74.2 (66)	81.2 (99)	0.22 (1.47)	13.2 (16)	8.3 (7)	0.2 (1.19)
Income, past month (in Indian rupees) (1 US\$ = 45 rupees)	3271.9 (1670.5)	2986.3 (2072.2)	0.29 (1.07)	5101.7 (2242.1)	4554.6 (1551.6)	0.06 (1.93)
Currently married	12.4 (11)	7.4 (9)	0.22 (1.49)	59.5 (72)	4.8 (4)	<0.01 (63.69)
Years since married ^a	9.7 (4.1)	11.6 (5.7)	0.42 (−0.82)	10.8 (5.5)	12.5 (4.8)	0.55 (−0.61)
Months since HIV diagnosis	5.2 (5.9)	6.6 (10.6)	0.27 (−1.11)	29.5 (37.6)	27.1 (34.9)	0.63 (0.48)
Sexual partnerships						
Sex with married partner, past year ^a	81.8 (9)	100 (9)	0.18 (1.82)	98.6 (71)	100 (4)	0.81 (0.06)
Sex with non-paying (/unpaid) sex partner, past year	9.0 (8)	20.5 (25)	0.02 (5.16)	20.7 (25)	26.2 (22)	0.35 (0.86)
Level of transactional sex involvement						
Daily transactional sex involvement after receiving HIV diagnosis (FSW only)	51.7 (46)	46.7 (57)	0.47 (0.51)			
10 + paid partners in the year subsequent to HIV diagnosis (clients only)				10.1 (12)	21.4 (18)	0.02 (5.03)
Alcohol behaviors						
Any alcohol use, past 30 days	25.8 (23)	47.5 (58)	<0.01 (10.24)	63.6 (77)	59.5 (50)	0.55 (0.36)
Heavy alcohol use ^b , past 7 days	22.5 (20)	27.9 (34)	0.37 (0.79)	45.5 (55)	40.5 (34)	0.48 (0.50)
HIV Knowledge						
Has correct knowledge about HIV transmission ^c	34.8 (31)	11.5 (14)	<0.01 (16.73)	25.6 (31)	3.6 (3)	<0.01 (17.42)
Knowledge of HIV status of partners						
Knows spouse's HIV status ^a	27.3 (3)	11.1 (1)	0.37 (0.81)	64.8 (46)	50.0 (2)	0.55 (0.36)
Has knowledge of any of the sex partners, past 90 days	13.5 (12)	4.1 (5)	0.01 (6.12)	47.1 (57)	4.8 (4)	<0.01 (42.54)

^a Among those currently married respondents (Female: Disclosed $N = 11$, Not disclosed $N = 9$, Male: Disclosed $N = 72$, Not disclosed $N = 4$)

^b Heavy alcohol use is defined as >3 drinks in a day or >7 drinks/week for women and >4 drinks in a day or >14 drinks/week for men

^c Correct knowledge about HIV: Those who correctly answered all statements (see methods)

[§] Chi-square test was used for categorical variables and T test was used for continuous variables

(aOR = 3.1, 95 % CI = 1.3–7.3), poor HIV knowledge (aOR = 12.3, 95 % CI = 2.7–55.1), and lack of knowledge of sex partners' HIV status (aOR = 13.9, 95 % CI = 4.7–41.6) (Table 3).

Discussion

In India, non-disclosure of HIV serostatus to sex partners among both HIV-infected FSWs and HIV-infected clients of FSWs is exceedingly common, with more than half of

women and two-fifths of men reporting that they had not previously disclosed their HIV serostatus to any of their sex partners. These findings are consistent with previous studies on disclosure of HIV serostatus among HIV-infected adults in India which revealed that 20–60 % of infected individuals do not disclose to sex partners. No previous studies in India specifically, and few internationally, have assessed FSWs' and male clients' disclosure of HIV status to sex partners [7, 8, 21]. In our study, married participants reported less non-disclosure than the overall sample. While increased disclosure among married participants could be due to the

Table 3 Associations between sexual behavior, alcohol use, HIV knowledge, and knowledge of HIV-status of sex partners with non-disclosure of HIV status to all sex partners, among HIV-infected FSWs (N = 211) and HIV-infected Male Clients of FSWs (N = 205)

Characteristics	Women			Men		
	% Non-disclosure	Crude OR (95 % CI)	Adjusted [#] OR (95 % CI)	% Non-disclosure	Crude OR (95 % CI)	Adjusted [#] OR (95 % CI)
<i>Sexual partnerships</i>						
Any non-paying (unpaid) sex partners, past year						
No	54.5	Referent	Referent	39.2	Referent	Referent
Yes	75.7	2.6 (1.1–6.1)**	2.6 (1.1–6.4)**	46.8	1.4 (0.7–2.6)	1.1 (0.5–2.3)
<i>Level of transactional sex involvement</i>						
Daily transactional sex involvement after knowing one's HIV status (FSW only)						
No	60.2	Referent	Referent			
Yes	55.3	0.8 (0.5–1.4)	0.8 (0.5–1.5)			
10+ paid partners in the year subsequent to HIV (clients only)						
No				38.2	Referent	Referent
Yes				60.0	2.4 (1.1–5.4)**	3.1 (1.3–7.3)**
<i>Alcohol use</i>						
Any alcohol use, past 30 days						
No	49.2	Referent	Referent	43.6	Referent	Referent
Yes	71.6	2.6 (1.4–4.7)**	2.8 (1.5–5.3)**	39.4	0.8 (0.5–1.5)	1.0 (0.5–1.8)
Heavy alcohol use, past 7 days						
No	56.1	Referent	Referent	43.1	Referent	Referent
Yes	63.0	1.3 (0.7–2.5)	1.3 (0.6–2.4)	38.2	0.8 (0.5–1.4)	0.9 (0.5–1.7)
<i>HIV knowledge</i>						
Has correct knowledge about HIV transmission						
Yes	31.1	Referent	Referent	8.8	Referent	Referent
No	65.1	4.1 (2.0–8.4)***	5.9 (2.7–13.1)***	47.4	9.3 (2.7–31.6)***	12.3 (2.7–55.1)***
<i>Knowledge of HIV status of partners</i>						
Has knowledge of spouse's HIV status						
Yes	25.0	Referent	Referent	4.2	Referent	Referent
No	57.1	4.0 (0.3–48.7)	3.7 (0.3–48.2)	7.4	1.8 (0.24–13.9)	2.3 (0.2–20.5)
Has knowledge of any of the sex partners, past 90 days						
Yes	29.4	Referent	Referent	6.6	Referent	Referent
No	60.3	3.6 (1.2–10.7)**	4.6 (1.5–14.4)**	55.6	17.8 (6.1–51.7)***	13.9 (4.7–41.6)***

[#] Model adjusted for age, education, income, and number of months since HIV was diagnosed

Dependent variable: non-disclosure of HIV-status to all sex partners

OR Odds ratio; CI Confidence interval

*** $P < 0.001$, ** $P < 0.05$

intimate aspect and longer duration of the marital relationship (sample average of 25 months), there was nevertheless a gender gap in this sample subset. Non-disclosure by men to their wives was almost non-existent (1 %), yet 39 % of married FSWs did not disclose their HIV status to their spouse. This discrepancy in rates of disclosure could be due to a variety of reasons. These include a much higher duration since diagnosis for men compared to women, allowing for greater time for disclosure to occur, as well as differential gender dynamics related to disclosure, such that men may be less fearful of repercussions from disclosure relative to women.

In this study, low awareness of the HIV serostatus of any sex partners was associated with non-disclosure, a scenario that was pervasive among study participants. Fewer than 30 % of men and 10 % of women indicated knowledge of the HIV serostatus of any sex partner they had in the past 90 days. Given the strikingly high number of sex partners that the FSWs in particular report in this time frame in this same study (median = 600 partners in the past year) [30] not having knowledge of the HIV serostatus of any partner is remarkable. These findings highlight the stark absence of discussion of HIV serostatus within sexual relationships in India, even among this very high risk population of HIV-

infected FSWs and male clients. The greater number of non-disclosure reports among FSWs relative to male clients is not surprising, given the potential financial costs of HIV disclosure for the women (e.g., losing clients or money).

The odds of non-disclosure of HIV serostatus was higher among male clients who had sex with a greater number of partners, those who have incorrect knowledge about HIV, and those who do not know about sex partners' HIV serostatus. Similarly, the odds of non-disclosure about HIV serostatus was higher among those FSWs who consume any alcohol, have incorrect knowledge about HIV, do not know about sex partners' HIV serostatus and have sex with unpaid/casual partners. Such findings are consistent with growing evidence from other countries indicating the lack of correct knowledge about HIV and not knowing sex partners' HIV-positive status being significant factors associated with non-disclosure of HIV serostatus [6, 18, 20]. However, there are gender-specific differences in disclosure, and the male clients, in contrast to the FSWs, were more likely to disclose their HIV serostatus to sex partners. As noted above, these results are consistent with the imbalance in sexual power that is often present between men and women, and particularly between FSWs and male clients.

This study has some methodological limitations. First, the sample was drawn from individuals linked to agencies serving HIV-infected FSWs and men in a single metropolitan area (Mumbai), potentially limiting generalizability of findings to all FSWs and male clients of FSWs in India. However, as Mumbai is an area with greater access to HIV education and services within India, one would expect from a geographical perspective that knowledge about HIV and accordingly, disclosure about HIV serostatus among this group would be greater than other locales in India. Secondly, we used a dichotomous measure of disclosure status of HIV to sex partners obtained from a single question asked in the survey that does not fully capture the complexity of the issues and circumstances of disclosure to sex partners. It is unclear from these data the motivations for such disclosure generally and by type of partner. In order to answer some of these questions, further in-depth studies using both qualitative and quantitative approaches with more detailed measures of disclosure (to various partner types, timing of disclosure, reasons for disclosure) are needed. Additionally, much of the data in this study came from self-report and is thus subject to both social desirability and recall biases. Use of service providers linked with research staff was designed to increase comfort and reduce social desirability bias; use of shorter time-frames for recall was designed to reduce recall bias. One would expect that such bias would result in an underestimation of the outcome non-disclosure, thus the important

implications of this study are still valid. Finally, the data in this study were cross-sectional and observational, with resulting limitations in inferring causation from the associations found. Nevertheless, these data emphasise the extent to which lack of disclosure of HIV serostatus remains an important issue.

Conclusion

HIV-infected FSWs and HIV-infected male clients of FSWs in Mumbai, India demonstrate the common scenario of non-disclosure of HIV serostatus to sex partners. More than half of FSWs and two-fifths of male clients did not disclose their HIV status to any sex partner. Consistent with previous research, the odds of non-disclosure is higher for those individuals with poorer HIV knowledge and not having knowledge of serostatus of their sex partners. Additionally, FSWs reporting alcohol use and those with non-paid partners have higher odds of non-disclosure of HIV serostatus; male clients reporting higher numbers of sex partners have higher odds of non-disclosure of HIV serostatus. Disclosure is a complex decision for HIV-infected persons and may be influenced by a fear of losing clients or sex in paid or unpaid relationships. Secondary HIV prevention programs in India and perhaps in other settings that seek to increase disclosure of HIV serostatus to sex partners may benefit from several factors that are amenable to intervention: improving basic HIV knowledge, reducing alcohol consumption, reducing the number of different sex partners and seeking knowledge about the serostatus of one's partner as a means to increase disclosure of HIV serostatus to sex partners.

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