

Change over Time in Police Interactions and HIV Risk Behavior Among Female Sex Workers in Andhra Pradesh, India

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Abstract:

Little is known about the effectiveness of intervening to change interactions between female sex workers (FSWs) and police in order to reduce HIV risk. Using data collected in the context of a HIV prevention intervention that included components to change policing practices (n = 1,680), we examine the association of FSWs' reports of negative police interactions and HIV risk behaviors and whether these associations varied over time. Results show negative police interactions declined significantly over time. FSWs who had more than one negative police interaction were more likely to experience STI symptoms (AOR 2.97 [95 % CI 2.27–3.89]), inconsistently use condoms with their clients (AOR 1.36 [95 % CI 1.03–1.79]), and accept more money for condomless sex (AOR 2.37 [95 % CI 1.76–3.21]). Over time, these associations were stable or increased. Even where interventions have reduced the number of police incidents experienced by FSWs, stakeholders in HIV prevention must remain vigilant in challenging these incidents.

Se sabe poco sobre la eficacia de las intervenciones que intentan de cambiar las interacciones entre las trabajadoras sexuales y oficiales de la policía, con el fin de reducir el riesgo de VIH. Utilizando datos recogidos como parte de una intervención de prevención del VIH que incluía componentes para cambiar las prácticas policíacas (n = 1680), se analiza la asociación de los reportes de trabajadores sexuales de interacciones negativas con oficiales de la policía y los comportamientos de alto riesgo de VIH; además, si estas asociaciones varían tras tiempo. Los resultados muestran que las interacciones negativas con oficiales de la policía disminuyeron significativamente tras tiempo. Respondientes que tenían más de una interacción negativa con la policía eran más propensos a experimentar síntomas de ITS (AOR 2,97 [95 % CI: 2,27 a 3,89]), a no usar condones con sus clientes (AOR 1,36 [95 % CI: 1,03 a 1,79]), e a aceptar más dinero para el sexo sin condón (AOR 2,37 [95 % CI: 1,76 a 3,21]). Tras el tiempo, estas asociaciones se mantuvieron estables o aumentaron. Aun cuando las intervenciones se han reducido el número de incidentes policíacas experimentados por los trabajadores sexuales, toda gente interesada en la prevención del VIH debe permanecer vigilante en desafiar estos incidentes.

Keywords: Female sex workers | Police | Sexual risk | HIV | Structural intervention | Community mobilization

Article:

Introduction

Recent work on the social contexts of HIV risk for female sex workers (FSWs) has examined the role of police and law enforcement, particularly in areas of the world where sex work is criminalized [1, 2]. Laws relating to sex work may be ambiguous, allowing considerable police discretion regarding whom to arrest and under what charges. This discretion may make FSWs vulnerable to exploitation by police as well as clients and coworkers [1]. In India, for example, although sex work per se is not illegal for adults, most of the activities surrounding sex work are illegal, including: running a brothel, receiving financial support from the earnings of prostitutes, assisting others to become prostitutes, and soliciting business in public places [3]. Sex workers are arrested for violations of these laws, as well as laws about public nuisance [3].

For women working as sex workers, experiences with police have been linked to HIV sexual risk. In a number of global settings, FSWs report having to bribe police with sex, money, or other capital to avoid arrest [2–5]. If FSWs are in possession of condoms, police may take them away or use the condoms as proof of sex work; this threat makes it less likely that FSWs will carry condoms [6, 7]. Further, in attempts to avoid these types of interactions with police, FSWs may move to venues that are more remote, making FSWs harder to reach with preventive services and potentially increasing their vulnerability to violence at the hands of clients [7–11]. In diverse settings including China [12] and South Africa [6], arrest and lack of police protection from violence have been associated with FSWs' HIV risk.

Recent research has begun to examine the different types of interactions between FSWs and police [1], but few published studies [3, 13] have discussed the effectiveness of intervening to change these interactions to reduce HIV risk. The current paper examines data collected from FSWs over several years in the context of a long-standing community-led structural intervention for HIV prevention in Andhra Pradesh. The intervention included components intended to reduce negative police interactions. The primary goals of this paper are (1) to assess whether, in the context of the intervention, FSWs reports of negative interactions between police and FSWs declined over time, and (2) whether any association between FSWs' reports of negative police interactions and HIV risk behaviors varied over time.

Setting

This study was conducted in Rajahmundry, a semi-urban area (population 478,199 as of the 2011 Indian census) in the East Godavari District of Andhra Pradesh state in southern India. Andhra Pradesh is among the states experiencing the highest impact of HIV/AIDS [14]. In the context of the region's low literacy, low social status, and lack of economic opportunities for women, sex work may be one of few options for survival [15]. For FSWs, stigmatization, disempowerment, and socioeconomic marginalization contribute to their vulnerability to HIV [16]. Among FSWs in Andhra Pradesh, HIV prevalence has been estimated to be as high as 16 % [17]. Since late

2004, a community-led structural intervention has been working in Rajahmundry to prevent HIV among FSWs by providing treatment for sexually transmitted infections (STIs), promoting normative change in health behaviors, decreasing stigma, and empowering FSWs through community mobilization [3, 18]. The data analyzed in this paper were collected as part of a larger research study, Project Parivartan, which uses a multi-methods strategy to understand the implementation and impact of the community-led structural intervention.

As described in more detail elsewhere [3], at the beginning of the intervention, FSWs were recruited and trained to work as Social Change Agents (SCAs), involving both peer education and community organizing responsibilities. SCAs implement many traditional behavior-change intervention strategies: distributing condoms to sex workers, bringing peers to the NGO-sponsored STI clinics and drop-in centers for services, and providing general health education. SCAs were also part of strategies aimed at the structural components of FSW's HIV risk, including receiving training and support to set up sex worker-led community-based organizations [19]. Members of the CBOs learned a variety of skills, including holding monthly meetings, logging activities, bookkeeping, and conducting elections for office bearers.

In the initial years of the intervention, the intervention's police advocacy efforts were made up of 'sensitization' meetings with local police officials. The meetings focused on challenging stigmatized ideas about sex work and suggesting ways that police could assist in HIV prevention. However, FSWs continued to report problems with physical violence and arrests by police [3]. A few years into the intervention, the intervention team developed a crisis intervention team as a more formal and directed strategy to address police-FSW interactions: development of a Crisis Intervention Team (CIT). The CIT included intervention staff, SCAs, lawyers, human rights activists, politicians, government officials, and members of the media. The team used three approaches: [1] collective action and legal literacy to empower FSWs to challenge police action they considered improper; [2] a rapid response mechanism to immediately engage diverse CIT members to influence the police; and [3] encouragement of FSWs to file court cases if they were arrested, fined, or forced to pay bribes [20]. As a result of the intervention's advocacy and CIT teams, some of the higher levels of the police administration indicated that police should no longer be engaging in certain forms of harassment of sex workers, including confiscating condoms. In order to reflect the difference between early intervention efforts regarding policing (e.g., sensitization meetings) and later efforts (e.g., functioning Crisis Intervention Team), for the purposes of this analysis we divide the three cross-sectional rounds of data collection into early stage (Rounds 1 and 2, 2006 and 2007) to full implementation (2009–2010).

Methods

Data Source

Data for this analysis came from Project Parivartan, which investigated the implementation and impact of a community mobilization intervention for HIV prevention among FSWs in the Rajahmundry area of East Godavari, Andhra Pradesh [18]. We analysed cross-sectional survey data collected at three time points: April to June 2006 (n = 812), March to May 2007 (n = 673), and November 2009 to February 2010 (n = 850). To be eligible for the study, participants had to be female, at least 18 years old, and report having exchanged sex for money at least once in the

12 months prior to the survey. For the current analysis, we restricted the sample to respondents who participated in only one round of the cross sectional survey (n = 1,717). Another 37 respondents were missing data on one or more study variables and were excluded from analyses, resulting in an analytic sample of 1,680 FSWs.

The recruitment and data collection methods have been discussed in detail elsewhere [18, 21], but in brief, participants were recruited via respondent-driven sampling for each round of data collection. Accordingly, data collection began with five initial participants (“seeds”), who were selected to represent diverse groups of FSWs. Following their interviews, these seeds were given three coupons to distribute to other eligible FSWs in their social networks. Subsequent participants who met the eligibility criteria and came into the study with a coupon were then given three coupons to recruit members of their social networks. This process of recruitment waves continued until the predetermined sample size was achieved. For each round of data collection, there were a high number of recruitment waves, evidence that the respondent driven sampling method resulted in adequate coverage of the FSWs population in the study area [22].

After participants provided informed consent, a trained interviewer conducted the interview in the local language (Telugu), lasting about 90 min. Participants received modest monetary incentives for their own completed interview and for recruiting other FSWs into the study. This research was approved by the Institutional Review Boards at American University and at Duke University, the Human Investigations Committee at Yale University, and the VHS-YRG Care Medical Centre Institutional Review Board in Chennai, India.

Study Variables

Police Interactions

We examine five negative police interactions reported by FSWs, each dichotomous (yes/no). Had sex with police to avoid trouble, gave gifts to police to avoid trouble, police took condoms away, experienced a workplace raid, and was arrested were based on questionnaire items which asked whether the respondent had experienced each event in the 6 months prior to interview. We also created a tally of the number of different types of interactions reported, which was collapsed to three categories for a summary measure of negative interactions with police: none, 1 type reported, and 2 or more types reported.

Demographic and Sex Work Characteristics

We also examine and control for characteristics that may be related to FSWs’ interactions with police and their HIV risk behaviors. Age was grouped into three categories (18–29, 30–39, 40 and older) and age at start of sex work was grouped into four categories (began sex work at younger than 18 years old, 18–29 years old, 30–39 years old, 40 years old or older). Venue reflects respondents reports of where they engaged in sex work most recently (brothel, street, lodge or hotel, home, highway, agriculture or other settings, or multiple venues). Sex work venue is of importance because some venues may make FSWs more visible to police. Number of clients in the past 7 days was measured continuously and collapsed into a dichotomous variable for high frequency of sex trades (10 or fewer clients/11 or more clients) based on preliminary

sensitivity analyses that suggested this was a natural split for predictive effects. Survey round was collapsed to capture the roll-out of intervention components that addressed police and policing practices; Rounds 1 and 2 (2006 and 2007) were grouped together, reflecting the early stages of policing components, and Round 3 (2009–2010) reflected full implementation of policing components.

Indicators of HIV Sexual Risk Behavior

The three dichotomous outcomes of the current study are indicators of HIV sexual risk behavior among FSWs. For STI symptoms (yes/no), respondents who reported any of six vaginal/anal STI symptoms (abdominal pain not related to diarrhea or menses, foul smelling vaginal discharge, pain while urinating, genital ulcers/sores, swelling in groin area, or itching) in the 6 months prior to the interview were coded as STI symptomatic. Although this method of syndromic assessment provides limited sensitivity and specificity for STI diagnosis, it is often used in settings without diagnostic facilities [23, 24]. Inconsistent condom use (yes/no) was based on questionnaire items asking respondents whether they used a condom with clients in the past 7 days. Questionnaire items included: “Overall in the past 7 days, about how often did you use condoms with your [regular/occasional] clients? Never, Rarely, Sometimes, Usually, Always, Don’t Know,” “In the last week, have you had sex with a [regular/occasional] client without a condom? No, Yes, Don’t Know,” “When was the last time you accepted more money from a client to have sex with him without a condom? In the last 7 days, In the last 30 days, In the last 6 months, In the last year, In the last 5 years, More than 5 years ago, Don’t Know,” and “When did you most recently have sex without a condom? Today, Not today but within the past 7 days, Within past 2–4 weeks, Within past 2–3 months, Within past 4–6 months, Within past 7–12 months, Over a year ago, Never, Don’t Know.” Women who reported sexual intercourse without a condom with any type of client (regular or occasional) in the 7 days prior to the interview were coded as inconsistently using condoms. FSWs were also asked whether they had accepted more money for sex without a condom within 6 months of the interview (yes/no).

Data Analysis

We first examined descriptive statistics to compare FSWs’ demographic characteristics, sex work characteristics, and experiences with police across time, from early stage (Rounds 1 and 2, 2006 and 2007) to full intervention implementation (2009–2010). Next, we conducted multiple logistic regression analyses to assess the association of our summary measure of negative police interactions with each of the HIV risk-related outcomes. Control variables were selected based on our prior research [1, 25] and theoretical importance, and included age, age at start of sex work, sex work venue, and client volume. A final set of regression models added interactions with survey round, to examine whether the association between negative police interactions and HIV risk-related outcomes varied over time. All statistical analyses were conducted using Stata 12.1/SE [26] and no RDS weights were employed [22, 27].

Results

The repeated cross-sectional data showed some stability and some change in demographic characteristics, police interactions, and HIV risk-related outcomes over time (see Table 1).

Respondents are on average about 32 years old, and they reported having about 10 clients in the 7 days prior to the survey. A wide array of sex work venues are represented by the sample, with homes, highways, agricultural or other venues, and multiple venues being most common. From Rounds 1 & 2 to Round 3, the proportion of respondents working on highways decreased, and the proportions working in agricultural venues and in multiple venues increased. Negative interactions with police were relatively pervasive among the respondents. Of the five specific police interactions examined, workplace raid was the most commonly reported and confiscation of condoms was the least common. Of note, FSWs' reports of bribes, workplace raids, and arrests were lower in Round 3 as compared with the prior survey rounds. Similarly, the summary tally of negative police interactions showed a decrease over time, from 21.2 % of respondents reporting at least 1 negative police interaction in the past 6 months (and 26.2 % reporting two or more) in Rounds 1 & 2, to 16.2 % of respondents reporting at least 1 negative police interaction in the past 6 months (and 14.3 % reporting two or more) in Round 3. Finally, substantial proportions of respondents reported behaviors indicative of HIV risk, with over forty percent of respondents indicating that they had experienced STI symptoms in the past 6 months. There was a decline over time in inconsistent condom use in the past 7 days (37.4–26.6 % from Rounds 1 & 2 to Round 3) as well as acceptance of more money for sex without a condom (22.7–18.0 %). Each of the demographic and sex work characteristics included in Table 1 was significantly associated with one or more of the outcomes of interest in bivariate analyses ($p < 0.10$, results not shown).

Table 1

Sample characteristics by survey round

	Rounds 1&2n = 1,191		Round 3n = 489		Totaln = 1,680		pvalue^a
Mean age in years (SD)	31.7 (7.94)		31.0 (7.68)		31.5 (7.87)		0.107
Mean no. clients, past 7 days (SD)	10.7 (13.62)		9.1 (11.9)		10.3 (13.16)		0.026*
	Percentage (n)		Percentage (n)		Percentage (n)		
Age at start of sex work							0.001 [†]
<18 years	15.4	(183)	18.4	(90)	16.3	(273)	
18–29	63.6	(758)	69.5	(340)	65.4	(1,098)	
30–39	18.5	(220)	11.0	(54)	16.3	(274)	
40 years or older	2.5	(30)	1.0	(5)	2.0	(35)	

	Rounds 1&2n = 1,191		Round 3n = 489		Totaln = 1,680		pvalue^a
Most recent sex work venue							0.001 [†]
Brothel	7.8	(93)	3.1	(15)	6.4	(108)	
Street	13.4	(159)	5.1	(25)	11.0	(184)	
Lodge/hotel	3.1	(37)	1.2	(6)	2.6	(43)	
Home	23.2	(276)	16.6	(81)	21.3	(357)	
Highway	18.2	(217)	5.7	(28)	14.6	(245)	
Agriculture or other venue	18.8	(224)	28.6	(140)	21.7	(364)	
Multiple venues	15.5	(185)	39.7	(194)	22.6	(379)	
Police interactions							
Police had sex with respondent so she could avoid trouble	11.9	(142)	9.0	(44)	11.1	(186)	0.083
Police accepted bribe or gift from respondent so she could avoid trouble	16.5	(197)	10.4	(51)	14.8	(248)	0.001 [†]
Police took condoms away	8.4	(100)	5.7	(28)	7.6	(128)	0.061
Police raided workplace	41.7	(497)	22.5	(110)	36.1	(607)	0.001 [†]
Police arrested respondent	16.8	(200)	8.8	(43)	14.5	(243)	0.001 [†]
Summary measure of negative interactions with police							0.001 [†]
None	52.6	(626)	69.5	(340)	57.5	(966)	
1 type reported	21.2	(253)	16.2	(79)	19.8	(332)	

	Rounds 1&2n = 1,191		Round 3n = 489		Totaln = 1,680		pvalue^a
2 or more types reported	26.2	(312)	14.3	(70)	22.7	(382)	
HIV risk-related outcomes							
STI symptoms	43.5	(518)	46.2	(226)	44.3	(744)	0.307
Inconsistent condom use with clients	37.4	(445)	26.6	(130)	34.2	(575)	0.001 [†]
Accepted more money for sex without a condom	22.7	(270)	18.0	(88)	21.3	(358)	0.034 [*]

a p value for tests of variation in sample characteristics by survey round: ANOVA for the two continuous variables and Chi square for the categorical variables. All variables refer to the 6 months prior to the survey, with the exception of inconsistent condom use with clients, which refers to the 7 days prior to the survey

* p < 0.05, ** p < 0.01, † p < 0.001

Table 2 shows the results of logistic regression analyses for each of the three study outcomes. Unadjusted associations are shown as the percentage experiencing the outcome among those exposed and among those unexposed to the indicated negative police interaction. Adjusted associations (AORs) are also presented for each outcome, each the result of a separate logistic regression model controlling for age, age at start of sex work, sex work venue, client volume, and survey round. The overall pattern is one of negative police interactions being positively related to HIV risk indicators. Women who reported sex with a police officer to avoid trouble, giving a bribe to a police officer to avoid trouble, having condoms confiscated by police, experiencing a workplace raid, or being arrested by police were more likely to report STI symptoms and acceptance of more money for sex without a condom (AORs 1.53–3.83), as compared with women who had not experienced these events. Women who reported having condoms confiscated or experiencing a workplace raid by police were also more likely than women who had not experienced these events to report inconsistent condom use with clients (condoms confiscated: AOR 1.59 [95 % CI 1.19–2.12]; workplace raid: AOR 1.72 [95 % CI 1.18–2.51]). Across all three outcomes of interest, particularly strong associations were observed with having condoms confiscated by police; women who reported this negative police interaction were between nearly two and nearly four times as likely to experience STI symptoms, to use condoms inconsistently with clients, and to accept more money for sex without a condom.

Table 2

Associations between female sex workers’ police interactions and HIV risk-related outcomes [adjusted odds ratios (AORs) and 95 % confidence intervals]

Police interactions	HIV risk-related outcomes								
	STI symptoms			Inconsistent condom use with clients			Accepted more money for sex without a condom		
	Percentage	AOR	CI	Percentage	AOR	CI	Percentage	AOR	CI
Sex with police officer to avoid trouble									
No	41.6	Ref.		34.3	Ref.		19.8	Ref.	
Yes	65.6	2.23	(1.60–3.11) [†]	33.9	1.16	(0.83–1.63)	33.3	2.04	(1.44–2.90) [†]
Gave bribe or gift to police to avoid trouble									
No	40.7	Ref.		32.8	Ref.		18.7	Ref.	
Yes	64.9	2.40	(1.80–3.21) [†]	42.3	1.59	(1.19–2.12) ^{**}	36.3	2.46	(1.82–3.33) [†]
<u>Condoms</u> confiscated by police									
No	42.5	Ref.		33.4	Ref.		19.2	Ref.	
Yes	66.4	2.42	(1.64–3.57) [†]	43.8	1.72	(1.18–2.51) ^{**}	46.9	3.83	(2.61–5.61) [†]
Workplace raid by police									
No	36.4	Ref.		33.9	Ref.		18.4	Ref.	

Police interactions	HIV risk-related outcomes								
	STI symptoms			Inconsistent condom use with clients			Accepted more money for sex without a condom		
	Percentage	AOR	CI	Percentage	AOR	CI	Percentage	AOR	CI
Yes	58.3	2.21	(1.77–2.77) [†]	34.8	1.13	(0.89–1.42)	26.5	1.57	(1.21–2.04)*
Arrested by police									
No	41.6	Ref.		34.0	Ref.		20.0	Ref.	
Yes	60.1	1.74	(1.30–2.33) [†]	35.8	1.20	(0.87–1.63)	28.8	1.53	(1.11–2.13)*
Summary measure of negative police interactions									
None	34.2	Ref.		34.3	Ref.		17.7	Ref.	
1 type reported	52.1	1.99	(1.53–2.59) [†]	29.5	0.87	(0.66–1.16)	18.1	1.03	(0.74–1.44)
2 or more types reported	63.1	2.97	(2.27–3.89) [†]	38.2	1.36	(1.03–1.79)*	33.3	2.37	(1.76–3.21) [†]

Each adjusted OR is the result of a separate logistic regression model and adjusts for respondent age, age at start of sex work, sex work venue, client volume, and survey round. All variables refer to the 6 months prior to the survey, with the exception of inconsistent condom use with clients, which refers to the 7 days prior to the survey

* $p < 0.05$, ** $p < 0.01$, † $p < 0.001$

The lower panel of Table 2 shows the results for the summary measure that tallied the number of negative police interactions reported by each respondent. FSWs who reported experiencing one type of negative police interaction were more likely to experience STI symptoms (AOR 1.99 [95 % CI 1.53–2.59]), as compared with those who reported no negative police interactions. Further, FSWs who reported experiencing two or more types of negative police interactions were more likely than those experiencing no negative police interactions to experience STI symptoms (AOR 2.97 [95 % CI 2.27–3.89]), to inconsistently use condoms with their clients (AOR 1.36 [95 % CI 1.03–1.79]), and to have accepted more money for sex without a condom (AOR 2.37 [95 % CI 1.76–3.21]).

Finally, the results of regression models that included interactions with survey round (results not shown) indicate that some of the associations did change over time, showing stronger relationships in Round 3 as compared with Rounds 1 & 2. In each case where the police interaction*survey round term was significant ($p < 0.10$), we ran subsequent regression models stratified by round. With regard to STI symptoms, in Rounds 1 & 2, respondents who had given a bribe to a police officer were more likely than respondents who had not given a bribe to report STI symptoms (AOR 2.28 [95 % CI 1.64–3.15]); this association was even stronger in Round 3 (AOR 2.94 [95 % CI 1.51–5.73]). Similarly, the association between having police confiscate one's condoms and inconsistent condom use increased across survey rounds, from an AOR of 1.43 (95 % CI 0.93–2.20) in Rounds 1 & 2 to an AOR of 3.33 (95 % CI 1.50–7.39) in Round 3. The associations between negative police interactions and accepting more money for sex without a condom did not change over time.

Discussion

Our findings indicate that FSWs' experiences with police are highly associated with HIV risk in this sample of FSWs in Andhra Pradesh, India. The pattern of associations between distinct types of police interactions and three different indicators of HIV risk are consistent with hypothesized direct and indirect mechanisms of effect [1, 28]. For example, having sex with a police officer to avoid trouble may be directly linked to STI symptoms; having condoms confiscated by police may be directly linked to inconsistent condom use and willingness to accept more money for condomless sex [29, 30]. And at the same time, policing practices could have indirect effects on FSWs' HIV risk. For example, bribes and arrest both have real, monetary costs to FSWs—many of whom are already economically vulnerable—and thus may indirectly affect HIV risk by increasing the likelihood of FSWs accepting risky sex transactions because of economic need. Similarly, a workplace raid or other police harassment could increase fear and insecurity among FSWs, which may affect condom negotiation with clients and in turn, STI susceptibility.

This study goes beyond prior studies that examine the associations between specific types of police experiences and measures of HIV vulnerability; we also find that the experience of any one type of negative police interaction is associated with increased likelihood of self-reported STI symptoms. Further, the experience of two or more negative police interactions is associated

with STI symptoms, inconsistent condom use, and acceptance of more money for sex without a condom.

The data for this study were collected in the context of an ongoing intervention that included components to reduce police abuses or misuses of power and to increase the just treatment of sex workers under the law. We find that both negative interactions between FSWs and police and measures of HIV sexual risk decline over time, from early in the intervention implementation (Rounds 1 & 2) to full implementation (Round 3). However, we also find that the strong associations between FSWs' police experiences and their HIV sexual risk remain stable or even increase over time. That is, the potential impact on HIV risk of these police-FSW interactions when they did occur remained significant. Thus, even in contexts where interventions have reduced the overall number of police incidents experienced by FSWs, FSWs and individuals and organizations interested in HIV prevention must remain vigilant in continuing to challenge these incidents.

The findings of this study should be interpreted in light of several study limitations. First, the data were gathered using respondent-driven sampling for respondent recruitment. RDS can be an effective method to sample hard-to-reach populations such as FSWs, provided certain statistical requirements are met [22, 31–34]. Based on the high number of recruitment waves following the initial seed for each survey round, we are confident that we achieved a diverse sample of FSWs in the study areas. Second, the data analyzed in this study were cross-sectional, restricting our ability to ascertain causality. The use of multiple cross-sections does help to validate the observed associations, but longitudinal research is needed to establish temporal order for causal modeling. We also focused exclusively on FSWs who were over 18 years old; no conclusions can be drawn with regard to negative police interactions and HIV risk among younger sex workers or male sex workers. Finally, our data are also exclusively self-report, and we have no means to assess the accuracy and reliability of FSWs' reports of experiences with police in this context. There is no incentive for our respondents to overreport experiences or behaviors, as the evaluation study had no relationship with the ongoing structural intervention; further, respondents were recruited and enrolled independent of their awareness of or participation in the intervention. Our quantitative findings regarding interactions with police are consistent with detailed accounts provided in in-depth qualitative interviews with FSWs [3]. Further, the levels of consistent condom use and STI symptomology in this study are in line with other similar HIV studies in the South Indian context [35, 36], as well as a national trends of small but significant declines in HIV risk for FSWs [37].

In conclusion, the results of the current study make an important contribution to the nascent literature reporting results of interventions with police that aim to prevent HIV among sex workers [3, 38]. FSWs' interactions with police are characterized by police power over the sex workers, manifested in a variety of ways including police discretion in when and under what charges to arrest a sex worker. In attempts to avoid arrest, women are more likely to have condomless sex with their clients, either because they avoid carrying the condoms themselves, they want to avoid the time and hassle of negotiating condom use, or they are under financial pressure to make up for money lost to bribes or legal fees and fines from arrest. Raising awareness about abuses of police power and holding police accountable may reduce the frequency with which they engage in these types of interactions; in this sense, this type of

intervention may reduce FSW's HIV risk. However, individuals and organizations interested in HIV prevention need to be vigilant and move beyond simply awareness. Action must be taken to eliminate these interactions, and ultimately to change the nature of police-FSW interactions. Based on our findings—both the strength of association and consistency of association across HIV risk-related outcomes—the immediate elimination of police confiscation of condoms should be prioritized. Indeed, a recent modeling study found that in India's Karnataka state, 6 % of HIV infections among FSWs and their clients could be avoided over 10 years by eliminating police condom confiscation and physical and sexual violence [28].

Further, strategies to convince police to stop accepting sex, bribes, or gifts from FSWs should be explored; ending these behaviors may reduce FSWs' HIV risk, in addition to reducing the HIV risk of the police officers, and perhaps most importantly, reducing the power differential between police and FSWs. For other behaviors such as arrest, there may be other things that could be done in the course of an arrest (or after the arrest takes place, in processing, holding, and filing of charges) that might reduce the impact on FSWs' HIV risk.

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