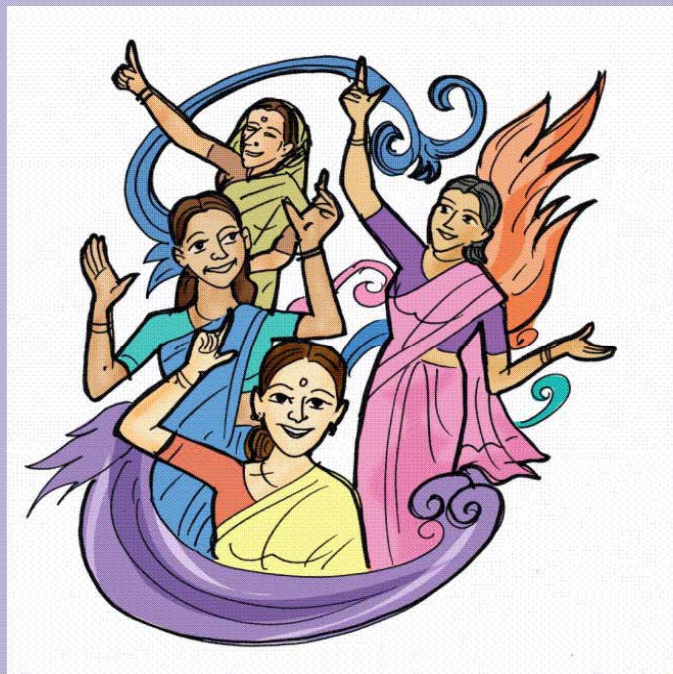


A COMPARISON OF FEMALE SEX WORK, CONDOM USE AND EXPOSURE TO PROGRAMME INTERVENTIONS IN 3 INDIAN DISTRICTS



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NOVEMBER 2009

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The CHARME Project is a project of the Centre Hospitalier affilié Universitaire de Quebec (CHA), Canada. Key partners in this project are Imperial College London, the London School of Hygiene and Tropical Medicine, the University of Manitoba, Canada and the Karnataka Health Promotion Trust (KHPT), Bangalore, India

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LIST OF ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
AOR	Adjusted Odds Ratios
CCS	Conventional Cluster Sampling
CI	Confidence Intervals
CSW	Commercial Sex Workers
DIC	Drop-In Centre
FSW	Female Sex Workers
FTFI	Face-to-Face Interview
HIV	Human Immunodeficiency Virus
IBBA	Integrated Biological and Behavioural Assessment
ICVI	Informal Confidential Voting Interview
IDU	Injection Drug User
KHPT	Karnataka Health Promotion Trust
M&E	Monitoring and Evaluation
MSM	Men who have Sex with Men
NPC	Non-Paying Clients
NAC	National AIDS Control Organisation
NACP	National AIDS Control Programmes
NGO	Non-governmental Organisation
OR	Odds Ratio
PE	Peer Educator
POS	Place of Solicitation
SBS	Special Behavioural Survey
STI	Sexually Transmitted Disease
TLCS	Time-Location Cluster Sampling

ABSTRACT

Background: The HIV epidemic in India remains concentrated in high-risk groups, including female sex workers (FSWs). To prevent HIV transmission within a population of over a billion, prevention measures are critical. Adapting the necessary interventions to area-specific needs is critical in providing more effective interventions.

Objectives: To assess the differentiating risk factors with regard to socio-demographic characteristics and sex work patterns, as well as determining the variations in condom use with different partner types and exposure to the *Avahan* interventions among the districts of Guntur, Mysore, and Mumbai.

Methods: Descriptive, univariate, and multivariate analyses of cross-sectional survey data done through Face-to-Face Interviews (FTFIs) among a total of 816 FSWs in Guntur (213), Mysore (208), and Mumbai (395).

Results: Always using condoms was the highest among FSWs in Mysore and lowest in Mumbai for sexual encounters with all partner types (Mysore vs. Mumbai: 43.7% vs. 2.8% among regular partners; 98.0% vs. 2.4% non-paying clients; 96.8% vs. 67.0% occasional clients; 98.0% vs. 48.0% repeat clients, all $p < 0.001$). With the exception of condom use with regular partners in Guntur, strong evidence was found for the greater likelihood of condom use among all partner types in both Mysore and Guntur as compared to Mumbai. Correspondingly, Mumbai had the lowest exposure to the interventions (ever visited by PE/NGO worker 82.1%, ever given condom by PE/NGO worker 82.1%, ever witnessed condom demonstration 82.5%, ever visited the sexual health clinic 78.2%, ever visited the drop-in centre 49.4%, and ever received a "grey pack" 64.6%). There was strong evidence for a greater chance of being exposed to the intervention in Mysore and almost all interventions in Guntur as compared to Mumbai. There was no evidence found for greater likelihood of ever having visited a drop-in centre or ever having received a "grey pack" in Guntur as compared to Mumbai.

Conclusion: This study unveiled striking differences in socio-demographic characteristics, sex work environments, condom use among different partner types, and exposure to intervention among the three districts. Pinpointing which districts and among which partner types condom use remains low helps to identify where intervention strategies should be altered or improved.

INTRODUCTION

UNAIDS and WHO estimate that approximately 2.5 million (ranging from 2 million to 3.1 million) individuals in India are living with HIV, corresponding to a national prevalence of approximately 0.36% (1, 2). Despite the stable trends of the HIV epidemic in recent years, there remains distinct variation between and within states and population groups (1).

Approximately 83% of the HIV infections are concentrated in six of the 28 states: Tamil Nadu, Andhra Pradesh, Karnataka, Maharashtra, Nagaland, and Manipur (3). HIV transmission in the latter two states – located in the north-eastern region of India – occurs primarily through injection drug use; while in the four remaining southern states, HIV transmission is largely through sexual contact (4, 5). Within these high-prevalence states, female sex workers (FSWs), men who have sex with men (MSM), and injection drug users (IDUs) have the highest rate of infection – estimated at a prevalence of 10 to 20% (4, 6).

With a high density population – exceeding one billion people – the HIV prevalence and transmission from and within these high-risk populations continues to be a serious threat to the general population in India. Bridging populations – or groups that are enabling the spread of the HIV epidemic into the general population – include the clients of sex workers, MSM who are married, long distance truck drivers, and men who migrate for seasonal work (4, 6). Approximately 85% of the new infections in India are caused by heterosexual contact (6, 7) with the main route of transmission being unprotected paid sex (8). The need for prevention is evident. Mathematical modelling suggests that prevention programs directed towards female sex workers (FSWs) could alone avert a larger scale epidemic and potentially drive the epidemic to extinction (9).

Given that the typology of sex work varies within and across states (10) and that HIV epidemics within the high-prevalence states reflects diverse social, cultural, religious, and sexual practices (6), there remains a need to adapt prevention interventions to the local context. Furthermore, establishing proximate determinants of risk – presence of STIs, condom use, type and frequency of sexual activity, and type of partner (3) – is key to the success of locally adapting interventions.

In addition to the two phases of the Indian National AIDS Control Programmes¹ (NACP I & II), many other targeted prevention measures have been implemented by NGOs throughout India in an effort to prevent mass transmission of HIV (10-16). In particular, the India AIDS Initiative (*Avahan*) funded by the Bill & Melinda Gates Foundation is a large-scale HIV prevention intervention focusing on high risk populations in the six aforementioned high HIV prevalence states (10, 16, 17). The initiative was started in 2003 and is based on the theory of core group transmission based on the assumption that the epidemic in India is dependent upon the transmission from and within the high-risk groups (17, 18) and addresses approximately 280,000 people *most* at risk and approximately another 5 million at risk (3).

To address HIV transmission among FSWs and their clients, three main schemes were employed under *Avahan*: 1) community mobilization and peer-led outreach education for the promotion of safer sex practices with a primary focus on the promotion of condom use; 2) increasing access to sexual health services and enhanced STI management, in addition to increasing the distribution and social marketing of condoms; and 3) forming enabling environments to support the adaptation of safer sex practices (16, 19). These strategies

¹ Implemented by the National AIDS Control Organisation (NACO)

include training peer FSW for community outreach, distribution of condoms, establishing sexual health clinics and providing presumptive treatment for certain STIs, and creating drop-in centres in order to provide a safe and nurturing environment for FSWs to gather and take haven (3).

Avahan has an extensive monitoring and evaluation (M&E) component in order to assess the effectiveness of the interventions. Part of the M&E component in southern India is carried out by the CHARME project, implemented by the Population Health Research Unit of the Centre Hospitalier *affilié* universitaire de Quebec, Canada. This seven-year project funded by *Avahan* focuses on collecting cross-sectional behavioural and STI/HIV prevalence data in both household-based and Special Behavioural Surveys (SBS) among high-risk populations targeted by the interventions.

This project has been undertaken to assess the varying determinants of risk for FSWs within the *Avahan* interventions in the districts of Mysore, Mumbai, and Guntur. The outcomes of this analysis help identify district-specific attitudes towards condom use and *Avahan* intervention exposure with the ultimate aim of helping to shape more effective, context-specific interventions.

AIMS AND OBJECTIVES

Overall Aim

To identify district-specific risk factors for HIV transmission among the female sex worker (FSW) population targeted by the *Avahan* interventions, with the ultimate goal of enabling more effective, context-specific adaptation of interventions.

Project Objectives

- 1) To examine evidence of the impact of HIV interventions targeting FSWs within India and globally, specifically, with regard to condom use.
- 2) To compare socio-demographic characteristics and sex work patterns among FSWs in the districts of Guntur, Mysore, and Mumbai.
- 3) To determine the variation in condom use with different partner types and exposure to the *Avahan* interventions among FSWs in the three districts.

METHODS

Study Setting

The study was conducted in the districts of Guntur, Mysore, and Mumbai, in the southern states of Andhra Pradesh, Karnataka, and Maharashtra respectively. The population in the three states totals approximately 228 million (76, 55, and 97 million, respectively). At the district level, Guntur has a population of 4.4 million (20). An estimated 780,000 live in Mysore – the second largest district of Karnataka state (21). Lastly, Mumbai, the capital of Maharashtra – and the most populous city in India – has an estimated population of about 16.4 million, including an urban population of over 3 million (22). The HIV prevalence rates among FSWs are 21.25% (Guntur), 26.11% (Mysore), and 23.70% (Mumbai) (19); however, rates in Mumbai have been reported to be as high as 58.7% (23).

Study Design

The study involved three cross-sectional surveys conducted in the three districts: 1) all FSW types in Guntur; 2) street-based FSWs in Mysore; and 3) both brothel and street-based FSWs in Mumbai. The surveys were conducted between December 2007 to January 2008.

Mapping and Sampling Framework

Based on earlier mapping and surveys², it was estimated that there were approximately 6,073 FSWs in Guntur; 1,950 FSWs in Mysore; and 17,061 FSWs in Mumbai³ in the areas covered by the *Avahan* project.

Samples size calculations were designed to detect a 10-15% increase in condom use with a 90% power and alpha level of 0.05, corresponding to 95% confidence in the observed estimates and were based on the assumption of baseline value of 50% for consistent condom use. Thus, it was estimated that 200 participants were needed per SBS sample. Individual district samples were selected in a two-stage process: in stage one, clusters or sites were selected for each district; and in stage two, the individual participants from the selected sites were recruited for the survey. Conventional Cluster Sampling (CCS) was used for more stable populations of brothel-based, home-based and lodge-based FSWs in Guntur. A Time-Location Cluster Sampling (TLCS) method was used for the less stable population of street-based FSWs and non-brothel based workers in Mysore and Mumbai. Since brothel-based FSWs in Mumbai were living in areas that were attached to brothels but solicited clients from outside the brothels, the TLCS method was preferentially used. Additionally, a two-step general weighting procedure was utilized. The first step consisted of calculating a cluster weight followed by adjustments to the cluster weight for cluster-level non-response, calculated independently for each type of sex work site. The second step consisted of calculating an FSW weight.⁴

Special Behavioural Surveys

The special behavioural surveys (SBS) comprised Face-to-Face Interviews (FTFIs) that were designed in English and translated back to Kannada (Mysore), Telugu (Guntur), and Hindi

² Integrated Behavioural and Biological Assessment (IBBA) carried out in all three states under *Avahan*.

³ Reported from an *Avahan* partner Management Information System (MIS), August 2008

⁴ All information based on sampling and selecting respondents for the IBBA in Karnataka

(Mumbai). The questionnaire comprised ten sections including information on demographic characteristics; husband/co-habiting partner, other non-commercial sex partners and clients; sexual history and behaviour; migration for sex work, risk perceptions, information on injection drug use, and exposure to the intervention (including use of intervention sexual health clinics and drop-in centres).

Interviewers in Mysore were trained peer FSWs and in Mumbai and Guntur trained female health researchers respectively from the TATA Institute of Social Sciences and the Centre for Media Studies in Hyderabad. Each interview took approximately 45 minutes and was conducted at a site close to places of solicitation (POS). Written informed consent was obtained from all FSWs agreeing to participate in the SBS. In an effort to retain confidentiality, participant names were not recorded and remained unlinked to the data.

Literature Review

A literature review was conducted to examine the evidence of the impact of HIV interventions targeting female sex workers. The outcomes investigated were self-reported use of condoms and, wherever possible, the biological endpoints of HIV/STIs rates. Literature was found from published articles and grey literature on various HIV prevention programmes within India, as well as interventions implemented in other countries. Searches were conducted on selected journal article databases including PubMed, Embase, Medline, Popline, and the Cochrane Library.

Data and Statistical Analyses

All data were double entered and cleaned by the team at the Karnataka Health Promotion Trust (KHPT) using Microsoft Access. Initially, the three questionnaires were compared for common questions and a subset of variables was selected accordingly. Data analysis was carried out using STATA version 10. Data from each of districts were checked for missing values and continuous variables were categorized based on distribution of data. To standardize variable names across the three districts, all the variables were relabelled. A singular data set was created for Mumbai by combining both street-based FSWs and brothel-based data. After preliminary individual district analysis, all district data were merged together and weighted analysis was carried out. All given results are weighted.

The primary outcomes of this analysis were reported condom use and reported exposure to the intervention. The former included condom use with clients, both repeat and occasional, as well as cohabiting and non-paying partners⁵; the latter incorporated knowledge of the intervention and its activities/services, contact with peer educators, receiving condoms from peer educators, visiting drop-in centres, visiting sexual health clinics, and receiving “grey packs”⁶.

Socio-demographic characteristics, sex work history and patterns, condom use, and exposure to the intervention were cross-tabulated for each of the districts and associations between the districts and variables were tested. Associations between primary outcomes (condom use and exposure to the intervention) and demographic characteristics/sex work patterns were also tested to identify potential confounders and effect modifiers.

⁵ Also called non-paying clients (NPC), similar to regular partners except non-cohabiting

⁶ ‘Grey pack’ consists of 1g azithromycin and 400mg cefixime and is a presumptive treatment taken every 3-6 months for gonorrhoea and chlamydia infection.

Univariate and multivariate analyses were carried out using odds ratios (ORs) to investigate the strength of association found among reported condom use and the three districts, as well as the reported exposure to intervention. The district of Mumbai was designated the baseline as it had the lowest percentage of reported condom usage among all partner types and lowest exposure to intervention of the three districts. To simplify the analyses, reported condom use in each partner type was re-categorized into a binary variable: always using condoms (100%) and all other (including never, sometimes, and frequently⁷). Multivariate analysis initially included age as *a priori* confounder. The final multivariate models were built by adding each potential confounding variable through a step-wise approach. Those variables associated with both the districts (exposure) and the condom use/intervention exposure (outcomes) – but not on the causal pathway – and which caused the overall OR to change by 10% or greater were included in the model. All variables included in the model were examined for effect modification using the Likelihood Ratio Test. In all other analyses, Wald test was the statistical test used.

Ethics Approval

Ethical clearance for this particular study was granted by the Ethics Committee at London School of Hygiene & Tropical Medicine. Prior data collection received ethics approval from the Research Ethics Review Board at the Centre Hospitalier *affilié* universitaire de Quebec in Québec, Canada; the Health Research Ethics Board of the University of Manitoba in Winnipeg, Canada; and the Institutional Review Board of St. John's Medical College in Bangalore, India. The study was also approved by the Government of India.

⁷ Original condom use categories: Never 0%; Sometimes < 50%; Frequently ≥ 50%; Always 100%

LITERATURE REVIEW

Intervention for FSWs: Indian Context

The published evidence on the effectiveness and impact of HIV prevention interventions within India is limited. Along with the *Avahan* interventions, there are a few notable studies on interventions effectiveness, which have been conducted in Mumbai, Kolkata and surrounding areas in the state of West Bengal, and Pune (Table 1).

One of the first studies presenting a description of behavioural interventions and its impact on reported condom use and HIV prevalence was conducted in Mumbai among FSWs and brothel madams. Following the intervention, FSWs reported significant increases in the level of condom use compared to a control group. Additionally, in the intervention group there was a significant increase (0% to 42%) in the number of women who were willing to refuse clients if they were not willing to use condoms. The incidence of HIV, syphilis, and hepatitis B was significantly lower in the intervention group as compared to the control group following the intervention. Despite the encouraging results, the percentage of FSWs always using condoms remained relatively low due to concerns about losing business if they insisted on condom use. (24)

A series of studies was later carried out to examine outcomes of a well-established intervention in Kolkata. The project initially started in 1991 as the Sexually Transmitted Diseases (STD)/HIV Intervention Project (SHIP) and following many modifications became what is now known as the “Sonagachi Project” (25). The project employs FSWs as peer educators to propagate information on behaviour change, to distribute and promote condoms, and to refer fellow FSWs to STI clinics. In addition, the project addresses and promotes collaboration and empowerment among the FSWs.

Despite being on the drug route into the heart of India and one of the most impoverished urban centres in the world, the rate of HIV infection among sex workers in Kolkata appears to be about 10-11% (14, 25). Additionally, condom use in Kolkata rose from 3% in 1992 to 90% in 1999, rates much higher than in other urban centres of India (25, 26). In an effort to test the efficacy of the Sonagachi interventions, a community controlled intervention study was carried out in two small urban communities in state of West Bengal (14). Although there was a 25% increase in constant condom use among the intervention group, there was no evidence that increased condom use led to a decreased incidence of HIV or other STIs. A later study compared STI rates between areas where the Sonagachi Project and National AIDS Control Organization (NACO) were implemented (11). The cross-sectional surveys done between 1992 and 2003 showed significant decreases in syphilis and trichomoniasis among the FSWs; however, there was no difference in prevalence of the STIs between the Sonagachi group and the NACO-only control group (11).

A study focusing on FSWs and men attending STI clinics in Pune showed a 70% decline in HIV acquisition risk in areas with FSW interventions; however, there was no significant reduction of HIV acquisition risk among non-FSW women, who were attending local STI clinics. (12).

One of the first studies to rigorously evaluate community-led preventative intervention initiatives (under the *Avahan* project) on effects on HIV/STIs was carried out among randomly sampled FSWs in Mysore (16). The study showed a significant increase in condom

use between baseline and follow-up cross-sectional surveys (25% increase with occasional clients, 13% increase with repeat clients, and 23% increase with regular partners). Correspondingly, the prevalence of syphilis, trichomonas infection, and chlamydial infection significantly declined (13%, 19%, and 6%, respectively) although the HIV prevalence remained stable (16). It is evident from this study that community led interventions can have a drastic impact on increasing condom use and consequently decreasing STI prevalence.

Interventions for FSWs: Global Context

Outside of India, quite a number of interventions have been rigorously evaluated for condom use, changes in STI rates, or both (Tables 2 & 3). However, the majority of the studied interventions for FSWs have not incorporated community mobilization and peer-led activities into their prevention strategies like *Avahan* and the Sonagachi project; however, there are two exceptions. A programme in Thailand focused on enhancing self-esteem by facilitating in-depth discussions, consultations with experienced FSWs, and open-ended video sessions, resulted in positive shifts of self-esteem and a corresponding increase in consistent condom use with customers in the intervention group (27). A study done on the replicated version of Sonagachi project for FSWs and paying clients in Brazil found that several community development components (e.g. social cohesion) were significantly associated with consistent condom use; however, there was no significant change found in condom use from pre- to post-intervention (28).

Programmes in Thailand, Malawi, and Côte d'Ivoire have incorporated peer-led education and training in conjunction with other conventional preventative interventions; however, the effects on condom use and STI rates have been mixed (28-31). An evaluation of an intervention in Malawi targeting bar-based FSWs and their potential clients (long-distance truck drivers) showed an increase in condom use with paying partners (i.e. clients); however, condom use with regular partners did not increase from baseline surveys (30). A six-year study done on FSWs in Côte d'Ivoire found substantial increases in condom use with most recent clients and corresponding significant declines in the prevalence of HIV, gonorrhoea, genital ulcers, and syphilis (31). Conversely, a programme evaluation in south Thailand found no increase in condom use and no difference in HIV prevalence or incidence between the control and intervention groups (29).

More traditional interventions using non-peer workers have been studied in the Democratic Republic of Congo (DRC), China, Singapore, Benin, Indonesia, Zimbabwe and Sierra Leone (32-38). The majority of these interventions have shown successful outcomes in condom use and HIV/STIs rates. One of the first studies measuring the effects of STI prevention with condom use on HIV-1 incidence was carried out in the DRC, showing a significant decline in HIV-1 incidence over 3 years with a complementary 57% increase in condom use with clients (32). Incidences of gonorrhoea, trichomoniasis, and chlamydia decreased in a prospective cohort study done in China showing considerable impact on increasing consistent condom use (33). A five-year brothel-based study done in Singapore resulted in an increase in consistent condom and significant decline in cervical gonorrhoea incidence (34). A six-year study done in Benin, initially found significant decline in the prevalence of HIV (53.3% to 40.6%) and a concurrent increase in condom use (35). However, after adjusting for age and country of origin, HIV prevalence remained stable over time, but significant downward trends remained in syphilis and gonorrhoea (35). Unusually, the decrease in STIs seen in a study done in Indonesia did not follow increases in condom use (36). Despite stable condom use among FSWs in the 'high-effort' intervention area (i.e. intervention group) and only a

slight increase in the ‘low-effort’ intervention area (i.e. control group), there still remained decreases in syphilis and trichomonas infection in both sites (36).

Studies focusing on the unique aspects of condom usage, without biological outcomes, were carried out in Zimbabwe and Sierra Leone (37, 38). A study in Zimbabwe investigating whether access to both male and female condoms increased level of protected sexual encounters found significant increases in consistent male condom use with clients among both groups (*Group A* given access to both male and female condoms & *Group B* given access to only male condoms); however, despite positive responses in female condom acceptability surveys there was little consistent use of female condoms in *Group A* (37). Interventions in the conflict setting of Sierra Leone were targeted to both FSWs and military personnel, where significant increases in condom use were reported during last sex among both FSWs and military personnel (38).

Although there have been no reported randomized control trials for behavioural-based interventions, a randomized double-blinded controlled trial was carried out among FSWs in Kenya (39, 40). Both arms were given access to free condoms, risk-reduction counselling, and STI case management, however the intervention arm received monthly antibiotic chemoprophylaxis. Although incidence of HIV-1 did not differ between the two groups, significant reductions in the incidence of gonorrhoea, chlamydia, and trichomonas were seen among the treatment group, with further evidence of associations between HIV-1 incidence and previous infections of gonorrhoea and chlamydia (39). Additionally, the proportion of women reporting consistently using condoms increased significantly (40). Studies after the trial termination indicated condom use continued to significantly increase and chlamydia and trichomonas prevalence continued to decrease (41).

Overall, these studies show that interventions directed towards FSWs can lead to increased condom use and subsequent decrease in HIV/STI rates.

RESULTS

Study Population

A total of 948 women were invited to participate in the surveys – Guntur (217), Mysore (312), and Mumbai (419). Corresponding response rates for the districts were 95.8%, 68.3%, and 94.3%, generating a total of 816 participants – which included 208 FSWs from Guntur, 213 from Mysore, and 395 from Mumbai.

Socio-demographic Characteristics

Table 4 summarizes the socio-demographic characteristics of the individual study populations. The median age of the respondents was 30 years of age (ranging from 17-48 years) with approximately 18% under the age of 25. Mysore district had a slightly older population of FSWs, compared to Mumbai and Guntur districts. The majority of the FSWs were not literate, had one or more children, and lived near the specified area of solicitation (place of interview). A large proportion of the total sample was currently married, separated/divorced or widowed. However, Mumbai district had significantly fewer separated/divorced or widowed FSWs and greater proportion of who were never married. A significantly greater proportion of women were cohabiting with a regular partner (husband, boyfriend, or lover) in Guntur and Mysore. Approximately, 70% of the participants in Guntur had sources of income outside of sex work, in contrast to over 90% of the women in Mumbai having sex work as their sole source of income. The age of sexual debut was significantly lower in Guntur, with 43% being less than 15 years of age at first sex, compared to 20% for Mumbai and Mysore.

Sex Work History, Pattern, and Environment

As shown in Table 5, the average age at initiation of sex work varied significantly across the districts, with Mumbai having the lowest average age of initiation at 22.4 years. In addition to FSWs in Mumbai beginning at a younger age, the majority had been in sex work for longer than both Guntur and Mysore. A minority of participants worked outside the current place of solicitation. Respondents in Guntur were more likely to solicit and entertain commercial clients at home (including rented room and other's home) as compared to the majority of participants in Mysore and Mumbai who solicit in public places (parks, streets, markets, etc) and entertain clients in brothels (including lodge and dabha⁸). Means to solicit clients vary among the districts: 64.3% in Guntur solicit through a middleman (pimp/broker), while greater than half in Mysore and Mumbai solicit independently. The remaining half in Mumbai does not solicit clients; instead clients come directly to the brothels. Over half of the participants in Guntur district have non-paying clients (NPC) as compared to 12% and 29.4% in Mysore and Mumbai, respectively. Mysore participants were significantly less likely to have repeat clients and had significantly fewer numbers of clients on the last day worked than the women in Guntur and Mumbai. Respondents in Mumbai worked significantly greater number of days in a month (mean 21.6 days) as compared to 9.41 days in Guntur and 14.71 days in Mumbai. Correspondingly, the average number of sex acts per month was greatest among FSWs in Mumbai at 76.85 acts per month. Nearly all participants in Guntur and Mumbai and less than 45% in Mysore reported that they had been ever asked for anal sex. However, than a third had ever had anal sex in Guntur and Mumbai, compared with only three percent in Mysore.

⁸ *Dabha*: small modest restaurants dotted throughout cities, local towns, and along highways in India, akin to a "dive"

Condom Use

Overall, always using condoms with all partner types was significantly the highest in Mysore district and lowest in Mumbai (Table 6). Among study participants with cohabiting partners, more than two-thirds reported *never* having used a condom with their regular partners, with the highest proportion found in Mumbai at 90.8% followed by 68% in Guntur.

Approximately, 30% of the FSWs with non-paying clients in Guntur reported always using a condom with such partners, as opposed to the significantly striking difference of 98% in Mysore and mere 2.4% in Mumbai. The majority of women reported always using condoms with occasional clients in all 3 districts. Similarly, among women with repeat commercial clients, significantly more FSWs in both Guntur (84.6%) and Mysore (98%) reported always using a condom with these clients than Mumbai (48%). However, of the women using condoms at any level (sometimes, frequently, or always) with repeat clients, the majority reported using a condom at last sex with such clients.

After adjusting for confounding variables, strong associations remained between reported condom use and district. Women in Mysore were 25 times more likely to always use a condom with regular partners and repeat clients compared to the women in Mumbai (adjusted OR: 25.18, 95%CI: 4.24 to 149.32 $p < 0.001$ and adjusted OR: 24.67, CI: 5.22 to 116.46 $p < 0.001$, respectively). Similarly, FSWs in Mysore were more than eight times more likely to always use a condom with occasional clients compared to FSWs in Mumbai (adjusted OR: 8.27, 95%CI 2.78 to 24.55). In Guntur FSWs were 50 times more likely to use a condom with non-paying clients than were women in Mumbai (adjusted OR: 50.1, CI 6.44 to 388.94 $p < 0.001$). Furthermore, Guntur respondents were approximately four times more likely to always use condoms with commercial clients (either occasional or repeat) than FSWs in Mumbai (adjusted OR: 3.37, 1.12 to 10.07 $p = 0.03$ and adjusted OR: 4.14, CI: 1.30 to 13.25 $p = 0.017$, respectively). No association was seen between condom use with regular partners in Guntur compared to Mumbai. This analysis suggests that after controlling for confounding, there is strong evidence of an association between the district and the reported levels of condom usage with various partner types.

Exposure to the Intervention

The majority of women in each district reported being aware of an NGO working in the area, with Mysore and Guntur having the greatest proportions at 98% (Table 7). There was a significantly lower proportion of women in Mumbai (82%) who were ever visited or ever given condom by a peer educator (PE) or NGO worker as compared to 95% or greater for both in Mysore and Guntur. Even fewer had ever witnessed a condom demonstration in Mumbai (78.2%), but this was high for Guntur (91.5%) and Mysore (96.8%). There were significant differences between the districts with respect to ever having visited a drop-in centre (39.2% and 47.8% in Mumbai and Guntur, respectively), as compared to 96.7% in Mysore. Less than 50% of the FSWs in Mumbai had ever visited the NGO sexual health/STI clinic, as compared to the majority who had visited the clinics in both Mysore (98.2%) and Guntur (94.1%). Of the women visiting the STI clinics, only 64.6% and 78.1% in Mumbai and Guntur had ever received a grey pack.

As with the analysis of condom use, multivariate analyses were carried out looking at intervention exposure. After adjusting for confounding, there was strong evidence of a much greater intervention exposure among FSWs in Mysore as compared to those in Mumbai. FSWs in Mysore were 20 times more likely to have ever been visited by or received condoms from a PE/NGO worker than women in Mumbai (adjusted ORs: 23.8 & 21.15, 95%CIs: 5.8-

97.2 & 4.5-99.4, respectively, both $p < 0.001$). Likewise, they were more likely to have visited the drop-in centres (adjusted OR: 141.5, 95%CI: 38.20 to 524.30, $p < 0.001$). Most notably, Mysore women were 440 times more likely to have ever visited the STI clinic than Mumbai FSWs (adjusted OR: 440.8, 95%CI: 71.5 to 2717.7, $p < 0.001$). Finally, FSWs in Mysore were more than 50 times and 46 times more likely to have ever witnessed a condom demonstration and to have ever received a grey pack, respectively, than those in Mumbai (adjusted ORs: 50.9 & 45.6, 95%CI: 12.0-215.3 & 10.5-198.1, both $p < 0.001$). Women in Guntur were more likely to have ever been visited by a PE/NGO worker, received condoms from PE/NGO workers, and witnessed condom demonstrations than women in Mumbai; however, significance weakened (adjusted ORs: 13.0, 6.9, & 5.7; 95%CI: 1.8-95.5, 1.14-41.45, & 1.34-24.50; $p = 0.012$, $p = 0.036$, & $p = 0.019$, respectively). After adjusting for confounding, the odds of ever having visited a drop-in centre or ever having received a grey pack were found to be the same among women in Guntur and Mumbai. However, strong evidence remained that FSWs in Guntur were 22 times more likely to have ever visited the STI clinics than the FSWs in Mumbai.

DISCUSSION

Earlier studies have established the need for understanding demographics and sex work patterns to improve the effectiveness of HIV/STI prevention programs (19, 42, 43). This study served to identify potential district-specific vulnerabilities for FSWs and gaps in the interventions currently being provided in the three districts. Socio-demographic and sex work characteristics were examined and described for the three districts. Additionally, associations for both reported condom usage among various partner types and reported exposure to interventions among the districts were investigated. This study provides strong evidence of varying demographic and sex work characteristics, condom use with different partner types, and exposure to interventions across the three districts; thus, helping to explain potential risk factors for HIV transmission specific to each district.

In the districts of Guntur, Mysore, and Mumbai, socio-demographic and sex work characteristics are widespread and diversified. Factors of age and marital status are closely associated with reasons for entering into sex work and differentiating patterns of sex work, in which unmarried FSWs are more likely to be brothel-based and rely on sex work as a primary source of income (19). In turn, these patterns of sex work, including place of solicitation (POS), are strongly associated with vulnerability to HIV transmission, with brothel and street-based FSWs at greatest risk (44). Thus, younger populations of FSWs found in Guntur and Mumbai and the substantially greater proportion of unmarried women in Mumbai indicate the greater vulnerability of women in these two districts. Concurrently, sex work was the sole source of income for the majority of women in Mumbai that may lead to greater susceptibility for this population.

Among the three districts, the demographic and sex work characteristics in Mysore suggest less vulnerability than the other districts - a smaller population of FSWs (45), substantially fewer clients on last day worked, fewer numbers of days worked per month, as well as significantly fewer number of sex acts per month. However, previous programme monitoring in Mysore suggests that external factors such as reduced violence by partners and police are contributing to a more conducive environment for safer sex practices (16). Additionally, stronger social cohesion, acceptance, greater social capital, and empowerment of women may also be critical factors (46).

Also, FSWs in Mysore had significantly greater exposure to the interventions compared to Mumbai. There is reasonable evidence that Guntur FSWs were more likely to be contacted and given condoms by PE/NGO workers, as well as to have witnessed a condom demonstration in comparison to Mumbai FSWs. Although there was strong evidence of significantly more FSWs ever having visited the sexual health clinic in Guntur as compared to Mumbai, there was no evidence of difference between the two in ever having received a grey pack at the clinic. This indicates that there could be an over reporting of STI clinic attendance or lower *frequency* of clinic visits, thus lowering the chances of ever having received a grey pack.

Furthermore, there was no evident difference in ever having attended a drop-in centre (DIC) between Guntur and Mumbai. Given that DICs are located close to or in the same building as the clinics, it was quite unexpected that STI clinic attendance was higher than the level of DIC attendance in Guntur. One explanation may be that the stigma of sex work is quite high in Guntur, and although an STI may necessitate going to the clinic for a quick check-up or treatment, visiting the DICs may be avoided as it is associated with sex work by the community. On the other hand, the higher levels of ever having visited sexual health clinics

and DICs in Mysore may be due to FSWs being more empowered and thus more able to attend both. The significantly low levels of intervention exposure in Mumbai compared to Mysore may be due to the lack of awareness of the specific services and facilities available, and the problem of reaching such a large number of women. Additionally, the majority of FSWs in Mumbai work more than 20 days per month, thus limiting the time available for intervention exposure. This large disparity in exposure to intervention between the districts suggests the need to investigate additional factors, such as stigma, scale and reach of the intervention, and location of the clinic and DIC.

As with exposure to intervention, Mysore had the highest levels of reported condom use among all partner types. Despite this fact, nearly half of the FSWs in Mysore reported that they *never* used condoms with regular partners, with even greater proportions in Guntur and Mumbai. Low rates of reported condom use with regular partners could be due to feelings of trust, intimacy and low risk perceptions, avoiding suspicion of sex work, or ultimately partner refusal and violence (47). Mumbai FSWs also had substantially lower proportions of always using condoms with non-commercial and repeat clients compared with occasional clients indicating greater complexities in negotiating condom use with more familiar partners and clients (16, 48). Overall, Mumbai had the lowest levels of condom use with all types of partners among the three districts. However, given that greater than 90% of FSWs in Mumbai rely on sex work for their sole source of income, these women may have a limited choice in whether or not to use condoms.

Limitations

This study had a number of limitations. Cross-sectional study design has inherent disadvantages, namely that the measurement of risk factors and outcomes are limited to point and period prevalence taken at one, simultaneous point in time, thus giving rise to issues of establishing temporality. Additionally, no causal inferences can be made between the exposure and outcomes, in this case between exposure to the interventions and condom use. Given that this particular study had no baseline survey, it is not possible to see whether behaviours with regard to condom use or exposure to intervention changed over time.

Reliability of self-reporting is a critical issue in this study. Given that many questions asked about past history of behaviour and exposure, for example the frequency of condom use among different partner types, recall bias is highly probable. Furthermore, social desirable responses may have been given, especially for questions regarding more taboo sexual behaviours, like anal sex. Many factors like societal norms, stigma, interview environment, privacy, and particularly the attitude and rapport of the participant with interviewer can influence social desirability bias (49, 50). In Mysore, interviews conducted by peer FSWs may have yielded more truthful answers with regard to behaviour as opposed to interviews with unfamiliar health-researchers in Guntur and Mumbai. Conversely, peer-FSWs may have been seen as threatening to the participants' sex work, thus causing the respondents to withhold valuable information during the interview. Also, given the lengthy questionnaire and nearly hour-long interview, both respondents and interviewers may have also been fatigued during the process, potentially resulting in misreporting and information error. The different interviewers and interviewing skills may also affect the reliability of the data. Additionally, response rates were high for both Guntur and Mumbai; however, relatively low for Mysore. Given that non-respondents generally have different characteristics from survey respondents, a degree of selection bias may have occurred, thus affecting the data collected from Mysore.

A few issues also arose with regard to the questionnaires used in the three districts. Overall, the majority of the questions were standardized among the three surveys; however, a few questions differed among the districts. Questions regarding place of solicitation (POS) for clients and place of entertainment with clients allowed for multiple responses in the district of Mysore as opposed to a single response in the other two districts. Thus, according to the recoding scheme developed by KHPT, all the multiple POS responses were re-coded to a single response largely according to their primary sampling unit (PSU). Although this was the only manner in which to compare these questions among the three districts, selecting one response may have unintentionally led to information bias.

Moreover, the questions about condom use at last sex were not standardized among the four different partner types – regular partner, other non-commercial partners, occasional clients, and repeat clients. For occasional clients, no last-event questions about condom were asked and for regular partners the question was asked with reference to the ‘last 10 times participant had sex with regular partner,’ thus analysis could not be done on these question types. To find a question used across all partner types the aggregate measure of condom use frequency with each partner type was used. However, this question type may have been more prone to recall bias (51, 52). Furthermore, questions on charges per sex act were omitted; this measure would have been an additional factor worth examining, as condom use may be associated with varying charges for sex acts in each district (16).

The intervention exposure and condom use measurements in this study are not representative all of the nuances involved with HIV risk reduction. Self-esteem and empowerment resulting from these interventions are critical aspects, as these elements help promote motivation for seeking preventative measures for HIV transmission. Currently, qualitative studies are being undertaken in these three districts to provide better understanding of these aspects, in addition to issues of violence, mental health, and stigma (47).

Conclusion

This study unveiled striking differences in socio-demographic characteristics, sex work patterns and environments, condom use with different partner types, and exposure to interventions in the districts of Guntur, Mysore, and Mumbai. The results help to pinpoint factors in Guntur and Mumbai which make the FSWs there a more vulnerable population in comparison to Mysore. Further investigation needs to be carried out to determine how the intervention strategies should be altered in accordance with these district-specific risk factors – ultimately shaping the *Avahan* interventions into a more effective means to reduce HIV transmission within FSW populations.

FUTURE RECOMMENDATIONS

- ❖ In the future, the same study could be carried out using place of solicitation (POS) as the exposure variable instead of the districts. Associations between the POS and socio-demographic and sex work characteristic, POS and condom use, & POS and intervention exposure could give more insight on POS-related vulnerabilities. Additionally, it would help to determine the relative importance of POS-related risk factors to the district-related risk factors (19).
- ❖ Additionally, investigating the association between exposure to the intervention and reported condom use in the three districts combined would be important for determining if intervention exposure led to improved condom usage. Also, the dose response to the intervention could be measured (e.g. number of times attended clinic, number of grey packs received, number of condom demo seen, and number visits to the drop-in centre in a month).
- ❖ In an effort to measure potential social desirability bias, comparisons between the survey type used in this study (FTFIs) and alternative surveys (Informal Confidential Voting Interviews (ICVIs)) could be carried out for each district.
- ❖ In order to validate the data further, results from the FTFIs (this study), along with the ICVIs and qualitative data (currently being analyzed) for the three districts could serve as means for triangulation – ultimately providing reliable and valid information for improving targeted programme interventions.
- ❖ Conducting subsequent cross-sectional surveys in these three districts over the next few years would also help to observe changes in socio-demographic characteristics and sex work patterns, as well as fluctuations in condom use and intervention exposure.

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Table 1: Studies on Interventions for FSWs within India

<u>Author & Year</u>	<u>Location</u>	<u>Type of Study</u>	<u>Number of participants</u>	<u>Intervention given</u>	<u>Condom Usage</u>	<u>HIV or other STI measures</u>
Bhave, et al. (1995)	Mumbai	Controlled intervention trial (pre and post intervention cross-sectional study)	<i>Intervention:</i> 334 SWs and 20 madams <i>Controls:</i> 207 SWs and 17 madams	Educational and motivational videos, group discussions pictorial educational material	↑ “Always” using condoms with clients (3% to 28%) in intervention gp as compared to control gp (3% to 0%)	↓ incidence densities of HIV (0.16/person years versus 0.05/py), syphilis (0.22/py and 0.08/py), and hepatitis B (0.12/py and 0.04/py) control vs. intervention, respectively
Basu, et al. (2004)	West Bengal	Pre and post (community controlled) intervention cross-sectional study	<i>Intervention:</i> 100 SWs <i>Controls:</i> 100 SWs	Health clinic and basic STI information, local peer educator training, outreach workers, advocacy work in community	↑ Constant condom users from 32% to 57% in intervention gp and decreased from 47% to 31% in control gp	Not measured
Brahme, et al. (2005)	Pune	Cross-sectional study (1993-1997)	Total of 1,359 FSWs attending STIs clinic	NACO and other NGO initiated interventions	↑ Consistent condom use (22% to 42%)	↓ Presence of genital ulcers over time, ↑ syphilis over time. Genital discharge remained stable
Gangopadhyay, et al. (2005)	Kolkata (Calcutta)	Pre and post intervention cross-sectional study	<i>Intervention</i> (Sonagachi): 173 SWs <i>Control</i> (NACO-only): 169 SWs	Sonagachi: Peer-led education, condom distribution, free STI clinics	Not measured	No difference in the prevalence of STIs between the two areas
Reza-Paul, et al. (2008)	Mysore	Pre and post intervention cross-sectional study	<i>Baseline:</i> 429 FSWs <i>Follow-up:</i> 425 FSWs	Peer-mediated outreach, sexual health services, condom accessibility, drop-in centre, presumptive treatment (1g azithromycin and 400mg cefixime)	↑ Condom use at last sex between baseline and follow-up: occasional clients (65% vs. 90%); repeat clients (53% vs. 66%); regular partners (7% vs. 30%)	↓ Syphilis (25% to 12%), trichomonas infection (33% to 14%), chlamydial infection (11% to 5%) HIV prevalence remained stable (26% vs. 24%).

Table 2: Studies on Interventions for FSWs in Other Asian Countries

<u>Author & Year</u>	<u>Location</u>	<u>Type of Study</u>	<u>Number of participants</u>	<u>Intervention given</u>	<u>Condom Usage</u>	<u>HIV or other STI measures</u>
van Griensven, et al. (1998)	South Thailand	Cohort study within pre and post controlled intervention cross-sectional studies	Intervention: 159 CSWs Control: 124 CSWs	Informational and educational campaign, peer educator training	No increase between intervention and control groups (75% vs 80%)	No difference in HIV prevalence ($\approx 20\%$) or incidence between intervention and control groups (4.3/100 person years vs. 4.2/100 pys)
Ford, et al. (1999)	Central Thailand	Pre and post (controlled intervention) cross-sectional study	Intervention: 62 CSWs Control: 68 CSWs	Video scenarios, discussions coordinated by health workers, video-depicted open-ended narratives all in an effort to promote self-esteem	\uparrow Consistent use with customers in the past month in intervention group (66% to 86%) and \downarrow in control gp (83% to 74%, <i>not significant</i>)	Not measured
Ford, et al. (2002)	Bali (Denpasar), Indonesia	Pre and post (intervention) cross-sectional study	High-effort area (intervention): 427 FSWs Low-effort area (control): 822 FSWs	Educational sessions, treatment, condom distribution, printed information for clients	Stable condom use in high-effort area, but \uparrow in low-effort area (65.7% to 74.4%)	\downarrow Syphilis prevalence (high-effort: 15.3 to 3.0% and low-effort: 8.4 to 4.8%) and trichomonas infection (high-effort: 9.8 to 0.5% and low-effort: 12.2 to 4.8%) Gonorrhoea stable for high-effort, decreased in low effort (66.1 to 55.0%), chlamydia stable in both
Ma, et al. (2002)	Guangzhou, China	Prospective cohort study	966 FSWs total	Counselling and sexual health education, STI clinics, written and video material	\uparrow Consistent condom use from 30% to 81%	\downarrow incidences of gonorrhoea (17.5/100 py to 5.1/100 py), trichomoniasis (22.4/100 py to 3.0/100 py), and chlamydia (65.9/100 py to 16.1/100 py)
Wong, et al. (2004)	Singapore	Pre and post (intervention) cross-sectional study	2,737 FSWs total	Educational sessions	\uparrow Consistent condom use from baseline to follow up ($< 45.0\%$ to 95.1%)	\downarrow in cervical gonorrhoea incidence from baseline to follow up (> 30 to 2/1000 person-months)

Table 3: Studies on Interventions for FSWs in Africa and South America

<u>Author & Year</u>	<u>Location</u>	<u>Type of Study</u>	<u>Number of participants</u>	<u>Intervention given</u>	<u>Condom Usage</u>	<u>HIV or other STI measures</u>
Laga, et al. (1994)	Kinshasa, Zaire (Democratic Republic of Congo)	Cohort study	531 FSWs HIV-1 sero-negative	Condom promotion and STI screening and treatment	↑ Condom use with clients (11% to 68%)	↓ in incidence of HIV-1 from the first 6 month interval to the last 6 month interval, 3 years later (11.7/100 women years (wy) vs. 4.4/100 wy)
Walden, et al. (1999)	Malawi	Pre and post (intervention) cross-sectional study with additional qualitative methods	Active district: 147 FSWs Non-active district: 154 FSWs Average district: 123 FSWs	Peer-educators, condom distribution	↑ in condom use with paying partners in active district compared to non-active and average (90.3% vs. 66.7% and 76.3%)	Not measured
Ray, et al. (2001)	Harare, Zimbabwe	Pre and post (intervention) cross-sectional study	Group A: 99 FSWs Group B: 50 FSWs	Group A: Received both male and female condoms as well as STI testing and treatment Group B: Received only male condoms as well as STI testing and treatment	↑ in consistent male condom use in Group A (0% to 52%) and in Group B (0% to 82%) Little consistent use of female condoms with clients in Group A (3% - 9%)	Not measured
Ghys, et al. (2002)	Abidjan, Côte d'Ivoire	Multiyear cross-sectional study	853 FSWs total	Peer education, group health education sessions, condom social marketing, free STI clinics, condom distribution	↑ in condom use with the most recent client from baseline to follow up (63% to 91%)	↓ in prevalence of HIV (89% to 32%), gonorrhoea (33% to 11%), genital ulcers (21% to 4%), and syphilis (21% to 2%) Increase in the prevalence of Chlamydia (5 to 7%)

Alary, et al. (2002)	Contonou, Benin	Three serial cross-sectional surveys	1,330 FSWs total	Field worker visits and free monthly STI testing and treatment	↑ in condom use (62.2% to 80.7%)	↓ in syphilis (8.9% to 1.5%), gonorrhoea (43.2% to 20.5%), and Chlamydia ↓ in prevalence of HIV (53.3% to 40.6%), <i>but not significant</i>
Kaul, et al. (2002 & 2004)	Nairobi, Kenya	Randomized, double blind placebo-controlled study	466 sero-negative for HIV FSWs Intervention: 230 FSWs Control: 236 FSWs	All subjects were given HIV prevention services including access to free condoms, risk reduction counselling, and STI diagnosis and treatment <i>Intervention arm</i> was additionally given monthly 1g of azithromycin <i>Control arm</i> identical placebo	↑ in proportion “always” using condoms (17% to 57.7%)	HIV-1 incidence did not differ between intervention and control arm (4% vs. 3.2%) ↓ incidence in intervention group of gonorrhoea (rate ratio (RR), 0.46), chlamydia (RR, 0.38), trichomonas (RR, 0.56).
Larsen, et al. (2004)	Port Loko, Sierra Leone	Pre and post (intervention) cross-sectional study	<i>FSWs:</i> <i>Baseline:</i> 201 <i>Follow-up:</i> 202 <i>Military personnel:</i> <i>Baseline:</i> 202 <i>Follow-up:</i> 205	Community outreach and education activities	↑ in condom use during last sex increased among CSWs (38% to 68%) and military (39% to 68%)	Not measured
Wong, et al. (2004)	Singapore	Pre and post (intervention) cross-sectional study	2,737 FSWs total	Educational sessions	↑ Consistent condom use from baseline to follow up (<45.0% to 95.1%)	↓ in cervical gonorrhoea incidence from baseline to follow up (>30 to 2/1000 person-months)

Table 4: Comparison of socio-demographic characteristics between female sex workers in the districts of Guntur, Mysore, & Mumbai

Socio-demographic Characteristics		<i>Guntur</i> % (n=208)	<i>Mysore</i> % (n=213)	<i>Mumbai</i> % (n=395)	p-value (Wald test)
	Age Group (yrs)				
	<25	24.0	14.6	16.7	0.0297
	25-29	21.8	19.5	32.8	
	30-34	20.9	21.6	21.3	
	35+	33.3	44.3	29.2	
	<i>Average Age</i>	30.0	32.3	30.5	
	Marital Status				
	Never married	6.7	8.5	17.0	<0.001
	Currently married	35.4	32.4	34.4	
	Separated/divorced	40.3	39.2	24.7	
	Widowed	17.6	19.9	15.0	
	Devadasi	-	-	8.9	
	Children (at least 1)				
	Yes	86.1	80.3	80.7	0.365
	No	13.9	19.7	19.3	
	Literate				
	Yes	34.0	28.6	30.1	0.587
	No	66.0	71.4	69.9	
	Other income				
Yes	69.3	52.3	8.1	<0.001	
No	30.7	47.7	92.0		
Residency					
Place of Interview	96.8	64.0	93.5	<0.001	
Outside area	3.2	36.1	6.5		
Age at first sex					
<15	42.5	20.7	19.6	<0.001	
15+	57.5	79.3	80.4		
<i>Average age at first sex</i>	15.0	17.2	16.5		
Regular Partner					
Yes	61.4	75.5	53.1	<0.001	
No	38.1	24.6	46.9		

Table 5: Comparison of patterns of sex work between female sex workers in the districts of Guntur, Mysore, & Mumbai

	Guntur % (n=208)	Mysore % (n=213)	Mumbai % (n=395)	p-value (χ^2 test)
Age started sex work (yrs)				
< 20	19.7	17.6	26.2	<0.001
20-24	35.7	25.6	40.9	
25-29	27.8	29.3	23.7	
30 +	16.8	27.5	9.2	
<i>Average age</i>	23.9	25.6	22.4	
Duration of sex work (yrs)				
< 5	51.1	40.6	31.9	0.0043
5 +	48.9	59.4	68.1	
<i>Average duration</i>	6.0	6.7	8.1	
Solicit commercial clients				
Home	45.0	11.7	0.7	<0.001
Brothel	19.6	5.6	30.4	
Public Place	35.4	82.8	68.9	
Place of entertainment				
Home	64.1	15.3	11.3	<0.001
Brothel	18.0	76.1	87.9	
Public Place	17.9	8.7	0.8	
Means to solicit clients				
Independent	29.0	75.3	50.4	<0.001
Middleman (pimp/broker)	64.3	9.3	0.5	
None (direct to brothel)	3.6	5.7	48.7	
Phone (Other)	3.1	9.6	(0.46)	
Non-paying clients*				
Yes	52.8	12.2	29.4	<0.001
Repeat clients				
Yes	86.9	63.9	85.2	<0.001
Number of clients on last day worked				
< 3 clients	43.8	64.2	44.0	<0.001
3 to 5 clients	47.9	33.4	49.5	
6+ clients	8.3	2.4	6.5	
<i>Average number</i>	3.1	2.6	3.1	
Days worked in a month				
< 7 days	10.2	40.9	1.4	<0.001
7 to 19 days	57.1	47.7	22.7	
20 + days	32.7	11.4	75.9	
<i>Average days</i>	14.7	9.4	21.6	
Number of sex acts in a month				
< 20	16.9	54.0	11.2	<0.001
20 to 49	35.6	33.9	21.9	
50+	47.6	12.1	66.9	
<i>Average number</i>	62.5	28.3	76.9	
Sex work in places outside of interview				
Yes	66.4	90.6	81.0	<0.001
Anal Sex				
Total ever asked	96.6	44.5	99.5	<0.001
Total ever had anal sex	32.7	3.3	20.4	<0.001

Sex work patterns

Table 6: Associations between condom use among female sex workers with different partner among female sex workers in the districts of Guntur, Mysore, & Mumbai

Districts				
Condom use	Guntur % (n=208)	Mysore % (n=213)	Mumbai % (n=395)	p-value (χ^2 test)
Condom use with regular partner (cohabiting)	n=133	n=152	n=194	
Never (0%)	58.0	45.5	90.8	<0.001
Sometimes (<50%)	24.7	7.6	4.1	
Frequently (\geq 50%)	7.5	3.2	2.3	
Always (100%)	9.8	43.7	2.8	
Condom use with non-paying client (NPC)	n=109	n=26	n=125	
Never	33.7	2.1	67.4	<0.001
Sometimes	14.7	-	22.5	
Frequently	21.7	-	7.7	
Always	29.8	98.0	2.4	
Condom use with occasional clients	n=208	n=213	n=395	
Never	0.4	0.5	0.1	<0.001
Sometimes	7.5	0.4	2.5	
Frequently	15.7	2.3	30.4	
Always	76.3	96.8	67.0	
Condom use with repeat commercial clients	n=181	n=130	n=324	
Never	1.6	0.5	4.2	<0.001
Sometimes	3.9	0.7	11.0	
Frequently	9.9	0.8	36.8	
Always	84.6	98.0	48.0	
At last sex or always in the last 10 times				
Condom use at last sex with NPC	n=67 92.7	n=25 100.0	n=44 61.3	<0.001
Condom use at last sex with repeat client	n=178 98.3	n=129 93.8	n=306 89.3	0.0884
Always use condoms in last 10 times had sex with regular partner	n=62 33.1	n=77 83.2	n=18 30.3	<0.001
Condom use with anal sex acts				
Last anal sex with occasional client	n=39 97.6	n=2 42.9	n=18 80.3	0.1949
Last anal sex with repeat client	n=12 100.0	n=2 100.0	n=11 100.0	-

Table 7: Associations between reported exposure to intervention among female sex workers in the districts of Guntur, Mysore, & Mumbai

	Districts			p-value (χ^2 test)
	Guntur % (n=208)	Mysore % (n=213)	Mumbai % (n=395)	
Aware of NGO*	97.7	98.2	90.8	0.001
Ever visited by PE [†] /NGO worker*	95.6	94.8	82.1	<0.001
Ever given condom by PE/NGO worker*	95.8	96.5	82.5	<0.001
Ever witnessed condom demonstration	91.6	96.8	78.2	<0.001
Ever visited the sexual health clinic	94.1	98.2	49.4	<0.001
Ever visited the drop-in centre	47.8	96.7	39.2	<0.001
Ever received the “grey pack” † §	n=198	n=204	n=199	
	78.1	98.1	64.6	<0.001

Table 8: Univariate & multivariate analyses of always using condom with various partner types among female sex workers in the districts of Guntur, Mysore, and Mumbai									
Condom use	Districts								
	Mumbai	Guntur				Mysore			
	Reference	Crude OR (95% CI)	p-value (Wald)	Adjusted OR (95% CI)	p-value (Wald)	Crude OR (95% CI)	p-value (Wald)	Adjusted OR (95% CI)	p-value (Wald)
Regular partners	1	3.81 (1.00-14.48)	0.050	1.83 (0.24-14.20)	0.56	27.15 (7.88-93.53)	<0.001	25.18 (4.24-149.32)	<0.001
Non-paying clients	1	17.40 (4.14-73.08)	<0.001	50.08 (6.44-388.94)	<0.001	> 500 (181-21406)	<0.001	> 500(1829-7036864)	<0.001
Occasional clients	1	1.59 (0.96-2.62)	0.073	3.37 (1.12-10.07)	0.03	14.65 (6.83-31.43)	<0.001	8.27 (2.78-24.55)	<0.001
Repeat clients	1	5.94 (3.42-10.33)	<0.001	4.14 (1.30-13.25)	0.017	51.99 (16.1-167.15)	<0.001	24.67 (5.22-116.46)	<0.001

OR: odds ratios; CI: confidence interval

*Actual Crude OR: 1,966 & Adjusted OR: 113,440; unusually large ORs due to small sample size in Mysore (n=26), corresponding to those having NPC

Multivariate models were adjusted for age, additional income, place of solicitation (POS), live outside of POS, duration of sex work, means to solicit, number of days worked per month, number of sex acts per month, currently do sex work outside of POS, ever been asked for anal sex, age initiated into sex work, number of clients on last day worked, have repeat clients & have non-paying clients

Table 9: Univariate & multivariate analyses of reported exposure to intervention among female sex workers in the districts of Guntur, Mysore, and Mumbai

Condom use	<i>Districts</i>								
	<i>Mumbai</i>	<i>Guntur</i>				<i>Mysore</i>			
	Reference	Crude OR (95% CI)	p-value (Wald)	Adjusted OR (95% CI)	p-value (Wald)	Crude OR (95% CI)	p-value (Wald)	Adjusted OR (95% CI)	p-value (Wald)
<i>Ever visited by PE‡/NGO* worker</i>	1	4.78 (2.33-9.822)	<0.001	13.00 (1.76-95.46)	0.012	4.00 (1.85-8.69)	0.001	23.75 (5.80-97.19)	<0.001
<i>Ever received condoms from PE/NGO worker</i>	1	4.86 (2.24-10.52)	<0.001	6.89 (1.14-41.45)	0.036	5.82 (2.56-13.26)	<0.001	21.15 (4.50-99.38)	<0.001
<i>Ever witnessed condom demonstration</i>	1	3.03 (1.59-5.80)	0.001	5.74 (1.34-24.50)	0.019	8.32 (3.47-19.93)	<0.001	50.92 (12.04-215.32)	<0.001
<i>Ever visited the drop-in centre</i>	1	1.40 (0.97-2.04)	0.074	1.25 (0.60-2.63)	0.549	44.97 (20.49-98.69)	<0.001	141.52 (38.20-524.30)	<0.001
<i>Ever visited the sexual health clinic</i>	1	16.44 (8.56-31.60)	<0.001	21.85 (5.84-81.69)	<0.001	56.96 (21.44-151.33)	<0.001	440.76 (71.48-2717.67)	<0.001
<i>Ever received a "grey pack"†</i>	1	1.95 (1.05-3.63)	0.035	1.16 (0.36-3.76)	0.807	14.57 (6.12-34.68)	<0.001	45.64 (10.51-198.08)	<0.001

‡ PE: FSW Peer Educators

OR, odds ratios; CI, confidence interval

*For Mysore, NGO is specifically Ashodaya

† ‘Grey pack’ consists of 1g azithromycin and 400mg cefixime and is a presumptive treatment taken every 3-6 months for gonorrhoea and chlamydia infection

Multivariate models were adjusted for age, marital status, additional income, place of solicitation (POS), live outside of POS, duration of sex work, means to solicit, number of days worked per month, number of sex acts per month, currently do sex work outside of POS, ever been asked for anal sex, ever had anal sex, cohabiting with a regular partner, age initiated into sex work, & number of clients on last day worked