

Size estimation, HIV prevalence and risk behaviours of female sex workers in Pakistan

Arshad Altaf,¹ Ajmal Agha,² Merydth Holte-McKinzie,³ Qamar Abbas,⁴ Salma Batool Jafri,⁵ Faran Emmanuel⁶

Canada-Pakistan HIV/AIDS Surveillance Project of Canadian International Development Agency, Sindh & National AIDS Control Programme, Karachi & Islamabad,¹ Community Health Sciences, Aga Khan University, Karachi,² AgriTeam Canada Consulting Ltd, 107 Promenade du Portage, Gatineau, Québec, Canada,³ Sindh AIDS Control Program, Government of Sindh, I.I. Depot, Karachi,⁴ Molecular Microbiology Lab, Sindh Institute of Urology and Transplantation, Karachi,⁵ Centre for Global Public Health, Dept of Community Health Sciences, University of Manitoba, Winnipeg, Canada.⁶

Corresponding Author: Arshad Altaf. Email: arshad.altaf@gmail.com

Abstract

Objective: To provide size estimation and to determine risky behaviours and HIV prevalence among female sex workers in Pakistan, which has progressed from a low to concentrated level of HIV epidemic.

Methods: A cross-sectional study (geographic mapping and integrated behavioural and biological survey-IBBS) was conducted between August 2005 to January 2006 in Karachi, Hyderabad and Sukkur. A detailed questionnaire and dry blood spot (DBS) specimen for HIV testing were collected by trained interviewers after informed consent. The study was ethically approved by review boards in Canada and Pakistan.

Results: About 14,900 female sex workers were estimated to be functional in Sindh. A total of 1158 of them were interviewed for the study. Average age of sex workers was 27.4±6.7 years, and the majority 787 (67.9%) were married, and uneducated 764 (65.9%). Sindhi (26.4%) was the predominant ethnicity. Mean number of paid clients was 2.1±1.2. Three workers were confirmed HIV positive (0.75%, 95 percent CI 0.2-2.2%) from Karachi. Condom use at last sexual act was highest (68%) among brothel-based workers from Karachi, and the lowest in Sukkur where only 1.3% street-based workers reported using a condom at last sexual act. Overall use of illicit drugs through injections was negligible.

Conclusion: HIV prevalence among female sex workers in Sindh, Pakistan is low but risky behaviours are present. Well organised service delivery programmes can help promoting safer practices.

Keywords: Female sex workers, Pakistan, Size estimation, Risk behaviours, HIV prevalence (JPMA 62: 551; 2012).

Introduction

The burden of Human Immunodeficiency Virus (HIV) among vulnerable groups is steadily increasing in Pakistan. HIV-positive injection drug users (IDUs) are reported from multiple cities across the country and the country has also progressed from low to concentrated level of the epidemic. Sindh is the most industrialised province of the country with a population of over 60 million. In 2008, the prevalence of HIV among IDUs in Karachi was 23.1% (95% CI: 19.0, 27.2), Hyderabad 30.5% (95% CI: 26.0, 35.0) and Larkana 28.5% (95% CI: 24.0, 33.0).¹ Though injection drug use has surpassed the heterosexual mode of transmission in 2004,² the risk associated with unsafe sex with female sex workers (FSW) still remains.

In Karachi and Hyderabad, there still exists red light areas with functioning brothels. However, its sex workers population dwindled sharply after a ban was imposed in the early 1980s. A large number of FSWs have left the area and now live in large to small flat complexes or less-developed localities in various parts of the city. There is no brothel in Sukkur. In 1998, a study was conducted in the red light district in Karachi and 81 FSWs were screened for HIV. Although no one was HIV-positive, 65% used no contraception and condom use was negligible.³ In 2004, another study was conducted in Karachi among 423 FSWs, and no one was HIV-positive and only 22% reported condom use at last sexual encounter.⁴ In the same year, a separate study documented low HIV knowledge levels among FSWs in Hyderabad and various misconceptions regarding Acquired Immune Deficiency Syndrome.⁵

The present study was conducted in 2005-6 as part of the second-generation surveillance work carried out by the Canada-Pakistan HIV/AIDS Surveillance Project, funded by the Canadian International Development Agency in partnership with the National and Sindh AIDS Control Programmes, to estimate the size of four key sub-populations - female sex workers (FSW), male sex workers (MSW), hijra sex workers (HSW) and IDUs - in three cities of the Sindh province of Pakistan. The three cities are vastly different. Karachi is a metropolis, Hyderabad has a mix of urban and rural dynamics, and Sukkur is in rural Sindh. No previous research among FSWs has been conducted in this pattern covering three key cities of a province at a time. The findings of the study have been used as baseline by policymakers and programme planners.

Methods

The cross-sectional study was conducted in Karachi, Hyderabad and Sukkur between August 2005 and January 2006. The survey was preceded by geographic mapping in order to reach size estimation and to define sampling

procedures prior to an integrated behavioural and biological survey (IBBS). To map the high-risk groups and estimate their sizes, the HIV/AIDS Surveillance Project (HASP) of the National AIDS Control Pakistan has developed a mapping approach to gather data and understand the risk situation in high-risk groups in terms of the number of settings and population size(s).⁶

The data collected are placed on a geographical map, in an epidemiological context of person, place and time. The approach involves defining high-risk activities for HIV, determining 'who' is involved and ascertaining 'how many' are there. In addition, the methodology identifies various locales (locations and spots) - where and when high-risk activity takes place - and prepares a detailed profile of these locations. The methodology provides size estimates of each of the populations. Identifying locations where high-risk activities take place was the first step of data collection, done in level 1 (also called L1). Practically, it involved field teams going out in various zones and gathering information from secondary and tertiary key informants. Respondents were asked about places/spots where drug injecting and sex work were carried out in each zone, and the information was recorded in a pre-designed format. Estimated numbers of each group (minimum and maximum) involved in these activities were also collected for each spot. The number of interviews required in each zone was kept to approximately 50. However, it ranged between 40 and 60 in different study settings. The objective was to reach a saturation point in the information collected within each targeted zone. The next step in data collection involved conducting key informant interviews at the selected spots within each zone. These interviews involved interviewing primary key informants (high-risk group themselves) and focused on validating the information collected and collated in the previous exercise. In smaller cities, all spots identified in L1 were visited, whereas in larger metropolitans, at least half of the spots were visited. This activity served as a verification of data collected during L1 and helped validate spots/cruising sites in each zone.

The validation process of kothikhana-based and home-based FSWs followed a slightly different methodology. A list of all network operators (i.e. pimps, aunties, madams, etc.) was prepared through snowballing in each zone, and these network operators were then interviewed for the number of sex workers who worked with each network operator, as well as the locations where this sex work was conducted. A similar sort of validation process was conducted for HSWs, in which 'deras' were profiled through snowballing and gurus were interviewed to gather information about specific spots as well as related information about the community. New spots were identified while talking to the high-risk

groups were added to the list.⁶

A spot is the place where a high-risk group is present or congregates. It is usually associated with an identifier. For example, "bus stop near ABC Hospital" or "corner of Abdullah Shah Ghazi mazar" etc. The distribution of a city in zone is for the convenience of implementing methodology and does not really have any thing to do with the administrative structure set by the city. For a large city like Karachi, 10-15 percent spots were validated whereas in smaller cities like Sukkur, all spots were validated. During the validation process, overlap was adjusted by revising the names of the spots, especially if they were very close to each other.

The approach was originally adapted from similar studies conducted by the India-Canada HIVAIDS Project (University of Manitoba, Canada), but a number of changes were made to tailor the methodology for local scenario and research needs.

Field teams were recruited on the basis of prior experience of similar kind of work, and were trained for three days on the basic concepts of HIV/AIDS and the mapping methodology. Due to legal vulnerability of the study participants, letters of support were obtained from the AIDS Control Programme and each field worker was given one with his/her name on it. A monitoring system was designed for quality assurance and a timeline was developed to complete data collection within the designated timeframe.

The setting of the study was crucial and the cities were picked after due consideration. Karachi is Pakistan's largest city; a sprawling metropolis by the sea, made up of 18 towns and six cantonments. It is one of the most important harbours on the Arabian Sea and has been a trading hub for centuries. Its estimated population is over 15 million.⁷ The city has a diverse, multi-ethnic population and a large number of people come here for economic opportunities.

Hyderabad and Sukkur are the second and third largest cities of the province, located 175 and 400 kms respectively north of Karachi. Hyderabad is the gateway to rural Sindh. It is also an important commercial center with textile, sugar, cement and glass manufacturing industries. It produces almost all of the ornamental glass bangles in Pakistan.⁸

Sukkur is located on the west bank of river Indus and it has one of the largest barrage systems of Asia, which is used for irrigation. It has a population of about 908,373. Even after scarcity of water Sukkur still has a large fertile and cultivable land. There are small-scale cottage industries as well. It is very famous for its dates. It also holds a large

number of riveraine forests on the course of Indus.⁹

The next step was to calculate the sample size for each most-at-risk population (MARPs) for individual cities. This was based on assumptions in which baseline prevalence and expected change in prevalence were varied to get the maximum sample size.

The estimated prevalence of condom use at baseline was used (reported at 45% from past studies) and the sample size was so calculated to detect a change of 10-15% in the baseline prevalence in future. With a 95% level of significance, and the power of the study set at 80%, a design effect of 2.0 was used to detect a sample size of 375. The sample was further inflated by 10% to account for data errors and missing values.

Ethical approval for the study was obtained from ethical review committees registered in Canada and Pakistan. Informed consent was also obtained from the study participants before the collection of behavioural and biological data by trained interviewers. The interviewer read aloud a one-and-a-half page document explaining the purpose of the study, the stakeholders involved, who to contact for any questions, what kinds of questions would be asked and requesting permission to collect a blood specimen. Once the participants agreed, they signed on the consent form along with date and time.

For the purposes of this study, any female who undertook sexual activity with a man in return for money or other financial benefits irrespective of the site of operation i.e., street, call girls, brothel, kothi-khana or home, was classified as an FSW. Inclusion criteria demanded that the female had to be between 15-45 years old and willing to participate. Although the legal age for consent in Pakistan is 18 years, but this age was negotiated with the ethical review committees because a large number of girls get into sex work at an early age. Those who were intoxicated and in the interviewer's judgment incapable of understanding the information needed for the survey were excluded.

Brothel-based sex workers included those girls who were living in a brothel with their families which usually included a mother and siblings. A father was occasionally found. They would go out mostly to the clients for commercial sex. Their rates and timings and the mode of transportation were almost always negotiated by the madam/pimp. The families would typically include either the mother, who in most cases was also a sex worker and had resided in a brothel all her life.

The case definition of street-based FSWs included a female who solicits clients in public places such as busy streets, intersections, bus and train stations and marketplaces. Sexual transactions always occurred at a venue chosen by the FSW and/or the client.

Kothi-Khana is a colloquial expression for a sex-work venue that literally means grand house. However, kothi-khanas are generally small premises, which are rented by a madam and/or pimp where a small number (usually two to three) of FSWs lived and entertained clients. Kothi-khanas were often in residential areas and were largely clandestine. Kothi-khana and home-based FSWs included those females who were living in these locations.

In terms of sampling strategy, time location cluster sampling was used to recruit street, home and kothi-khana based FSWs. This approach has been increasingly used in recent years. It takes advantage of the fact that some hidden populations tend to gather or congregate at certain types of locations.¹⁰ In time location cluster sampling, these spots are enumerated first in a geographic mapping exercise as done in our study. The list of spots was used as a sampling frame to choose a probability sample found at the spots during a pre-defined time interval. Three attempts were made at each spot to recruit study participants for IBBS. In case she was not available or refused, which was negligible, the next spot in the list was used for recruiting purposes. The number of sex workers at one spot remained between two to three. However, the issue of interviewing the first available two could not be ruled out. Brothel-based FSWs were recruited using random sampling after conducting a census. Interviews of kothi-khana/home based FSWs were conducted at the project office in complete privacy by female interviewers. The study participants were provided transportation and a token amount of Rs 500 (US\$ 8.3; exchange rate at the time of study 1US\$=60 Pak rupees). While in the brothel, one room was hired and selected FSWs came there for the interview and blood sampling.

Blood samples were collected by Dried Blood Specimen (DBS) methodology. DBS was collected using self-retracting lancets. The interviewers had received training in DBS collection and universal precautions. All the specimen were tested for HIV antibodies at the Molecular Diagnostics and Immunology Laboratory of the Sindh Institute of Urology and Transplantation (SIUT). All the specimens were screened by an EIA (Enzyme immunoassay); HIV Genetic Systems rLAV EIA (Bio-Rad USA) (in single wells). Samples that tested positive in screening were tested in duplicate wells by the second EIA (Vironostika HIV Uni-Form II; Biomeriux, The Netherlands). Specimens positive by the second EIA were confirmed by the Western Blot (Genetic Systems HIV-1 Western Blot; Bio-Rad USA). The blood sample was taken from the middle finger of the left hand. Usually the tiny mark of needle stays for three to four days so that was also used as monitoring indicator to ensure there weren't any duplication of interviews.

Forms of mapping and IBBS were edited first in the

field and then at the office to avoid any data omissions or mistakes. All forms that did not have estimates were rejected.

Data were entered using Epi Info 6 [Center for Disease Control, Atlanta, USA], and Statistical Program for Social Sciences (SPSS) version 12 [SPSS Inc., Chicago, Illinois, USA] was used for further analysis. We calculated means and standard deviation for continuous and proportions for categorical variables.

Although the questionnaire used in IBBS had several indicators, for the purposes of this manuscript only those indicators recommended by the Family Health International Behavioral Surveillance Surveys (BSS) Guidelines for Repeated Behavioural Surveys in Populations at Risk of HIV.¹¹

These indicators define aspects of behaviour that are key to the spread of HIV, and behaviours that HIV prevention programmes should generally track. Although most indicators in the FHI list are self explanatory, two require further explanation. The first, "no incorrect beliefs about AIDS transmission", reflects on the misconceptions about AIDS, including that a healthy looking person cannot have HIV infection or that HIV can be transmitted by insect bite or eating together with an HIV-positive person, sharing utensils and clothes etc. The second indicator was the knowledge of prevention methods. The prevention methods probed included condom use during sex, avoiding sex, that proper use of condoms can prevent HIV transmission, use of new syringe for injection and blood transfusion of screened blood only.

Results

The findings of geographic mapping suggested that there were a total of 14900 female sex workers estimated in the three selected cities of Sindh. Karachi being the largest city, had the highest number of sex workers with an estimate of 11500 (street-based 5800; home/kothikhana 5600, and brothel 100) at 916 spots. In Hyderabad there were 1700 FSWs estimated, including 1000 street-based, 600 home/kothikhana based and 100 in brothel found at 186 spots. In Sukkur 1700 FSWs were estimated, including 900 street-based and 800 home/kothikhana based, at 236 spots. There was no functioning brothel in Sukkur city.

A total of 1158 FSWs of different categories were interviewed for IBBS in the three cities. The response rate was about 97%. However, 33 study participants were rejected because they did not belong to the sex workers' category. In Karachi a total of 400 FSWs were interviewed. Among them 125 (31%) were street-based, 225 (56%) kothi-khana/home, and 50 (13%) brothel-based FSWs. In Hyderabad, 390 FSWs were included in the IBBS. Out of

Table-1: Knowledge and behaviours of street-based FSWs in Karachi, Hyderabad and Sukkur.

Variables	Karachi N=125		Hyderabad N=122		Sukkur N=80	
	Count	%	Count	%	Count	%
Condom use at last sexual act						
Yes	48	38.4	15	12.3	1	1.3
Used injection for taking illicit drugs in the past six months						
Yes	1	0.8			1	1.3
Exposure to interventions (prevention programmes for FSWs)						
Yes	30	24			0	
No incorrect beliefs about AIDS transmission						
Rejected common misconceptions	1	0.8	2	1.6	0	
Misconceptions about AIDS mentioned	124	99.2	120	98.4	80	100
Knowledge of HIV prevention methods?						
None of the methods was identified	27	21.6	96	78.7	80	100
Any one of the methods identified	42	33.6	17	13.9		
Two or more methods were identified	56	44.8	9	7.4		
Voluntary HIV test						
Yes	3	2.4	2	1.6	2	2.5

FSWs: Female Sex Workers.

Table-2: Knowledge and behaviours of kothikhana/home based FSWs in Karachi, Hyderabad and Sukkur.

	Karachi N=225		Hyderabad N=228		Sukkur N=288	
	Count	%	Count	%	Count	%
Condom use at last sexual act						
Yes	113	50.2	23	10.1	62	21.5
Used injection for taking illicit drugs in the past six months						
Yes	2	0.9			27	9.4
Exposure to intervention (prevention programmes for FSWs)						
Yes	60	26.7	5	2.2	1	0.3
No incorrect beliefs about AIDS transmission						
Rejected common misconceptions	25	11.1			7	2.4
Misconceptions about AIDS mentioned	200	88.9	228	100	281	97.6
Knowledge of HIV prevention methods						
None of the methods was identified	53	23.6	184	80.7	130	45.1
Any one of the methods identified	64	28.4	37	16.2	66	22.9
Two or more methods were identified	108	48	7	3.1	92	31.9
Voluntary HIV test						
Yes	10	4.4	4	1.7	7	2.4

FSWs: Female Sex Workers.

them, 122 (31%) were street-based, 228 (58%) kothi-khana/home based and 40 (10%) brothel-based. In Sukkur, 368 FSWs were interviewed. Out of them 80 (22%) were street-based and 288 (78%) kothi-khana/home based. There was no brothel in Sukkur. The knowledge and behavioural details were noted (Table 1-3).

The average age of FSWs in Karachi was 27.4 ± 6.7 years, Hyderabad 28.7±6.7 years and Sukkur 25.9±6.5 years. In the three cities, majority (68.3%) FSWs were married, but the highest proportion was in the home-based category in Hyderabad where 215 (94.3%) were married. It is noteworthy that brothel-based FSWs consider themselves to be married to long-term clients in exchange for a regular income for sex. FSWs in Karachi entertained an average of

2.1±1.4 clients per day, while in Hyderabad it was 1.2±0.7 and in Sukkur 2.6±1.1 clients a day.

Questions related to knowledge and risky behaviours showed condom use at last sexual act among kothi-khana/home based category to be 113 (50.2%) in Karachi, 23 (10.1%) in Hyderabad and 62 (21.5%) in Sukkur. At least one HIV prevention method (i.e. condom use) was reported by 64 (28.4%) in Karachi, 37 (16.2%) in Hyderabad and 66 (22.9%) in Sukkur. Thirtyone (62%) brothel-based FSWs from Karachi said they always used a condom in the preceding month and 22 (55%) in Hyderabad. No FSW reported using drugs through injection. Two or more prevention methods for HIV were reported by 23 (46%) FSWs in Karachi and 19 (47.5%) in Hyderabad.

Table-3: Knowledge and behaviours of brothel-based FSWs in Karachi and Hyderabad.

	Karachi N=50		Hyderabad N=40	
	Count	%	Count	%
Condom use at last sexual act				
Yes	34	68	28	7.2
Used Injection for taking illicit drugs in the past six months				
No	50	100	40	100
Exposure to intervention (prevention programmes for FSWs)				
Yes	41	82	24	60
No incorrect beliefs about AIDS transmission				
Rejected common misconceptions	5	10	4	10
Misconceptions about AIDS mentioned	45	90	36	90
Knowledge of HIV prevention methods				
None of the methods was identified	8	16	2	5
Any one of the methods identified	19	38	19	47.5
Two or more methods were identified	23	46	19	47.5
Voluntary HIV test				
Yes	35	70	28	82.3

FSWs: Female Sex Workers.

Three (0.75%, 95 percent CI 0.2-2.2%) FSWs from Karachi were confirmed HIV-positive. Two of the three were kothi-khana/home based and one was street-based. In Hyderabad, out of 390 no one was HIV-positive. Similarly in Sukkur out of 368 no FSW was found to be HIV-positive.

Discussion

The three cities of Sindh have almost 15000 (14900) FSWs. Karachi had the highest estimate of 11500 FSWs, while Hyderabad and Sukkur had 1700 sex workers each of different categories. The prevalence of HIV among FSWs in Karachi, Hyderabad and Sukkur was less than one percent; there were only three HIV-positive FSWs in Karachi (0.75%). Condom use at last sexual act was highest (68%) among brothel-based FSWs from Karachi, and the lowest in Sukkur where only 1.3% street-based FSWs reported using a condom at last sexual act. The overall use of illicit drugs through injections was negligible.

FSWs in Pakistan have low HIV prevalence even with risky behaviours such as minimal condom use. While heterosexual contact still remains as the most common mode of HIV transmission globally,¹² in Pakistan injection drug use has surpassed heterosexual sex as the main mode of transmission² since 2004. Local experts suggest that the clientele of sex workers in Pakistan is still a small group of males which has not yet acquired HIV even if some of them may be bisexual. But they are of firm belief that the situation is bound to change in the near future. Nevertheless the transmission potential of HIV through sexual contact cannot be undermined, particularly when condom use among sex workers in Pakistan is of hugely varying degrees. Condom use in commercial sex is also related to the presence and quality of intervention programmes. In the brothels of Karachi and

Hyderabad where there has been a service delivery programme on ground since 2004-5, the indicators are much better. For example, in Karachi 68% brothel-based FSWs reported condom use in their last sexual act, whereas in Sukkur, where there was no service delivery programme, the condom use among street-based FSWs was only 1.3% in their last sexual act. Besides, in Karachi where a lot of focus has been on brothels and it is practically not easy to identify or recruit street-based FSWs into a programme, condom use in their last sexual act was only 12.3%. Well-organised intervention programmes with good outreach workers do result in improved safe practices. In China outreach workers visited establishments of sex workers to conduct interventions (lectures, discussion, video and audio and condom distribution) over six weeks. Condom use at preceding sexual act and in the last three sexual encounters increased from 61% to 85% ($p < 0.01$).¹³ In another community-led intervention programme for FSWs in Mysore, India, striking increases in condom use were seen between baseline and follow-up surveys. Condom use at last sexual act with occasional clients was 65% versus 90% ($p < 0.001$), and improved with repeat clients from 53% to 66%.¹⁴

The experience of working with the intervention programme for FSWs in Pakistan suggests that a lot of focus was put on the brothels, most likely because of convenience and easy access; although it should be noted that even working at a static site is not easy. Merely 30% of street-based FSWs were aware of the intervention but more than half (60%) of kothi-khana/home based FSWs were exposed to the intervention. Interacting with aunties and madams has suggested that recruiting street-based FSWs is never easy and requires both persistence and a well skilled peer educator because this particular group likes to keep a very low profile,

unlike kothi-khana/home based FSWs who have a key contact in the middle in the form of madam/aunti/baji or a male pimp. If the middle person, commonly termed in Pakistan as social mobiliser, is willing, working with kothi-khana/home based FSWs is not that challenging as has been our experience while recruiting this group in surveillance rounds. An effective programme should have a modest number of outreach workers. While no reference is available as to what should be the ideal number of outreach workers, usually one outreach worker cannot cover more than 30-40 FSWs and an ideal programme should target even less number of FSWs per outreach worker. However, that will obviously depend on the resources available.

There are certain limitations to the study. It has been four years since data collection, and no service delivery programme was on ground for FSWs in Sukkur because of bureaucratic delays. In Hyderabad it continued on an irregular basis. While every effort was made to ensure that the respondents belonged to the high-risk group in question and (female) study coordinators frequently checked the quality of interviewers, interviewer and recall bias cannot be ruled out. Similarly, the issue of deviating from sampling strategy and collecting samples for convenience can also not be ruled out. The delay in receiving treatment due to anonymous unlink study was never discussed in length at the beginning of the study, and towards the end of the project it was decided by all stakeholders that all future studies will be linked. Ideally, sexually transmitted infections (STIs) should have been studied as well, but due to the decreased sensitivity and specificity of DBS technique in determining STIs (syphilis, for example), it was decided not to include STIs.

The findings of the behavioural and biological survey have been used as baseline by programmes providing services to FSWs in Sindh. Following this survey, another round was conducted in 2006-7 among all risk groups, including FSWs.

Conclusion

The low prevalence of HIV among FSWs in Pakistan is a window of opportunity to capitalise on and develop

effective programmes with trained peer educators. Service delivery programmes for all sub-categories of FSWs promoting condom use as well as Voluntary Counselling and Testing (VCT) should be on ground in these three cities.

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