



Epidemiology of HIV/AIDS and Syphilis among High Risk Groups in Pakistan

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ABSTRACT

The prevalence of HIV/AIDS and syphilis is rapidly increasing among high risk groups (HRGs) in Pakistan leading it away from achieving the 6th millennium development goal of halting and reversing HIV/AIDS epidemic. Syphilis increases the risk of HIV transmission by two to five times, and this co-infection is common among HRGs. The objective of this study was to investigate the prevalence of HIV/AIDS and syphilis among selected HRGs. During a period from September 2015 to February 2016, community-based sampling was done from 134 Hijra sex workers (HSW), 101 female sex workers (FSW), 104 jail prisoners and 48 intravenous drug users (IDUs) through community outreach, peer referring and field sampling. Blood samples were tested for syphilis and HIV infections after pre-test counseling and receiving informed written consent. Initial testing was performed by rapid devices approved by World Health Organization (WHO) and confirmed by Chemiluminescence Immunoassays (CLIA). Of total 387 respondents, 149 subjects tested positive for syphilis (38.5%), whereas 37 tested positive for HIV (9.6%). Syphilis co-infection was found in 22 of the HIV infected subjects (59.5%; odd ratio 2.53; p=0.008). Co-infection was most prevalent among HSW group (90.9%; OR 8.67; P=0.005) followed by FSW group (20%) and IDUs (14.3%). There is a pressing need for HIV prevention plan that should emphasize on raising awareness and promote use of preventive measures to limit HIV/AIDS and syphilis infections in HRGs especially among the HSWs and FSWs.

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Authors' Contribution

UW conducted the study and wrote main draft of manuscript. HSS and AF assisted in data collection. HAZ helped in study design and research supervision. AR and MA helped in manuscript revision and data analysis.

Key words

HIV-syphilis co-infection, High risk groups, Sex workers, Intravenous drug users.

INTRODUCTION

As the world enters the fourth decade of human immunodeficiency virus (HIV) epidemic, AIDS has emerged as one of the most serious public health problems in the developing countries. According to WHO, 1.2 million people died of AIDS in 2014 alone and an estimated 36.9 million people were living with HIV by the end of 2014 (WHO, 2015). The situation is very depressing in countries with low human development index (HDI) scores, where the magnitude of the epidemic is continuously expanding.

In Pakistan, the first case of HIV was diagnosed in 1986 and was reported in 1987 (UNO, 2016). Since then, the number has increased dramatically. According to the national estimates, there are 102,000 people infected with

HIV (NACP, 2016). Due to high prevalence of HIV in high risk groups, the country is now classified into concentrated phase of the epidemic (Bokhari *et al.*, 2007). The mode of transmission largely remains heterosexual (52.55%) followed by blood transfusion (11.73%) (Baqi *et al.*, 1998; Bhurgri, 2006). The country is placed among 12 countries which account for more than 90% of the infected people living with HIV and is one of the 12 countries bearing more than 90% of new HIV infections in Asia region (UNAIDS, 2013). Globally new HIV infections have dropped by 0.7% during last decade, but in sharp contrast, the incidence and disease burden of HIV is continuously growing at an alarming pace in Pakistan. The latest report on global disease burden (GBD) of HIV shows 17.6% increase in annual incidence of HIV in Pakistan compared to 2.2% for the rest of the world (The Lancet, 2015). The situation is further aggravated by low coverage (5.87%) of anti-retroviral treatment (ART) in Pakistani patients, which is second only to Afghanistan and Madagascar. This resulted

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in a staggering 14.4% increase in HIV-related mortality rate. The wide-ranging impact of HIV/AIDS in Pakistan deserves renewed attention and additional research.

The probability of acquiring HIV infection is increased many folds in the presence of other sexually transmitted infections most notably, syphilis. There has been a strong interaction between very early HIV infection and syphilis. Despite the low reported incidence of HIV infection (<0.1%) in adult Pakistani population, the epidemic is becoming established among high risk groups (HRGs) including intravenous drug users (IDUs), female sex workers (FSWs), men who have sex with men (MSM) and transgenders (a.k.a. Hijra sex workers or HSWs). This group is repeatedly termed as the “vectors of disease” and “core transmitters” (World Bank Report, 2013).

The objective of this cross-sectional study was to investigate the prevalence of HIV/AIDS and syphilis among selected high risk groups in five cities of Pakistan.

MATERIAL AND METHODS

High risk group

A community-based sampling was carried out from four high risk groups: Hijra sex workers (HSW), female sex workers (FSW), jail prisoners and intravenous drug users (IDUs) from September 2015 to February 2016, through community outreach, peer referring and field sampling. The sampling was carried out from 5 major cities of Pakistan, including Islamabad (IDUs), Rawalpindi (FSWs, HSWs), Faisalabad (FSWs, HSWs), Mirpur (Jail Prisoners), and Kotli (Jail Prisoners).

Hijra sex workers (HSW)

They live and work under the command of senior Hijras known as ‘Gurus’ whom they respect and follow (Nanda, 1990). The Guru patronizes his followers, trains them in singing and dancing and facilitates their commercial sex work. Our study team identified and approached the Gurus in Rawalpindi and Faisalabad and convinced them to participate in the study. The house of the Guru was used as the sampling site. Eligibility criteria included willingness to participate on the study.

Female sex workers (FSW)

These participants were enrolled through respondent-driven sampling (RDS), used for hidden subjects or difficult to reach (Heckathorn, 1997). The business settings for FSWs included brothels, hair/beauty salons, hotels, and private homes, and were either identifiable or otherwise. Samples were collected at their sites, already mapped though coordination with their representatives or ‘managers’. The inclusion criteria included: the FSW

must be involved in commercial sex for money or goods during the past 2 months; and was aged ≥ 16 years; and was willing to participate in the study by providing informed consent.

Jail prisoners

The sampling was carried out from selected population of jail prisoners known to have high risk sexual behavior. The sampling was carried out at two district jails (Mirpur and Kotli). A meeting was organized at each of these prisons with superintendent of prison prior to the study. Approval was granted by the Superintendent of Police. During the process of collecting the samples and individual consent, no jail officer was involved in order to avoid any pressure to the prisoners.

Intravenous drug users (IDU)

Field sampling was carried out at the public places where these drug users used to gather for the activity. Many of them were homeless street dwellers and jobless. Inclusion criteria included subjects taking drugs for recreational/non-therapeutic purposes and through subdermal route at least once during the past month.

Sample collection and testing

Blood samples (about 5 ml) were collected after pre-test counseling from each participant for HIV and syphilis testing using the standard protocol. Samples were transported to the testing facility maintaining cold chain, centrifuged, and serum was frozen at -40°C until testing. All study participants gave informed written consent. The results of the testing were kept confidential and were made available only to participating subjects. Initial HIV testing was carried out by rapid HIV devices (Alere Determine™ HIV-1/2, Alere North America Inc. USA) approved by WHO and re-tested by the Architect Anti-HIV-1/2 chemiluminescence immunoassay on the Architect i2000 system (Abbott Laboratories, Abbott Park, IL, USA). The result was considered positive only if the second confirmatory test was also positive. Rapid plasma reagin (RPR) test was performed for screening antibodies to syphilis (Spinreact, SA/SAU, Ctra. Santa Coloma, Spain) and confirmed by anti-TP chemiluminescence immunoassay on the Architect i2000 system (Abbott Laboratories, Abbott Park, IL, USA) and the result was considered positive only if the second confirmatory test was also positive.

All initial screening and confirmatory tests were conducted at the Department of Blood Transfusion Services, Shaheed Zulfikar Ali Bhutto Medical University, Islamabad. Statistical analysis was carried out using SPSS 20.0. The frequencies of HIV and syphilis results,

odds ratios (OR) and 95% confidence intervals (CI) were calculated. A p value of ≤ 0.05 was considered to be significant. The research protocol was reviewed and approved by the Ethical Committee of Shaheed Zulfiqar Ali Bhutto Medical University dated March 26, 2015.

Table I.- Frequency of HIV and syphilis in high risk groups (N=387).

	Syphilis Negative	Syphilis Positive	Odd Ratio	95% CI	P value
Transgenders /HSW (n=134)					
HIV Neg	52	60	8.67	1.93-38.85	0.005
HIV Pos	2	20			
Female sex workers/FSW (n=101)					
HIV Neg	64	32	0.5	0.054-4.65	0.54
HIV Pos	4	1			
Jail Prisoners (n=104)					
HIV Neg	68	33	0.29	0.015-5.82	0.42
HIV Pos	3	0			
Intravenous Drug users/IDUs (n=48)					
HIV Neg	39	2	3.25	0.25-41.6	0.36
HIV Pos	6	1			
Overall HRGs (n=387)					
HIV Neg	223	127	2.53	1.3-5.1	0.008
HIV Pos	15	22			

RESULTS

A total of 387 subjects from selected high risk groups agreed to provide blood samples and written consents. The overall refusal rate to participate in the study was 7%. Among responders, there were 134 hijra sex workers (HSWs), 101 female sex workers (FSWs), 104 jail prisoners with high risk behavior and 48 intravenous drug users (IDUs). The median age in HSW group was 29 years (range 19-45 years). The FSWs were aged between 17 and 35 years with a median age of 22.5 years. All jail prisoners included in the study were male with a median age of 34 years (range 23-51 years). All IDUs were also males with a median age of 31.5 years (range 21-49 years).

Of 387, a total of 149 subjects tested positive for syphilis (38.5%), whereas 37 tested positive for HIV (9.6%). Syphilis co-infection was found in 22 of the HIV infected subjects (59.5%; odd ratio 2.53; $p=0.008$). The prevalence of HIV among hijra sex workers (HSWs) was found to be 16.4%, followed by 14.6% in intravenous drug users (IDUs), 4.95% among female sex workers (FSWs) and 2.9% in jail prisoners.

Likewise, syphilis infection was found to be 59.7%

among HSWs, followed by 32.7% in FSWs, 31.7% among jail prisoners and 6.25% in IDUs. HIV co-infection was 90.9% among HSWs, followed by 20% in FSWs, 14.3% among IDUs, while none of the jail prisoner had HIV-syphilis co-infection. [Table I](#) shows prevalence of HIV and syphilis among different risk groups.

DISCUSSION

Pakistan is a signatory to the Millennium Development Goals (MDGs); goal 6 of which states that Pakistan will “halt and begin to reverse the spread of the human immunodeficiency virus (HIV) that causes AIDS” by the year 2015. In continuation of the MDGs, the Sustainable Development Goals (SDGs) also advocate a need to end the epidemic of AIDS by 2030 under goal 3 ([United Nations, 2017](#)). However, the key challenges which hamper this struggle and intensify HIV vulnerability and risk in Pakistan are stigmas attached to the disease, socioeconomic inequality, illiteracy, economic limitations and a large covert sex work industry. The sex workers often receive inadequate attention from both healthcare officials and community. Credible data is difficult to gather due to stigma linked with sex work.

The prevalence of syphilis, HIV and its co-infection has been reportedly increasing among the sex workers, especially HSWs. An integrated biological and behavioral survey (IBBS) was conducted in 19 cities by the HIV/AIDS Surveillance Project (HASP) in 2011, which established the prevalence of HIV among HSWs to be 5.2%, compared to 6.1% in 2008. Despite a relatively low prevalence shown in the survey, more recent surveys have reported a surge in this percentage especially in the cities of Rawalpindi and Karachi. A survey conducted by [Raza et al. \(2015\)](#) documented HIV and syphilis prevalence in this group as 23% and 76.9%, respectively in Rawalpindi. An increasing trend of both HIV and syphilis among HSWs is seen over the last decade. A study from Indonesia has reported the prevalence of syphilis and HIV as 19.3% and 22% among hijra sex workers ([Pisani et al., 2004](#)). A meta-analysis from USA, six Asia-Pacific countries, five Latin America, and three European countries revealed the prevalence of HIV among HSWs as 19.1% ([Baral et al., 2013](#)). Another group from USA reported the prevalence of HIV as 12.0% in 2008 ([Schulden et al., 2008](#)).

Female sex workers (FSWs) harbor a large burden of HIV infection worldwide despite extensive HIV prevention efforts targeting FSWs over the past decades ([Shannon et al., 2015](#)). Our study reported the prevalence of syphilis and HIV in FSWs as 32.67% and 4.95%, respectively. A recent study from China showed the prevalence of syphilis and HIV as 15.0% and 4.7%, respectively ([Zhou](#)

et al., 2014). Another group from Bangladesh reported the prevalence for these infections as 45.7% and 2.8% (Azim *et al.*, 2001). We observed during sample collection that FSWs have good knowledge of the sexual behaviors and attitudes that go with it and use of condoms. The Integrated Biological and Behavioral Surveillance, Round 2 of the Ministry of Health Pakistan has reported that 11.4% of FSWs were aware of HIV prevention programmes (IBBS Round 2, 2007).

Due to overpopulation, Pakistani jails have turned high risk for communicable disease notably AIDS, syphilis, hepatitis and other STIs. Globally, the prisoner population has shown a higher prevalence rates for these communicable diseases as compared to the general population (Hutchinson *et al.*, 1998; Taylor *et al.*, 1995; Spaulding *et al.*, 2002; Wiehe *et al.*, 2015; Shah *et al.*, 2013). Our study has reported the prevalence of syphilis and HIV as 31.7% and 2.9%, respectively. In Ghana, the HIV seroprevalence was 5.9% while for syphilis it was 16.5% (Adjei *et al.*, 2008). HIV prevalence was 2.1% in a national survey from prisons in Iran in 2009 (Navadeh *et al.*, 2013). A study from Maryland, USA reported the prevalence of HIV among prisoners as 3.3% (Kassira *et al.*, 2001). Due to high prevalence of HIV among high risk groups, jail prisoners are an essential audience for HIV/AIDS testing, treatment, and prevention efforts. HIV in prisons is both a public health and a human rights issue that needs to be addressed urgently for an effective response.

Drug abuse and addiction have been intricately associated with contracting HIV and syphilis. The infected drug users have the potential to spread it to their sexual partners further escalating the epidemic. In India, 45% of the wives of HIV positive IDUs were tested positive (Panda *et al.*, 2000). Our study has reported the prevalence of 6.25% and 14.6% for syphilis and HIV respectively. Some earlier reports from Pakistan have reported the prevalence for syphilis and HIV as 13-16% and 23%, respectively (Altaf *et al.*, 2003; Ghauri *et al.*, 2003; Bokhari *et al.*, 2007). Two separate studies investigated the prevalence of syphilis as 25.9% while HIV was documented as 12.4% (Hameed *et al.*, 2010; Samo *et al.*, 2013). International reports on syphilis and HIV prevalence in IDUs show 11.33% and 8.66% prevalence in Russia, 23% and 1.4% in Bangladesh, 3.11% and 8.68% in China (Rhodes *et al.*, 2006; Azim *et al.*, 2002; Zou *et al.*, 2015).

CONCLUSION

Our study demonstrates high prevalence of HIV/AIDS and syphilis co-infections among high risk groups in Pakistan. The findings of this study warrant further research on implementing interventions targeting specific

HRGs. High prevalence of HIV and syphilis among HSWs underlines need of a multipronged approach towards HIV and Syphilis prevention and treatment in this group. The HIV, Syphilis epidemics in Pakistan can be curtailed by targeting mainly the vulnerable and high risk groups which have high propensity of contracting these sexually transmitted infections. This could lessen the size of epidemic impact and could limit it at an early stage.

Statement of conflict of interest

Authors have declared no conflict of interest.

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