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HIV, hepatitis B, and hepatitis C prevalence and associated risk behaviors among female sex workers in three Afghan cities

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Abstract

Objective—To assess prevalence of HIV, syphilis, and hepatitis B (HBV) and C virus and associated risk behaviors among female sex workers (FSWs) in three Afghan cities. Design: Cross-sectional prevalence assessment.

Methods—Consented FSWs from Jalalabad, Kabul, and Mazar-i-Sharif completed an interviewer-administered questionnaire, pre and post-test counseling, and rapid and confirmatory testing for HIV, HCV, HBV and syphilis. Logistic regression was used to detect correlates associated with HBV infection.

Results—Of 520 participants, median age and age of initiating sex work were 29 and 23 years, respectively, and median number of monthly clients was 12. Few FSWs reported ever having used illicit drugs (6.9%) or alcohol (4.7%). Demographic and risk behaviors varied significantly by enrollment site, with Kabul FSWs more likely to report sexually-transmitted infection (STI) symptoms, longer sex work duration, and sex work in other cities. Prevalence of HIV was 0.19%, HCV was 1.92%, and HBV was 6.54%, with no cases of syphilis detected. HBV was independently associated with 12 clients monthly (AOR=3.15, 95% CI: 1.38 – 7.17), ever using alcohol (AOR=2.61, 95% CI: 1.45 – 4.69), anal sex (AOR=2.42, 95% CI: 1.15 – 5.08), and having children (AOR=2.12, 95% CI: 1.72 – 2.63) in site-controlled multivariate analysis.

Conclusions—While prevalence of HIV, HCV, and syphilis is currently low in these three Afghan cities, risky sexual practices were common and associated with HBV. Programming inclusive of voluntary testing for HIV, viral hepatitis, and STIs, hepatitis vaccination, substance abuse prevention, and condom promotion for both FSWs and clients should be pursued in Afghanistan.

Keywords

HIV; hepatitis B; female sex worker; Afghanistan

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Introduction

Sex work has long been recognized as a driver of epidemics of sexually-transmitted infections (STIs), including HIV, in several Asian settings [1,2]. These epidemics are initially concentrated among sex workers (SWs) and generalized among clients and their partners; these groups, predominantly SWs, have been the target of prevention activities in settings where sex work is openly conducted [3-5]. In more conservative settings, such as Pakistan and Iran, SWs remain a largely hidden population.[6,7] HIV has been documented among SWs in these conservative settings and concern is growing that this population will be difficult to reach with prevention activities [7,8].

In Afghanistan, a highly socially-conservative country, sex work is illegal and, in prior governments, was a capital offense [9,10]. However, sizable SW populations have been enumerated in several urban centers [11,12]. This risk group is predicted to increase in size due to rising cost of living and limited job prospects, particularly for women [10]. Men, particularly adolescent boys, also engage in sex work and transactional sex [11]. As noted in other settings, there is some degree of overlap between drug user and SW populations, which increases direct risk of HIV infection for SWs and establishes SWs as a bridging group between injecting drug users (IDUs) and other populations [13-15]. Among IDUs surveyed in Kabul in 2006, the majority reported ever having patronized a female SW (FSW) and condom use was rare [16].

While there are few data regarding general population or vulnerable group seroprevalence of STIs like *N. gonorrhea* and *C. trachomatis*, with respect to HIV, Afghanistan is currently considered a low prevalence country [1]. Among a national sample of 16,870 blood donors in 2005, positive screening tests were reported for hepatitis C virus (HCV) among 2.6%, for syphilis-suggestive (VDRL) reaction among 0.35%, for hepatitis B surface antigen (HBsAg) among 1.23%, and for HIV among 0.12% [17]. Among a sample of obstetric patients in Kabul, there were no HIV or syphilis cases detected in 2006; the prevalence of HBsAg was 1.53% [18]. However, among IDUs in Kabul and Herat, measurable prevalence of HIV (3.1% for both cities), HBsAg (6.5% and 3.5%), and syphilis (1.2% and 1.5%) was detected in 2005 and 2007, respectively [16,19, 20]. Prior reports indicated that both HIV awareness and condom use are quite low among FSWs in Kabul, but there are no data on STI prevalence among this group [11,21]. The purpose of this study was to assess seroprevalence of HIV, syphilis, hepatitis C virus (HCV), and hepatitis B virus (HBV) and associated risk behaviors among FSWs in three Afghan cities.

Methods

Setting

Participants were recruited in Jalalabad, Kabul, and Mazar-i-Sharif, the largest cities in their respective regions. Kabul, the capital of Afghanistan, has a population of 2.5 million, with Dari (Afghan dialect of Farsi) being the most common spoken language amidst an ethnically diverse population [22]. The population of Mazar-i-Sharif, approximately 300,600, is ethnically mixed with the predominant languages spoken being Dari and Uzbek [22]. Jalalabad is located in Nangahar Province, with an estimated population of 60,000 and is predominantly Pashtun [22]. At the time of this study, there were two SW-focused programs operating in Kabul, with one program in each Jalalabad and Mazar-i-Sharif.

Study Design and Participants

This cross-sectional study was conducted between September, 2006 and January, 2008 through the designated programs or International Rescue Committee (IRC) study offices in each site. Eligible participants were those: reporting sex work within the past six months,

aged 18 years or greater, and able to provide informed consent. Prior to data collection, approval was obtained from the institutional review boards of the University of California, San Diego; the Walter Reed Army Institute of Research; the U.S. Naval Medical Research Unit 3 in Cairo, Egypt; and the Ministry of Public Health of the Islamic Republic of Afghanistan.

Measures

The study instrument assessed socio-demographics, travel, sex work histories, and other risky drug use and sexual behaviors. Duration of sex work, age of sex work initiation, travel outside Afghanistan, and monthly client volume were included to reflect potential exposure to infection. Condom use and consistent use with clients in the last 6 months was assessed due to potential risk reduction. We also assessed current STI symptoms and treatment for an STI in the last 3 months to provide additional insight into sexual risk and care-seeking behaviors. Illicit drugs and alcohol use were assessed, including whether drugs were used to facilitate sex work or used with clients.

Procedures

Only individuals previously identified as SWs through outreach or other prior programs were considered for participation. Program outreach workers or employees of the aforementioned programs approached SWs in their usual places of congregation (e.g. bazaars, tea houses) or the program office and briefly described the study. Those individuals interested in participation were invited to the program office or, where not possible, to the study office and met in a confidential room by a gender-matched study representative, where informed consent was obtained. The study questionnaire was then administered in either Dari or Pashto, according to the participant's preference, in a confidential setting by a gender-matched trained interviewer.

Rapid whole blood testing for HIV, syphilis, and hepatitis B surface antigen (HBsAg) were performed with Determine HIV 1/2®, Determine Syphilis®, and Determine HBsAg® (Abbott Diagnostics Japan, Tokyo, Japan), and hepatitis C virus antibody (HCV Ab) with Standard Diagnostics HCV Ab (Standard Diagnostics, Kyonggi-do, Korea). Positive HIV screens were assessed with a second rapid test, HIV (1+2) Antibody Colloidal Gold® (KHB Kehua, Shanghai, China). Participants with positive rapid tests (and, in the case of HIV, any discordant results with the two rapid tests) underwent intravenous sampling for confirmatory serologic testing. Positive or discordant HIV rapid tests were confirmed with Western blot assay (HIV Blot 2.2®, GeneLabs Diagnostics, Singapore). Syphilis was confirmed with Treponema pallidum particle agglutination (TPPA) assay (Fujirebio Diagnostics, Malvern, PA, USA) and HCV Ab was confirmed with RIBA (RIBA 3.0 SIA®, Chiron Corporation, Emeryville, CA, USA), with testing performed at the Afghan Public Health Institute (APHI) Laboratory in Kabul. Participants were provided with follow-up appointments with the study team for confirmatory results. HBsAg was confirmed with polymerase chain reaction (PCR) (Amplicor, Roche Diagnostics, Mannheim, Germany) at the NAMRU-3 laboratory in Cairo, Egypt.

All participants received pre- and post-test counseling and risk reduction counseling, a small non-monetary gift of hygiene items (e.g. toothpaste, shampoo) of U.S.\$8 value, and condoms. No data were recorded on those declining or ineligible for study entry. Participants with positive screening tests were provided with follow-up appointments to obtain confirmatory results. Syphilis treatment was available through the study program, while participants with hepatitis or HIV were provided with risk reduction counseling and referred to the nearest VCT Center for care.

Statistical Analysis

Descriptive statistics for the study population were generated, stratified by study site. The outcomes of interest were infection prevalence and any detected associations with specific risk behaviors. Prevalence of HIV, syphilis, HCV, and HBV was calculated with ninety-five percent confidence intervals based on Poisson and binomial distributions.

Continuous variables, such as duration of sex work, were transformed to dichotomous variables at the median. Risk behaviors, such as condom use with clients, were reported by frequency. These variables were dichotomized into ever/never (e.g. drug use) or always/ not always (e.g. condom use with clients in the last 6 months). Correlates of HIV, HCV, and syphilis were not analyzed due to low prevalence. Site-controlled logistic regression was performed to identify potential associations between HBV and demographic and risk behavior variables. Variables were entered into a multivariate model if they were associated at the 10% level in univariate analysis. The final site-controlled multivariate model was inclusive of all variables either remaining significant or identified as confounders in likelihood ratio test. The goodness-of-fit of the model was assessed with the Hosmer-Lemeshow test.

Results

Demographics

There were 543 sex workers enrolled in the study; due to the low number of male SWs (n=23), analysis was confined to FSWs (n=520). The majority of FSWs had been married, had no formal education, and originated from Afghanistan (Table 1). Most had children, of whom 94.8% lived with their children. There were significant differences in sociodemographic characteristics by site, with FSWs from Jalalabad being younger, less likely to have been married, and more likely to have lived outside the country in the last 5 years (Table 1). Most (83.4%) participants were unemployed, with others reporting additional employment as cleaners, teachers, or other jobs.

Sex Work-related Characteristics

The mean ages of sexual debut and sex work initiation were 18.1 years (SD=3.0) and 23.3 years (SD=5.1), with 11.2% engaging in sex work prior to age 18. Overall, participants reported a mean of 16.9 (SD=15.0, IQR=5 - 25) monthly clients, with an average service charge of 627 Afghanis (SD=434; range: 100 – 3000) (U.S.\$1=50 Afghanis). Of 710 responses (multiple answers allowed), the most common reasons for engaging in sex work were need to support herself (50.0%) or her family (32.4%); 8.9% reported being forced into sex work by their families. Few reported turning to sex work after being widowed (5.2%) or after being sexually assaulted and consequently unable to marry (1.5%). As FSWs could find clients through multiple sources, 960 responses were received for the question assessing where clients were met. The most common venues for meeting clients were at the bazaar (29.7%), by telephone (24.7%), or through a pimp or madam (24.2%); other venues reported were the tea house (*chai khana*) (12.6%) or private homes (7.9%).

Risky Behaviors

Two-thirds of FSWs (63.3%) had heard of condoms, of whom only half (51.7%) had ever used a condom (Table 1). Nearly one-third (30.2%) of participants had ever used a condom with clients, with 60 (38.2%) reporting always using condoms use with clients in the last 6 months. Of sexual services provided, most participants offered only vaginal intercourse (74.8%), with 18.7% providing both vaginal and anal sex, 2.7% anal sex only, and 2.5% oral and vaginal sex only. FSWs providing anal sex were more likely to have ever used condoms with a client (p=0.005). Half (51.7%) of participants reported treatment for presumptive STI

in the last three months; 29.8% (n=155) reported genital sores, warts, or itching at the time of enrollment.

Regarding other risky behaviors, 6.9% reported ever having used non-medicinal drugs, of whom 34.4% had used sedatives (e.g. diazepam), 28.1% had used pain medication (e.g. pentazocine hydrochloride), 9.4% had used opium, and 6.3% had used marijuana (64 total responses). Only 2 participants reported ever having injected drugs. Alcohol use (which is illegal in Afghanistan) was reported by 4.7% (n=26) participants. Most participants who reported alcohol or drug use only used the substance sporadically, with 93.3% of alcohol users consuming 3 drinks or less each week and 76.2% using medications or other substances twice weekly or less. Of participants using drugs or alcohol (n=51), most reported that alcohol (80.7%) and substance use (72.1%) made sex work easier and 53.9% reported using alcohol or drugs with clients.

Seroprevalence

Seroprevalence of the measured infections was relatively low, with only one case of HIV (0.19%, 95% CI: 0.005 – 1.07) and no cases of syphilis detected. Ten participants had HCV (1.92%, 95% CI: 0.92 – 3.54). HBV was the most common infection, with 34 cases (6.54%, 95% CI: 4.41 – 8.67) diagnosed. There was significant differences by site for HBV prevalence, ranging from 3.0% in Mazar-i-Sharif to 17.5% in Jalalabad ($p<0.001$).

Correlates of Infection

The low prevalence of HIV, syphilis, and HCV precluded subsequent risk factor analysis. In univariable analysis, HBV was associated with ever using drugs, ever using alcohol, charging less than 450 Afghanis per service, 12 clients monthly, and having children (Table 2). In multivariable analysis, 12 clients monthly, ever using alcohol, provision of anal sex, and having children were independently associated with HBV infection (Table 3). No variable reflecting condom use was associated with HBV when considering the entire FSW population (data not shown).

Discussion

Seroprevalence of HIV, syphilis, and HCV were low in these three FSW populations, as compared to IDUs, the only other vulnerable group for which data is available in this setting [16,19,20]. HBV prevalence was also relatively low and similar to that measured among Afghan refugees in Pakistan and among IDUs in Kabul [16,23]. The relatively higher prevalence of HBV in Jalalabad was also observed among IDUs recruited in that city; we attribute this to the proximity to Pakistan, where HBV is endemic and where border crossing was relatively easier than for other countries bordering Afghanistan at the time of this study [24]. In the case of FSWs, HBV exposure may be related to clients spending time in Pakistan. Jalalabad lies on key trucking routes for importation of goods from Pakistan, usually originating at the ports in Karachi [25]. Long-distance truckers have been identified as a bridging group for HIV in other Asian settings such as India, and Pakistan, and may be contributing to the higher prevalence of HBV among FSWs in Jalalabad [26,27]. However, as the prevalence of HBV in the general population in Jalalabad is unknown, it is possible that the disparity between sites represents chronic infection acquired either at birth, through household contacts, or iatrogenically remotely. HBV prevalence among general population groups in Jalalabad should be considered as results may influence childhood vaccination strategies.

HBV was independently associated with charging less for services and with providing anal sex. We believe these associations may result from reduction of practices driven by poverty

or increasing numbers of FSWs. Additionally, engaging in anal sex may be a means of preventing pregnancy in a situation where there is no ability to negotiate condom use. Given the relatively large proportion of FSWs who were married at the time of the study, avoiding vaginal intercourse with clients might ensure there were no paternity disputes or other issues that might lead to an unsafe domestic situation. Anal sex as a means of avoiding unintended pregnancy has been described among adolescent populations, a vulnerable population often lacking condom negotiation skills [28,29]. Further study on the context of condom use with sex work in this setting is needed to better understand reasons for this observation.

The association between HBV and having children may reflect infection acquired at the time of delivery. While assisted deliveries are slowly increasing in Afghanistan, most participants had lived or worked outside Afghanistan in the recent past and may have delivered while refugees [30]. Iatrogenic transmission through injections has been demonstrated to be a large contributor to prevalence of HBV and HCV in Pakistan [31,32]. This association might also reflect willingness of women with dependent children to engage in riskier behaviors or be less discriminating in their clientele and thus be at greater risk for infection.

Ever using alcohol was independently associated with HBV infection in multivariate analysis as was ever using drugs in univariate analysis; these associations may reflect a compromised ability to negotiate condom use when intoxicated. While drug or alcohol use was uncommon among participants, those who had used either substance believed that sex work was easier while intoxicated, an opinion shared by FSWs in diverse settings such as Viet Nam, the Philippines, and Mexico.[33-35]. Use of alcohol or drugs to cope with sex work may increase the likelihood of engaging in risky sexual behaviors or having clients who are drug users, as substance use with clients was reported by half of FSWs who had used drugs or alcohol.

While there is little information regarding the context of sex work in Afghanistan, the characteristics reported by our participants indicate several general differences from those reported among FSWs in Kabul in 2002 [11]. Generally speaking, the reported average number of clients and price/service has decreased while the use of gatekeepers to find clients has increased. The latter finding is supported by our data that nearly one-fourth of women found clients through gatekeepers (i.e., pimps or madams). Our data also speak to how few alternative employment opportunities exist for women in Afghanistan: over four-fifths of women had no other employment, the majority engaged in sex work to support themselves or their families, of whom 5% were widows, and nearly one in ten were forced to participate in sex work by their families

There are a number of limitations to this data that must be considered. First, due to convenience sampling, the results may not represent the true prevalence of HIV, HCV, HBV, or syphilis among FSWs in the cities assessed. Our efforts to safely access this hidden population through outreach programs likely prevented complete representation of FSWs in those cities, but were necessary for participant and staff safety. Although methodologically sub-optimal, input following ethical review for this first study among SWs in Afghanistan determined that recruitment performed solely among previously-identified SWs through operating SW-oriented programming optimally minimized participant risk. We also attempted to recruit male SWs, but could not accrue a sufficient number for characterization; only 23 were enrolled. Further, only adults (age of majority in Afghanistan is 18 years) were considered for participation, though at least 10% of the participants initiated sex work prior to that age. Male and child sex work has been reported in Afghanistan and may have very different associated risk behaviors and resulting prevalence of STIs [11]. Analysis of factors associated with HIV and HCV were under-powered due to the very low prevalence of these infections, potentially masking some associations. Face-to-face interviews may have

resulted in socially-desirable responding regarding various risky behaviors. We attempted to minimize this by having same-sex interviewers; self-administered questionnaires were not feasible due to low literacy and the costs of interactive audio programs were prohibitive. Last, participants were enrolled based on self-report of engaging in sex work. As there were no objective means of determining FSW status, we note that some individuals may have been enrolled who had not actually engaged in sex work. However, monitoring of staff performance, intensive training/ re-training, and use of non-monetary incentives were employed to minimize this occurrence.

In conclusion, while prevalence of HIV, HCV, and syphilis are low among FSWs in Jalalabad, Kabul, and Mazar-i-Sharif, Afghanistan, risky sexual behaviors were common and condom use rare. A number of factors, both social and economic, favor increasing numbers of women turning to sex work for survival and create an environment favorable to infection transmission. In addition to vocational training and educational opportunities for women and political advocacy for women's rights, outreach programming for FSWs should emphasize health sexual education and techniques for culturally-informed condom negotiation. Further, health care, including counseling and HIV/STI testing, reproductive health care, and hepatitis B vaccination, should be incorporated with FSW-oriented outreach programming.

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References

1. Joint United Nations Programme on HIV/AIDS (UNAIDS). Report on the global AIDS epidemic. UNAIDS; Geneva, Switzerland: 2008.
2. Ruxrungtham K, Brown T, Phanuphak P. HIV/AIDS in Asia. *Lancet*. 2004; 364:69–82. [PubMed: 15234860]
3. Gouws E, White PJ, Stover J, Brown T. Short term estimates of adult HIV incidence by mode of transmission: Kenya and Thailand as examples. *Sex Transm Infect*. 2006; 82(Suppl 3):iii51–55. [PubMed: 16735294]
4. Hsieh YH. Changing faces of commercial sex in Thailand: implications for the HIV/AIDS epidemic. *J Acquir Immune Defic Syndr*. 2002; 30:537–40. [PubMed: 12154348]
5. Chandrasekaran P, Dallabetta G, Loo V, Rao S, Gayle H, Alexander A. Containing HIV/AIDS in India: the unfinished agenda. *Lancet Infect Dis*. 2006; 6:508–21. [PubMed: 16870529]
6. Mohebbi MR. Female sex workers and fear of stigmatisation. *Sex Transm Infect*. 2005; 81:180–1. [PubMed: 15800100]
7. Bokhari A, Nizamani NM, Jackson DJ, et al. HIV risk in Karachi and Lahore, Pakistan: an emerging epidemic in injecting and commercial sex networks. *Int J STD AIDS*. 2007; 18:486–92. [PubMed: 17623508]
8. Hawkes S, Collumbien M, Platt L, et al. HIV and other sexually transmitted infections among men, transgenders and women selling sex in two cities in Pakistan: a cross-sectional prevalence survey. *Sex Transm Infect*. 2009; 85(Suppl 2):ii8–16. [PubMed: 19307351]

9. Toosi N. AP IMPACT: Harsh justice under resurgent Taliban. International Business Times. Aug 6.2008 March 26, 2010Available at: http://www.usatoday.com/news/world/2008-08-06-3468733695_x.htm
10. Qadiry T. Under wraps, prostitution rife in north Afghanistan. Reuters News Service. May 20.2008 March 26, 2010Available at:<http://www.reuters.com/article/idUSISL17365820080519>
11. Bazger, F.; Young, AT. Survey of groups at high risk of contracting sexually transmitted infections and HIV/AIDS in Kabul. ORA International; Kabul, Afghanistan: 2005.
12. SAR AIDS Human Development Sector, South Asia Region, The World Bank. Mapping and Situation Assessment of Key Populations at High Risk of HIV in Three Cities of Afghanistan. March 26, 2010Available at: siteresources.worldbank.org/INTHIVAIDS/Resources/-2008-05-16
13. Emmanuel F, Fatima M. Coverage to curb the emerging HIV epidemic among injecting drug users in Pakistan: delivering prevention services where most needed. Int J Drug Policy. 2008; 19(Suppl 1):S59–64. [PubMed: 18281206]
14. Lau JT, Tsui HY, Zhang Y, et al. Comparing HIV-related syringe-sharing behaviors among female IDU engaging versus not engaging in commercial sex. Drug Alcohol Depend. 2008; 97:54–63. [PubMed: 18479841]
15. Saidel TJ, Des Jarlais DC, Peerapatanapokin W, Dorabjee J, Singh S, Brown T. Potential impact of HIV among IDUs on heterosexual transmission in Asian settings: scenarios from the Asian epidemic model. Int J Drug Policy. 2003; 14:63–74.
16. Todd CS, Abed AM, Strathdee SA, et al. Prevalence of HIV, hepatitis C, hepatitis B, and associated risk behaviors among injection drug users in Kabul, Afghanistan. Emerg Infect Dis. 2007; 13:1327–1331. [PubMed: 18252103]
17. Central Blood Bank. Report of Testing of Blood Donors from March – December, 2006. Ministry of Public Health; Kabul: 2006.
18. Todd CS, Ahmadzai M, Atiqzai F, et al. Seroprevalence and correlates of HIV, syphilis, and hepatitis B and C infection among intrapartum patients in Kabul, Afghanistan. BMC Infect Dis. 2008; 8:119. [PubMed: 18798996]
19. Nasir, A.; Todd, CS.; Stanekzai, MR., et al. Prevalence of HIV, Viral Hepatitis, Syphilis and Risk Behaviors among Injection Drug Users in Hirat, Afghanistan [Abstract]. MOPE-0280, International AIDS Conference; August 5, 2008; Mexico City, Mexico.
20. Todd CS, Nasir A, Stanekzai MR, et al. Prevalence and correlates of syphilis and condom use among male injection drug users in four Afghan cities. Sex Transm Dis. Accepted for publication.
21. Foran, J. Knowledge, attitudes, behaviour, and practices: HIV/AIDS study in Afghanistan. Action Aid; Kabul Afghanistan: 2006.
22. Central Statistics Office. Annual Report. Kabul, Afghanistan: 2005.
23. Quddus A, Luby SP, Jamal Z, Jafar T. Prevalence of hepatitis B among Afghan refugees living in Balochistan, Pakistan. Int J Infect Dis. 2006; 10:242–7. [PubMed: 16448838]
24. Andre F. Hepatitis B epidemiology in Asia: the Middle East and Africa. Vaccine. 2000; 18(Suppl 1):S20–2. [PubMed: 10683538]
25. Ali Z, King L. Taliban burns 10 trucks on Afghanistan-Pakistan supply route. Los Angeles Times. Feb 5.2009 March 26, 2010Available at: http://www.latimes.com/news/nationworld/world/la-fg-pakistan5-2009feb05_0,828001.story
26. Pandey A, Benara SK, Roy N, et al. IBBA Study Team. Risk behaviour, sexually transmitted infections and HIV among long-distance truck drivers: a cross-sectional survey along national highways in India. AIDS. 2008; 22(Suppl 5):S81–90. [PubMed: 19098482]
27. Rai MA, Warraich HJ, Ali SH, Nerurkar VR. HIV/AIDS in Pakistan: the battle begins. Retrovirology. 2007; 21:4, 22.
28. Houston AM, Fang J, Husman C, Peralta L. More than just vaginal intercourse: anal intercourse and condom use patterns in the context of “main” and “casual” sexual relationships among urban minority adolescent females. J Pediatr Adolesc Gynecol. 2007; 20:299–304. [PubMed: 17868897]
29. Mpofo E, Flisher AJ, Bility K, Onya H, Lombard C. Sexual partners in a rural South African setting. AIDS Behav. 2006; 10:399–404. [PubMed: 16402280]
30. United Nations Childrens Fund. Afghanistan: Statistics. March 26, 2010Available at: http://www.unicef.org/infobycountry/afghanistan_statistics.html

31. Khan AJ, Luby SP, Fikree F, et al. Unsafe injections and the transmission of hepatitis B and C in a periurban community in Pakistan. *Bull World Health Organ.* 2000; 78:956–63. [PubMed: 10994278]
32. Usman HR, Akhtar S, Rahbar MH, Hamid S, Moattar T, Luby SP. Injections in health care settings: a risk factor for acute hepatitis B virus infection in Karachi, Pakistan. *Epidemiol Infect.* 2003; 130:293–300. [PubMed: 12729198]
33. Nemoto T, Iwamoto M, Colby D, et al. HIV-related risk behaviors among female sex workers in Ho Chi Minh City, Vietnam. *AIDS Educ Prev.* 2008; 20:435–53. [PubMed: 18956984]
34. Chiao C, Morisky DE, Rosenberg R, Ksobiech K, Malow R. The relationship between HIV/ Sexually Transmitted Infection risk and alcohol use during commercial sex episodes: results from the study of female commercial sex workers in the Philippines. *Subst Use Misuse.* 2006; 41:1509–33. [PubMed: 17002991]
35. Strathdee SA, Mausbach B, Lozada R, et al. Predictors of sexual risk reduction among Mexican female sex workers enrolled in a behavioral intervention study. *J Acquir Immune Defic Syndr.* 2009; 51(Suppl 1):S42–6. [PubMed: 19384101]

Table 1
Sociodemographic and behavioral characteristics of female sex workers in Afghanistan (n=520).

Feature	Kabul (N=173)	Jalalabad (N=114)	Mazar-i-Sharif (N=233)	p-value
Age (years)				0.043
Median, IQR	30, 25 - 33	25, 22 - 30	30, 23 - 35	
	N %	N %	N %	
Education				<0.001
> 1 year	28 16.2	18 15.8	74 31.8	
no formal education	145 83.8	96 84.2	159 62.8	
Marital status				<0.001
never married	9 5.2	39 34.2	22 9.4	
never married	164 94.8	75 65.8	211 90.6	
Have children				<0.001
no	33 19.1	45 39.5	28 12.0	
yes	140 80.9	69 60.5	205 88.0	
Lived outside of Afghanistan in last 5 years				<0.001
no	104 60.1	45 39.5	175 75.1	
yes	69 39.9	69 60.5	58 24.9	
Monthly income, median (Afghanis)				<0.001
< 7500	53 30.5	36 31.6	168 72.1	
> 7500	120 69.5	78 68.4	65 27.9	
Duration as Sex Worker:				<0.001
5 years	121 69.9	98 84.0	146 62.7	
>5 years	52 30.1	16 14.0	87 37.3	
Number of Clients per Month:				<0.001
11 clients/month	66 38.2	6 5.4	181 77.7	
12 clients/month	107 61.8	108 94.6	52 22.3	
Charge per Client:				<0.001
450 Afs/service *	57 32.9	88 77.2	63 27.0	
>450 Afs/service *	116 67.1	26 22.8	170 73.0	

Feature	Kabul (N=173)	Jalalabad (N=114)	Mazar-i-Sharif (N=233)	p-value
Ever use a condom with a client:				
Yes	75 43.4	46 40.4	36 15.5	<0.001
Current STI Symptoms:				
Yes	82 47.4	31 27.2	42 18.0	<0.001
Treatment for STI in Last 3 Months:				
Yes	108 62.4	71 62.3	90 38.6	<0.001
Anal Sex Provision:				
Provide anal sex	30 17.3	30 26.3	58 24.9	0.115
Sold Sex Outside City of Residence:				
Yes	49 28.5	14 12.3	30 12.9	<0.001

* Afs= Afghani, the national currency of Afghanistan. U.S.\$1=50 Afghani.

N=number

IQR= interquartile range

Table 2

Factors associated with hepatitis B virus (HBV) infection among 520 female sex workers in Afghanistan in site-controlled univariate logistic regression analysis.

Feature	HBV+ (N=34)	HBV- (N=487)	OR	(95% CI)
Initiation sex work>22 years of age	52.9%	52.5%	1.02	(0.36-2.89)
More than 12 clients monthly	76.5%	49.7%	3.30	(1.46-7.47)
Payment <450 Afghanis/ service	64.7%	38.2%	2.96	(2.15-4.07)
Provision of anal sex	41.2%	27.2%	2.57	(0.92-7.21)
>5 years duration of sex work	58.8%	52.2%	0.98	(0.64-1.50)
Ever use condom with client	23.5%	30.7%	0.70	(0.17-2.78)
Ever use drugs	13.3%	7.5%	1.77	(1.55 – 2.02)
Ever use alcohol	14.7%	4.3%	3.82	(2.89 – 5.05)
Sold sex outside city of residence	15.2%	18.1%	0.81	(0.60-1.09)
Have children	85.3%	79.2%	1.52	(1.41 - 1.64)
Lived outside Afghanistan in last 5 years	47.1%	37.0%	1.58	(0.83 - 3.01)

OR= odds ratio

CI= confidence interval

N= number

Bold text denotes statistically significant associations.

Table 3

Factors independently associated with hepatitis B infection among female sex workers in 3 cities in Afghanistan (n=520).

Factors	OR[*]	(95% CI)	p-value
12 or more clients/ month	3.14	(1.38 - 7.17)	<0.001
Have children	2.12	(1.71-2.63)	<0.001
Provide anal sex	2.41	(1.14-5.08)	0.020
Ever use alcohol	2.61	(1.45- 4.69)	0.001

* Hosmer-Lemeshow goodness of fit=0.337