Sexually Transmitted Diseases, November 2007, Vol. 34, No. 11, p.878–882
DOI: 10.1097/OLQ.0b013e318095068a

Prevalence of Human Immunodeficiency Virus Infection, Risk Behavior, and HIV Knowledge Among Tuberculosis Patients in Afghanistan

CATHERINE S. TODD, MD, MPH,* YOLANDA BARBERA-LAINEZ, PHARMD,† SHANNON C. DOOCY, PHD,‡ AHMADULLAH AHMADZAI, MD,† FAIS M. DELAWAR, MD,§ AND GILBERT M. BURNHAM, MD, PHD‡

Objectives/Goal: **To assess prevalence and correlates of human immunodeficiency virus (HIV) infection, risk factors, and HIV knowledge among tuberculosis patients in Afghanistan.**

Study Design: **Adult participants undergoing treatment for tuberculosis in this cross-sectional study completed a questionnaire and HIV testing between November 2005 and February 2006. Prevalence of HIV and high-risk behaviors were calculated, with correlates of high-risk behavior and relevant knowledge assessed.**

Results: **Of 1163 participants, 2 (0.2%, 95% CI: 0.0–0.6) were HIV-infected. Known risk factors for HIV infection, such as paying women for sex or male to male sexual contact, were rarely reported, though receipt of injections from a nonmedical provider was common (38%). Symptoms suspicious for sexually transmitted infection were reported by 5% of the population and were significantly associated with young (<26 years) age (OR: 3.2, 95% CI: 1.7–6.0). Relatively, a few participants had ever heard of HIV (23%) or condoms (25%). Condom use was significantly more frequent among those 26 and older (OR: 2.9, 95% CI: 1.7–5.2) and among male participants (OR: 1.5, 95% CI: 1.0–2.2).**

Conclusions: **HIV prevalence among tuberculosis patients in Afghanistan is currently quite low. However, lack of knowledge of HIV and engaging in high-risk practices, particularly regarding health, make this group vulnerable. Health education sessions regarding HIV, sexually transmitted infection, and blood-borne infections should be implemented for tuberculosis patients during the treatment course.**

THE GLOBAL EPIDEMIC OF human immunodeficiency virus (HIV) has radically challenged efforts at tuberculosis control and treatment. Tuberculosis is a leading cause of death among HIV patients, with recent reports indicating that between 27 and 80% of tuberculosis patients are coinfected in a variety of settings with measurable prevalence of HIV.[1–3] There is little information regarding HIV among tuberculosis patients in the Central Asian region; however, the recent, explosive concentrated HIV epidemics in several Central Asian countries place this region at great risk for an increase in tuberculosis cases.[4]

Tuberculosis remains a challenge in developing settings where HIV coinfection is still uncommon. Afghanistan has one of the highest estimated tuberculosis prevalence rates among Asian countries.[5] Although Afghanistan is assumed to be a low HIV prevalence country and a few cases have been reported to date, there are multiple factors placing it at risk for an epidemic.[6,7] These factors include: geographic proximity to countries experiencing concentrated epidemics, largely among injection drug users; increasing use of opium and heroin and change to injecting behavior within the country; return of refugees from areas of higher prevalence; and lack of knowledge about HIV transmission and prevention with concomitant risky behaviors.[4,7–9]

Prevalence of coinfection with HIV and tuberculosis is an important consideration for informing screening and treatment protocols for the Afghan National Tuberculosis Program. Additionally, tuberculosis patients are an important sentinel group for HIV prevalence assessment. The purpose of this study was to assess prevalence of HIV infection and high-risk behaviors among tuberculosis patient in Afghanistan.

Materials and Methods

Setting and Site Selection

Afghanistan is located in Central Asia, bordered by Turkmenistan, Pakistan, Iran, Uzbekistan, Tajikistan, and China. The country has an estimated population of 31 million, bolstered by the recent return of more than 3 million refugees, largely from neighboring countries, since the Taliban regime was ousted in 2001.[10,11] Afghanistan is among the least developed countries globally, with a per capita income of US $250.[12] In the last 4 years, HIV cases

*From the *Division of International Health and Cross-Cultural Medicine, University of California, San Diego, La Jolla, California; †International Rescue Committee, Kabul, Afghanistan; ‡Department of International Health, Johns Hopkins Bloomberg Scholl of Public Health, Baltimore, Maryland; and §National Tuberculosis Control Program, Ministry of Public Health, Kabul, Afghanistan*

The authors appreciate the efforts of the National Tuberculosis Control and National HIV/AIDS Control Programs for assistance with field activities and the support of the Ministry of Public Health of the Islamic Republic of Afghanistan. Last, and most importantly, the authors thank the participants for their time and trust. Dr. Todd is grateful for the support of the National Institutes of Health (K01TW007408).

This project was funded by the Global Fund to Fight AIDS, Tuberculosis, and Malaria [Round 2: Building Afghanistan's capacity to address AIDS, TB, and malaria; AFG-202-G01-I].

Correspondence: Catherine S. Todd, MD, MPH, Division of International Health and Cross-Cultural Medicine, Department of Family and Preventive Medicine, University of California, San Diego, 9500 Gilman Drive, Mailcode 0622, La Jolla, CA 92093-0622. E-mail: cstodd@ucsd.edu.

Received for publication December 6, 2006, and accepted April 23, 2007.

have been detected in major urban centers in Afghanistan, largely through blood bank facilities. This study was conducted in Ministry of Public Health and affiliated NGO-run tuberculosis clinics of urban centers (Kabul, Hirat, Jalalabad, Kandahar, Mazar-i-Sharif, Ghazni, and Gardez) reporting prior HIV case detection.

Study Design

This cross-sectional study was conducted among a consecutive convenience sample of patients receiving treatment for active tuberculosis. The patients represented a mixture of pulmonary and extrapulmonary cases, with extrapulmonary cases comprising no more than 20% of the total sample. Sample sizes at each clinic were precalculated based on the average quarterly patient volume reported to the National Tuberculosis Program over 5 quarters (spring 2004 through spring 2005).

Two male–female study teams were trained in human subjects research, questionnaire administration, and HIV counseling and testing. On-going quality assurance was instituted through periodic field inspections by the study management team. Approval of the ethical review panels of the University of California, San Diego, Johns Hopkins University Bloomberg School of Public Health, and the Ministry of Public Health of the Islamic Republic of Afghanistan were obtained before study initiation.

Inclusion Criteria and Sampling Methods

Study teams approached participants at each site for confidential discussion of enrollment. Inclusion criteria for participation were age of majority (18 years or greater), 2 positive acid-fast bacilli smears for pulmonary tuberculosis or radiographic evidence or clinical improvement on treatment for extrapulmonary tuberculosis, and ability to provide informed consent. The consent process, questionnaire administration, testing, and posttest counseling were conducted in a private room in each clinic by a study representative matched to the gender of the participant. Each participant was assigned a unique number at the time of consent, the sole identifier on the questionnaire and test materials for preservation of confidentiality.

Following informed consent, the study representative administered a questionnaire assessing demographics, socioeconomic status, travel and medical history, and risk factors for HIV infection. Specific risk factors assessed were drug use, prior blood transfusion or donation, number of therapeutic injections, and sexual activity.

Counseling and testing were performed after questionnaire completion. The testing algorithm utilized whole blood rapid antibody testing, with Abbott Determine (Abbott Diagnostics, Abbott Park, IL) for the first test, with positive tests reassessed with OraSure OraQuick (OraSure Technologies, Bethlehem, PA). Participants with repeatedly positive or discordant rapid HIV tests underwent intravenous sampling for serologic confirmation with Western Blot assay (WB; HIV BLOT 2.2, GeneLabs Diagnostics, Singapore) at the Voluntary Counseling and Testing Center in Kabul.[13] An additional 10% of negative Determine tests were retested with OraQuick for quality assurance in the field. Posttest counseling was then provided.

Statistical Analysis

Data were cleaned and double-entered in a validating software program for accuracy. Descriptive characteristics were generated for the population. Prevalence of HIV infection and individual risky behaviors were calculated, using binomial probability testing for confidence intervals. Logistic regression analysis was used to obtain odds ratios (OR) and associated 95% confidence intervals (CIs) for variables of interest (blood-borne exposures, prior incarceration, risky sexual practices, prior sexually transmitted infection (STI) symptoms, HIV knowledge, and condom use). Multiple logistic regression analysis was used to determine independent associations. All variables with a $P < 0.10$ in univariate regression were considered for best-fit multivariate models using stepwise methods. All reported P-values were 2-sided; P values < 0.05 were considered statistically significant. Data analysis was performed using STATA Version 8.0 (Stata Corp, College Station, TX) and SPSS Version 12.0 (SPSS Inc., Chicago, IL).

Results

Of 1163 participants completing the study, just over half were male and the majority were married and aged 40 years or less (Table 1). About one-third had traveled outside the country in the last 5 years, with Pakistan being the most common destination. Two participants (0.2%, 95% CI: 0.0–0.6) were diagnosed with HIV infection confirmed by Western Blot.

Study participants had a mean of 2 visits to a medical provider in the last year. Nearly one-third (30.7%, 95% CI: 28.0–33.5) reported a prior episode of jaundice, whereas 12.3% (95% CI: 10.4–14.4) had been previously diagnosed with hepatitis. Frequency of prior hepatitis diagnosis and reports of jaundice were similar between men and women ($P = 0.249$ and 0.102, respectively). Receipt of therapeutic injections was common; 76.0% (CI: 73.3–78.5) of participants had received at least 1 injection from any provider in the last year. A total of 759 respondents or 66% (CI: 63.3–68.9) received injections from medical providers, and overall the average number of injections received in the past year was reported at 1.9 (SD: 1.7). Those receiving injections from medical providers were more likely to be males (OR: 1.5, CI: 1.2–1.9), report prior jaundice (OR: 1.5,

TABLE 1. Descriptive Statistics of Tuberculosis Patients Receiving HIV Screening (n = 1163)

Characteristic	N	%	95% Confidence Interval
Gender			
Male	504	56.6	53.8–59.5
Female	659	43.3	40.5–46.2
Age (yr)			
18–25	370	31.8	29.1–34.6
26–40	370	31.8	29.1–34.6
41–55	226	19.4	17.2–21.8
>55	181	15.6	13.5–17.8
Civil status			
Married	836	71.9	69.2–74.5
Never married	241	20.7	18.4–23.2
Widowed	85	7.3	5.9–9.0
Province of Residence			
Kabul	351	30.1	27.6–32.9
Mazar-i-Sharif	244	21.0	18.7–23.4
Ghazni	41	3.5	2.5–4.8
Hirat	120	10.3	8.6–12.2
Kandahar	170	14.6	12.6–16.8
Jalalabad	166	14.3	12.1–16.1
Gardez	71	6.1	4.8–7.6
Travel			
Past 5 y	395	34.0	31.2–36.8
Ever	479	41.2	38.3–44.1
Destination—-past 5 yr			
Pakistan	287	24.7	22.2–27.3
Iran	101	8.7	7.1–10.5
Other	35	3.0	2.1–4.2

TABLE 2. Univariate Correlates of HIV and Condom Awareness Among Tuberculosis Patients in Afghanistan (N = 1163)

Variable	Aware of HIV N (%)	OR (95% CI)	Aware of Condoms N (%)	OR (95% CI)
Gender		2.38 (1.78–3.18)		1.36 (1.02–1.81)
Men	454 (37.9)		464 (28.2)	
Women	558 (20.4)		606 (22.4)	
Age (yr)		0.81 (0.60–1.09)		2.34 (1.65–3.36)
<26	321 (31.2)		329 (15.2)	
>26	677 (26.7)		725 (29.5)	
Urban dweller		7.95 (3.23–25.33)		3.53 (1.74–8.08)
Yes	917 (30.6)		973 (27.0)	
No	95 (5.3)		97 (9.0)	
Ever traveled outside Afghanistan		1.44 (1.08–1.91)		1.46 (1.09–1.95)
Yes	444 (32.4)		454 (29.1)	
No	568 (25.0)		616 (21.9)	
Prior hepatitis diagnosis		0.54 (0.31–0.89)		0.68 (0.40–1.09)
Yes	115 (18.3)		126 (19.0)	
No	829 (29.4)		875 (25.8)	
Jaundice		0.97 (0.71–1.32)		1.06 (0.78–1.45)
Yes	309 (28.2)		324 (25.9)	
No	692 (28.8)		735 (24.8)	
Nonmedical provider injections		0.46 (0.33–0.63)		0.57 (0.41–0.78)
Yes	349 (19.8)		379 (19.5)	
No	571 (35.0)		594 (30.0)	
Pay for sex		2.54 (0.87–7.91)		2.22 (0.76–6.47)
Yes	18 (61.1)		18 (50.0)	
No	364 (38.2)		373 (31.1)	
MSM		0.25 (0.01–2.07)		0.34 (0.01–2.85)
Yes	7 (14.3)		7 (14.3)	
No	366 (38.2)		373 (33.0)	
Marijuana		2.85 (1.03–8.01)		2.02 (0.71–5.45)
Yes	19 (52.6)		20 (40.0)	
No	984 (28.0)		1,041 (24.8)	
Prior incarceration		2.16 (1.13–4.09)		1.44 (0.73–2.76)
Yes	46 (45.7)		48 (33.3)	
No	917 (28.0)		971 (25.7)	

CI: 1.2–2.1), and be 26 years of age or older (OR: 1.4, CI: 1.0–1.8). Injections from nonmedical providers were received by 38.3% (CI: 35.3–41.2); those receiving injections from nonmedical providers in the last year were more likely to be 26 years or older (OR: 1.5, CI: 1.1–1.9) and report prior hepatitis diagnosis (OR: 1.7, 95% CI: 1.1–2.5). Men were significantly more likely to report having donated or sold blood, with 9.2% of men indicating past sales/donation of blood when compared with 0.3% of women (OR: 33.0, 95% CI: 8.5–281.1). Blood transfusions were also significantly more frequent among men than women (OR: 1.7, 95% CI: 1.0–3.0). Selling blood was significantly associated with prior imprisonment (Table 2). History of hepatitis, drug use, and having paid for sex were not associated with selling blood.

No participants reported intravenous illicit drug use; recreational drug use, principally smoking marijuana, was reported by male participants (4%). No women reported drug use. The majority of participants (79.7%) reported ever having sexual intercourse. Lifetime sexual partners varied to some degree, with women who reported prior sexual activity having a mean number of 1.0 ± 0.2 lifetime partners, men who reported prior sexual activity but were not married reporting 4.4 + 6.9 lifetime partners, men having only 1 wife reported 1.2 + 0.9 lifetime partners, and men with more than 1 wife reported 2.2 ± 0.8 lifetime partners.

Risky sexual practices (paying for sex or MSM) were rare, with only 21 male participants (1.8% of all participants/4.2% of male participants) reporting either behavior. History of genitourinary symptoms was common (45%, n = 519); dysuria was the most frequently-reported symptom (44% of all responses, n = 400). However, only 1.3% of participants reported prior STI diagnosis and only 1.6% reported that their spouse had a prior STI. Ever having abnormal penile discharge, genital warts, sores, or itching was reported by 10.5% (CI: 8.6–12.7) of participants. Ever experiencing these symptoms was significantly related to age less than 26 years (OR: 2.0, 95% CI: 1.2–3.3).

Relatively few participants had ever heard of HIV (23.3%); participants who were male, urban residents, had traveled outside Afghanistan, had a prior diagnosis of hepatitis, had used marijuana, or had been incarcerated were more likely to have heard of HIV, whereas those having received injections from a nonmedical provider or prior hepatitis diagnosis were less likely to have heard of HIV (Table 2). In multivariable analysis, living in urban settings (AOR: 6.21, 95% CI: 1.81–21.28) was independently associated with HIV awareness, whereas receiving injections from a nonmedical provider (AOR: 0.51, 95% CI: 0.29–0.91) and those previously diagnosed with hepatitis (AOR: 0.28, 95% CI: 0.11–0.72) remained less likely to be aware of HIV. For those aware of HIV, knowledge of transmission routes was assessed; only 13%

(n = 35) knew 3 correct transmission routes with no incorrect responses.

Condom awareness and use were also uncommon, with only 25% of participants having heard of and 11% ever having used condoms. Condom awareness was more likely for urban residents, those aged 26 years or greater, among those having traveled outside Afghanistan, and men, whereas those receiving injections from a nonmedical provider were less likely to be aware of condoms (Table 2). In multivariable logistic regression analysis, significant associations persisted for urban dwellers (AOR: 4.37, 95% CI: 2.06–9.17), older participants (AOR: 2.64, 95% CI: 1.83–3.79), and the inverse association with having received injections from a nonmedical provider (AOR: 0.54, 95% CI: 0.39–0.74) also persisted. No rural residents reported condom use with a spouse; in urban areas, condom use was significantly more frequent among those aged 26 years and older (OR: 2.9, 95% CI: 1.7–5.2), and male participants (OR: 1.5, 95% CI 1.0–2.2).

Discussion

Afghanistan has a high estimated prevalence of tuberculosis, whereas the estimated HIV prevalence is quite low. To our knowledge, this is the first such assessment of tuberculosis patients in Afghanistan and our findings corroborate the low estimated HIV prevalence in the general population.[14]

Receipt of injections was common among study participants, both from medical and nonmedical providers, reflecting practices in this region which have been linked to high prevalence of hepatitis in Pakistan.[15,16] Although not related to HIV infection, injections from a nonmedical provider were significantly associated with prior hepatitis diagnosis, a finding also observed among injection drug users in Kabul.[17] However, prior hepatitis diagnosis was based on report and it is unclear how the diagnosis was made and whether a blood-borne viral subtype of hepatitis was responsible for the infection. Those receiving injections from a nonmedical provider may be less inclined to access trained medical providers, perhaps through perceptions of higher cost. Those receiving injections from nonmedical providers were less likely to be aware of HIV or condoms, indicating that campaigns to increase HIV and other blood-borne infection awareness should also include nonmedical venues. It is concerning that reported prior jaundice was correlated with injections from a medical provider; however, given lack of assessment for hepatitis B or C antibody, we cannot definitively link prior blood-borne hepatitis to this practice.

High-risk behaviors for HIV infection were rare, with no participant reporting injection drug use and very few stating that they had engaged the services of a sex worker or were MSM. Symptoms most concerning for STI were also uncommon and were related to young age, consistent with findings in other settings and populations.[18,19]

The awareness of HIV (23%) and use of condoms (11%) is lower than that observed among Afghan drug-user populations.[9,20] In a recent knowledge, attitude, and practice survey by ActionAid among university students, injection drug users, sex workers, truck drivers, returnees, and medical professionals, 68% were aware of HIV and 66% of male respondents were aware of condoms and stated they would use them to prevent HIV (personal communication, Dr. John Foran). This information indicates that condom promotion campaigns may be acceptable if accompanied by HIV/STI prevention information. Urban residents were more likely to have heard of both HIV and condoms, indicating need for dissemination of information to rural areas. However, the rural participants were those able to access care in urban settings and may have either been displaced or have had enough resources to travel for care. These participants may not be representative of patients from rural settings; however, we do not believe that the lower awareness of HIV among rural participants is affected by this potential bias. Further study is warranted to determine the most culturally appropriate means of raising condom awareness, particularly among rural populations.

The results of this study must be considered in light of some important limitations. The study population cannot be considered representative of tuberculosis patients in Afghanistan, since recruitment was based on convenience sampling. Socioeconomic status was not evaluated, limiting the ability to assess HIV knowledge and medical care access to available resources. Because of the very low prevalence of HIV, there is not sufficient power to determine factors associated with HIV infection in this setting. Because risk behaviors were assessed from self report, socially desirable responding may have occurred and some respondents may have been fearful to admit some sensitive behaviors. Additionally, approximately 20% of male participants did not answer questions regarding sexual risk factors and some participants reporting high-risk sexual activities did not answer HIV and condom knowledge questions; as a result, data presented here may be compromised by underreporting.

The prevalence of HIV and high-risk behaviors is currently low among tuberculosis patients in Afghanistan. However, there are many factors present in Afghanistan potentially promoting the development of substantial HIV infections in the future. These include injection of medications by unskilled providers, incarceration, low utilization of condoms, and lack of HIV knowledge. With continued insecurity, a health system only now recovering from years of conflict, and the limited availability of organized HIV testing, Afghanistan is at risk for developing a steady increase in HIV patients, many of whom may be beyond the present capacity of the health system to diagnose or provide treatment.

References

1. Silveira JM, Sassi RA, de Oliveira Netto IC, et al. Prevalence of and factors related to tuberculosis in seropositive human immunodeficiency virus patients at a reference center for treatment of human immunodeficiency virus in the southern region of the state of Rio Grande do Sul, Brazil. J Bras Pneumol 2006; 32:48–55.
2. Zhou J, Kumarasamy N, Ditangco R, et al.; TREAT Asia HIV Observational Database. The TREAT Asia HIV Observational Database: Baseline and retrospective data. J Acquir Immune Defic Syndr 2005; 38:174–179.
3. Gandhi NR, Moll A, Sturm AW, et al. Extensively drug-resistant tuberculosis as a cause of death in patients co-infected with tuberculosis and HIV in a rural area of South Africa. Lancet 2006; 368:1575–1580.
4. UNAIDS. 2006 Report on the Global AIDS Epidemic. Geneva: UNAIDS, 2006.
5. World Health Organization. Global tuberculosis control: Surveillance, planning, financing. WHO report, 2005. Geneva: World Health Organization, 2005 (WHO/HTM/TB2005.349).
6. United Nations Development Fund. YOUANDAIDS: The HIV/AIDS Portal for Asia Pacific. Afghanistan: The looming threat. Available at: www.youandaids.org/Features/Afghanistan.asp. Accessed March 8, 2006.
7. Hankins CA, Friedman SR, Zafar T, et al. Transmission and prevention of HIV and sexually transmitted infections in war settings: Implications for current and future armed conflicts. AIDS 2002; 16:2245–2252.
8. United Nations Office for Drugs and Crime. Afghanistan Opium Survey 2005. Kabul, Afghanistan: United Nations Office for Drugs and Crime, 2005.
9. Zafar T, Brahmbhatt H, ul Hassan S, et al. A comparison of HIV knowledge and risk behaviors among Afghani and Pakistani drug

users in Quetta, Pakistan. J Acquir Immune Defic Syndr 2003; 32:394–398.
10. CIA: The World Factbook. Afghanistan. Available at: www.cia.gov/cia/publications/factbook/print/af.html. Accessed February 20, 2007.
11. ReliefWeb. UNHCR's global refugee figure lowest since 1980, Internal displacement, statelessness remain high. June 17, 2005. Available at: www.reliefweb.int/rw/rwb.nsf/db900SID/EVOD-6DFDTJ?OpenDocument. Accessed February 20, 2007.
12. United Nations Children's Fund. Afghanistan: Statistics. Available at: www.unicef.org/infobycountry/afghanistan_afghanistan_statistics.html. Accessed February 20, 2007.
13. World Health Organization. Rapid HIV tests: Guidelines for use in HIV testing and counseling in resource constrained settings. Geneva: 2004.
14. IRIN News AFGHANISTAN: Increase in people living with HIV/AIDS. October 11, 2005. Available at: www.irinnews.org/report.asp?ReportID=49483. Accessed June 7, 2006.
15. 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; 78:956–963.
16. Luby SP, Qamruddin K, Shah AA, et al. The relationship between therapeutic injections and high prevalence of hepatitis C infection in Hafizabad, Pakistan. Epidemiol Infect 1997; 119:349–356.
17. Todd CS, Abed A, Strathdee SA, et al. Prevalence of HIV, Viral Hepatitis, Syphilis and Risk Behaviors among Injection Drug Users in Kabul, Afghanistan. ABS TUAC0304, presented August 15, 2006, XVI International AIDS Conference, Toronto, Canada.
18. Griffiths V, Cheung WH, Carlin EM, et al. Incidence of concurrent sexually transmitted infections in patients with genital warts. Int J STD AIDS 2006; 17:413–414.
19. Reynolds SJ, Risbud AR, Shepherd ME, et al. High rates of syphilis among STI patients are contributing to the spread of HIV-1 in India. Sex Transm Infect 2006; 82:121–126.
20. Todd CS, Abed AS, Strathdee SA, et al. Association between expatriation and HIV awareness and knowledge among injecting drug users in Kabul, Afghanistan: A cross-sectional comparison of former refugees to those remaining during conflict. Confl Health 2007;1:5.