Seroprevalence of HIV in Newly Detected Pulmonary Tuberculosis Patients in Khuzestan, Iran: Should HIV Testing Be Included in National Tuberculosis Program in This Region?

Seyed Mohammad Alavi [1*], Hamid Moradzadegan [1], Mohammad Mehdi Khoshkhoy [1]

[1] Jundishapur Infectious and Tropical Diseases Research Center, Jundishapur University of Medical Sciences, Ahvaz, IR Iran

* Corresponding author: Seyed Mohammad Alavi, Jundishapur Infectious and Tropical Diseases Research Center, Infectious Disease Ward of Razi Hospital, Jundishapur University of Medical Sciences, No: 52, West 11 Avenue, Kianabad, Ahvaz, IR Iran.Tel.: +98-6113387724, Fax: +98-6113333077, E-mail: alavi.seyed-mohammad@yahoo.com

A B S T R A C T

Background: Human immunodeficiency virus (HIV) testing strategy for tuberculosis (TB) patients in some high HIV incidence countries has been recommended based on interaction between HIV and TB.

Objectives: The present study aimed to determine the prevalence of HIV infection among newly detected pulmonary TB patients.

Patients and Methods: In a cross sectional study, 104 cases including 95 non injecting drug users (IDU) and nine IDU, from 2009 to 2011 in Ahvaz capital of Khuzestan province in the south west of Iran, underwent HIV testing as early as being diagnosed as pulmonary TB. Inclusion criteria for HIV positivity was two EIA-HIV positive tests and confirmatory western blots. SPSS-16 software was employed to analyze data, including demographical characteristics, epidemiological and laboratory findings.

Results: Overall HIV prevalence among pulmonary TB patients was 7.6%. Comparing HIV prevalence between non IDU pulmonary TB and IDU pulmonary TB showed that IDU cases were significantly at the risk of HIV infection [2.1% vs. 66.6%,odds ratio (95%CI): 1.6,0.31-12.97, P < 0.0001].

Conclusions: In the region under study HIV prevalence in newly detected pulmonary TB patients (except in IDU patients) was low compared with HIV high prevalence region. Therefore, routine HIV testing may not be required.

Keywords: Tuberculosis, Pulmonary; HIV; Iran

1. Background

Both the tuberculosis (TB) and human immunodeficiency virus (HIV) infection are among the major public health problems worldwide, particularly in undeveloped countries (1, 2). TB is a common life threatening opportunistic infectious disease in HIV infected patients (3). HIV is also a known risk factor for TB acquisition and puts the patients with latent infection at increased risk for progressing to active TB disease (4, 5). Close interaction between HIV and TB makes it necessary to undergo HIV testing as early as TB diagnosis (6-8).

HIV testing strategy for TB patients in some high HIV incidence countries has been associated with limited success ranged from nearly 40% to 80% (9, 10). Is this strategy needed or not in low HIV incidence countries such as Iran? TB is an endemic and prevalent infectious disease in Iran with incidence rate of 13 per 100000 population (11). According to official reports, the HIV seroprevalence rate in Iran has risen from low to concentrated (12). The overall seroprevalence rate of HIV infection in general population in Iran is 0.15%; but this rate has surpassed 5% in injecting drug users (IDUs) as the main high risk population in the country (12-15). To the best knowledge, in contrast to frequent studies on the prevalence of TB in HIV infected cases, there is limited data on seroprevalence of HIV among TB cases in the region under study and even through the country.

2. Objectives

The present study aimed to determine the prevalence of HIV infection among newly detected TB patients.

3. Patients and Methods

This cross sectional study was conducted from 2009 to 2011 in Ahvaz, capital of Khuzestan province located in the south west of Iran. The feature of HIV epidemic in Ahvaz as the capital city of Khuzestan with the 4,500,000 population is similar to the other parts of the country. The population under study included all newly diagnosed TB cases attending TB laboratory according to diagnostic criteria of national TB program and HIV/AIDS program in Iran (12, 16). Cases with at least two sputum smear positive for acid fast bacillus (SSP-AFB) or a chest radiography (C-X ray) suggesting tuberculosis plus one SSP-AFB or, sputum culture positive for *Mycobacterium tuberculosis* and one SSP-AFB were defined as pulmonary TB. The cases underwent HIV testing as early as being diagnosed as pulmonary TB.

Inclusion criteria for HIV positivity were two positive Electerochemiluminascence Immunoassay (EIA) by Elecsys 2010 (Roche, Germany), and confirmatory western blots using HIV-INO genetic kit, Italy. A medical chart including information about demographic characteristics, epidemiological aspects, clinical findings and laboratory results was used to gather date while attending Laboratory or Infectious Diseases Ward of Razi Hospital affiliated to Jundishapur University of Medical Sciences.

Pulmonary TB cases were divided into two groups as IDU a non IDU. Non IDUs were regarded as representatives of general population from HIV infection view. SPSS-16 software for windows using descriptive statistics was employed to analyze the gathered data, chi -squared, and Fisher exact test followed. Differences at the level of <0.05 were considered significant. Patients` participation in the study was voluntary and based on informed consent. Patients were assured that this study would not have any additional costs for them and their names would not appear in the reporting of the information. This study was approved by Council for Research and Ethics of Infectious Diseases Department of Razi Hospital.

4. Results

Of the total 273 TB patients, 104 patients agreed to participate in the study. The mean age of participants was 44.3 years (range of 14-88 years). The majority were male (73.6%), 66% were urban and 34% were rural. The most common occupation was jobless followed by shopkeeper and farmer in men and housewife in women. Other demographic characteristics are presented in *Table 1*. Out of 104 subjects under study, nine reported a history of IDU, three had received blood products, four had received blood transfusion and 13 had a history of unsafe sexual contact. The results of eight participants were positive for HIV test.

All of the HIV positive patients were jobless male with mean age of 32.7 years (range of 29-55 years). The overall rate of HIV prevalence in newly detected pulmonary TB patients was 7.6%. High risk behaviors for HIV infection among TB cases are shown in *Table 2*. Comparing HIV prevalence among general population with the rate of 0.15%, non IDU pulmonary TB with the rate of 2.1% and IDU pulmonary TB with the rate of 66.6% showed that the IDU subjects with pulmonary TB were significantly co-infected by HIV (< 0.0001). IDU pulmonary TB patients are significantly at the risk of HIV infection [66.6% vs. 2.1%, odds ratio (95% CI): 1.6, 0.32-12.97].

5. Discussion

In high HIV prevalence area, TB is the most common cause of mortality. TB patients are the most important high risk population to be infected by HIV. Therefore, knowing the HIV status in the TB patients is vital to reduce TB mortality by prevention and control of HIV/TB co-infection. As with other studies elsewhere, majority of the TB patients did not take part in HIV testing because of fear of being stigmatized due to anticipated consequence of testing HIV positive. This study addressed the status of HIV in participants with pulmonary tuberculosis.

Table 1. Demographic Characteristics of Studied Patients With Pulmonary TB

	No. (%)
Sex	
Male	74 (71.1)
Female	30 (28.9)
Age, y	
15-25	18 (17.3)
25-65	80 (76.9)
+ 65	6 (5.8)
Residency	
Rural	43 (41.3)
Urban	61 (58.7)
Occupation	
Jobless	16 (15.3)
Housekeeper	28 (26.9)
Shopkeeper	38 (36.5)
Farmer	22 (21.3)

Table 2. HIV Risk Factors Among Pulmonary Tuberculosis

	HIV + (n = 8), No. (%)	HIV - (n = 96), No. (%)	Total
IDU [a]	6 (75)	3 (3.2)	9
Blood transfusion	1 (12.5)	3 (3.2)	4
Blood products	0 (0.0)	3 (3.2)	3
Unsafe sex	1 (12.5)	12 (12.3)	13

[a] [Odds ratio (95% CI):1.5, 0.21-12.78], P < 0.0001

Abbreviations: HIV, Human Immune deficiency Virus; IDU, Injecting Drug Users

The overall HIV prevalence rate in the pulmonary TB patients was 7.6% which was consistent with WHO report (8). Overall WHO estimation for HIV prevalence in new diagnosed TB patients worldwide is 8% (8). Regardless of IDU cases, HIV prevalence rate in the current study was similar to other studies reported by Zhou *et al.* (China, 2008), Tang *et al.* (China, 2009) and Talebimehr (Iran, 2008), but lower than the rate reported by Ipuge *et al.* (Tanzania, 2009) and Daftary *et al.* (South Africa, 2007) (17-21). Reported HIV prevalence rate (17-21) ranges from 2.27% (Iran) and 2.3% (China) to 44% (Tanzania) and 60% (South Africa). There are many reasons for these differences; HIV prevalence among pulmonary TB depends on various factors such as: HIV status in the region under study (e.g. high prevalence or low prevalence area), design of study (e.g. population based or hospital based study) and behaviors of the subjects under study(e.g. IDUs or unsafe sex contacts) (17-19, 21-23).

According to WHO classification; South Africa and Tanzania are defined as HIV high prevalence area (more than 5% of general population are infected by HIV), while, China and Iran are categorized as HIV low prevalence area (lower than 1% general population are HIV infected). The current study was a hospital based study while other studies were population based. Although, the overall prevalence of HIV in the pulmonary TB was 7.6%, this status was not hemogenous. HIV prevalence in IDU pulmonary TB patients was significantly higher than that in non-IDU pulmonary TB patients (66.6% vs. 2.1%). In spite of the recommendation of HIV testing to all TB patients in high HIV prevalence setting (6), because of low HIV prevalence among the non-IDU tuberculosis patients (2.1%), compared with HIV high prevalence regions (more than 5%), routine HIV testing of patients with tuberculosis (21) in the region under study is not cost benefit.

The current study does however offer HIV testing into TB patients in a specific context such as IDU subjects with high HIV prevalence due to their sharing needles and syringes (12, 19). The present study did not address the roles of gender, age, residency and occupation; whereas it was observed that female and older TB patients were at lower risk of HIV infection. The reason for such condition may be due to the life style and behavior of the patients under study (11, 12). Indeed, factors such as residency, age,

gender and occupation are not real risk factors for HIV acquisition.

The present study found that in the region under study, HIV prevalence in newly detected pulmonary TB patients (except in IDU patients) was low, compared with HIV high prevalence regions. Therefore, undergoing routine HIV testing in national TB program may not be required.

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Authors' Contribution

None declared.

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