

PREVALENCE OF HIV AND TUBERCULOSIS AMONG JAIL INMATES IN LAHORE - PAKISTAN

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ABSTRACT

The purpose of this study was to determine the prevalence of HIV and tuberculosis. Using sputum smear examination for AFB screening and double PCR for HIV among jail inmates of Camp Jail, Lahore. This was a cross-sectional descriptive study and was carried out in district Camp Jail, Lahore, during the period between Jan 2007 to June 2008. The study population comprised of 3851 prisoners, all were males. Data was collected by administering closed-ended questionnaire. Sputum and blood samples were collected from symptomatic prisoners in standardised sputum containers and vials respectively. Majority of respondents (73.6%) were of urban background and most of these respondents (46.4%) were illiterate. Majority (36.8%) were factory workers before being locked up in the jail. The prevalence of smoking and drug/alcohol abuse was 63.1% and 37.9% respectively. One hundred and thirty seven respondents (52.2%) had cough. Lab tests on serum done on jail inmates showed that 6 of 261 respondents (2.3%) were HIV positive. However none of the jail inmates was sputum smears positive for Mycobacterium tuberculosis. The study found clustering of risk factors among jail inmates which are conducive to the transmission of STIs, HIV/AIDS and tuberculosis. This study revealed that 6 of 261 jail inmates were seropositive for HIV.

Key words: *Tuberculosis, Sputum smear examination, Jail inmates, Socio-economic status Smoking, Drug abuse, Cough, Disease positivity*

INTRODUCTION

Tuberculosis (TB) is the leading cause of mortality among infectious diseases worldwide and 95% of TB cases and 98% of deaths due to tuberculosis occur in developing countries.¹ Due to the inadequacy of disease surveillance in Pakistan, it is not possible to present exact data for the incidence of TB-related mortality. However, based on the results of *ad hoc* surveys, and using an estimated annual cumulative incidence of TB of 171 cases per 100 000, Pakistan ranks 8th among the 22 high-burden tuberculosis countries worldwide. According to the World Health Organization (WHO), Pakistan accounts for 43 percent of the tuberculosis disease burden in the WHO Eastern Mediterranean Region. Every year, approximately 270,000 people in Pakistan develop tuberculosis, the majority of whom are economically productive adults. The emergence of multidrug resistance and co-infection rates of TB and HIV/AIDS are growing concerns in the country.² High-risk groups for TB infection in Pakistan, like other developing countries, may include people with human immunodeficiency virus (HIV)/AIDS, people with diabetes or cancer, the malnourished, those living with someone who has active tuberculosis, poor and indigent people, residents of homeless shelters, and present or former prisoners.³

Prisoners constitute a high risk group for acquisition of TB infection and development of tuberculosis compared with the general population due to the overcrowding, closed living conditions, insufficient ventilation, generally low socio-economic status, poor nutrition, and poor health of prison inmates.⁴ Poor access to TB services and socio-economic status play a role in the elevated TB rates among correctional inmates⁵. Inmates, in contrast to non-inmates, are more likely to have multiple risk factors for infection with mycobacterium tuberculosis and for progression to tuberculosis disease.

Inmates are also more likely to have drug-resistant TB. Special efforts are needed to mitigate the personal and public health toll created by these risk factors.⁶ The concentration of these factors in a congregate population has resulted in explosive outbreaks of TB, as demonstrated in a North Carolina outbreak involving 25 homeless patients, 72% of whom had a history of incarceration in the local county jail.⁷ Tuberculosis outbreaks and ongoing transmission have occurred even after inmates were screened for TB⁸ and also have been attributed to failure to complete treatment by inmates known to have latent TB infection⁹.

Tuberculosis among prisoners is a problem that is encountered and described by countries in

all continents.¹⁰ The prevalence can be much higher than in the general population. For example, in a study in Botswana prisons the point prevalence was 3797 per 100,000 population.¹¹ In another study done on males aged 15 to 64 years at a correctional facility the percentage of TB cases reported as residing in a correctional facility was 9.2% for those born in the United States.¹²

Excess alcohol use, use of injections non-injectable drugs and homelessness within 1 year prior to diagnosis of TB in adult males aged 15 to 64 years were all more frequent in inmates with TB than in non-inmates with TB. Additionally, inmates were more likely than non-inmates to report at least one TB risk factor including HIV-infection (60.1% vs 42.0%, respectively). Inmates with TB were also more likely than non-inmates with TB to be HIV infected.¹³ Another study showed that inmates also have high incidence of TB, with rates often >200/100,000 population,¹⁴ and they have a disproportionately greater number of risk factors for TB (e.g., low SES, HIV infection, and substance abuse) compared with the general population.

Despite elevated rates of HIV infection—the strongest risk factor for developing TB among adults who have latent TB infection¹⁵ however the HIV status of more than one third of inmates with TB is unknown. In a study of 20 large city and county jails, a review of inmate medical records found that only 48% of 376 inmates with latent TB infection had a known HIV status.¹⁶ Although the CDC recommends routine HIV counselling and testing at intake to the correctional facility,¹⁷ the majority of correctional systems currently do not offer universal HIV testing, a critical limitation for effective TB prevention and control and for the medical management of individual patients.¹⁸ Moreover, in HIV-infected persons infected with *M tuberculosis*, the progression to tuberculosis is often rapid and can result in difficult-to-control outbreaks.¹⁹

In prisons, intravenous drug use is frequent and facilitates transmission of HIV which in turn provides a perfect breeding ground for rapid spread of TB from index cases to other inmates.²⁰ Frequently, because of rapid turnover, TB cases are not recognized and, once prisoners are released, they may infect others.²¹ Furthermore, for various reasons, including lack of adherence and drug shortage, treatment is often suboptimal leading to multidrug-resistant (MDR) TB. In a Thai study, the prevalence of MDR-TB was 19%,²² and in one study in Orel, Russia, multidrug-resistant (MDR) TB was significantly more prevalent among prison inmates compared to community patients (MDR: 12% vs. 5%).²³

There is increasing recognition that the high risk of TB infection in prison settings poses a problem not only for those imprisoned but also for society at large.²⁴ mobile, circulating within the prison system and Transmission of TB in prisons is also particularly dangerous as it often involves resistant strains²⁵. Dedicated housing units for prison inmates with HIV infection were sites of transmission in California in 1995²⁶ and South Carolina in 1999²⁷

In the South Carolina outbreak, delayed diagnosis and isolation of an inmate who apparently had active TB after entering the facility led to >15 outbreak cases. Transmission leading to TB infection in the community also was documented in an outbreak that occurred in a jail in Tennessee during 1995–1997^{28,29} that involved approximately 40 inmates; contact investigations were incomplete because of brief jail terms and frequent movement of inmates. During the same period, 43% of patients with TB in the surrounding community had previously been incarcerated in that jail,²⁸ and, after 2 years, the jail outbreak strain was more prevalent in the community than it was during the jail outbreak.

Outbreaks of both multidrug-resistant and drug-susceptible TB related to HIV co-infection have been documented in correctional facilities³¹. These outbreaks are often attributed to the failure to detect tuberculosis early after entry into the facility or failure to complete treatment for latent infection resulting in tuberculosis transmission to other inmates, correctional facility employees, and community members.³² Epidemiological and operational studies have helped elucidate problem areas for TB prevention and control in correctional systems and the surrounding community.³³

All the prisons in Pakistan are faced with the problem of housing inmates far exceeding the number than what each of them was originally designed for. Due to meagre resources, the old buildings are in dilapidated condition and poses extreme health hazards for those who are confined in its four walls. The overcrowding invariably forces prisoners to sleep on the rooftops of the common toilets, without proper bedding, and as a consequence they remain exposed to different hazards. This overcrowding also adds to the already unhygienic conditions, as the ancient buildings lack a proper sewerage system. The segregated portion within the premises for women prisoners presents an even worse example of the negation of the fundamental right with respect to the inviolability of human dignity. The rooms, originally built to accommodate not more than ten prisoners, are being used for the confinement of more than 40. It is not only the women prisoners who are

locked in these gloomy, unventilated and unlit rooms, but also the infant and children, some of whom are given birth in the same overcrowded premises. The prisoners in such overcrowded accommodation have no alternative but to sleep on the floor under hazardous conditions due to lack of space. The prisoners, therefore, run the risk of being exposed to health hazards.³⁴

Pakistan is signatory to Millennium Development Goals, which binds all countries to reflect them in their national policies. MDGs specify that progress should be measured in terms of the reduction in TB prevalence and deaths. In pursuance of achieving MDGs for Pakistan it is mandatory to reach those marginalized, isolated people whose living conditions make them vulnerable to poverty and disease. The people incarcerated in the jails are one such group. Currently there are no available data on prevalence of TB infection in the prisons of Pakistan.

This Study was designed to reach these jail inmates to estimate the burden of TB among them and examine their living conditions at jail to determine their vulnerability to acquisition of TB. Since worldwide the number of people infected with both HIV and tuberculosis is rising and to make the global situation worse, tuberculosis has formed a lethal partnership with HIV, This study also focused to determine the HIV positivity of prisoners.

MATERIALS & METHODS

The work was carried out in District Camp Jail, Lahore. All prisoners were male. The number of prisoners was reported by the Deputy Superintendent of District Camp Jail. Taking the prevalence of TB, 9.2% among residents of a correctional facility¹², the population of District Camp Jail was 3851, hence the sample size estimated, at 99% confidence interval by keeping 14.2% worst acceptable value, was 261.

Study Design

The study was descriptive and cross-sectional.

Study Instruments

1. Demographic, socio-economic data and medical information was collected by administering closed-ended questionnaire.
2. Sputum samples were collected from symptomatic prisoners (TB suspects) in standardised sputum containers, transported on the same day to Punjab Provincial Lab, Institute of Public Health.
3. Sputum processing: Smears were prepared from mucopurulent /thick portions of speci-

mens, stained with Ziehl Neelson stain. Microscopy was done under oil immersion.

4. HIV testing was done by rapid test kits and if positive, cases were confirmed by Double-Elisa.

Data Collection

Data collection was carried out by a team comprising of 6 students identified from the paramedical class of Institute of Public Health and two laboratory assistants of TB and HIV-AIDS Provincial reference Labs under the auspices of Bacteriology Department of Institute of Public Health. The team was headed by an M Phil student.

The request for the grant of permission to conduct research at Camp Jail was submitted and the permission was granted by Home Department on 9th January, 2007.

Ethical Considerations

Informed consent was taken before enrolling the prisoners for study. Permission was taken from Punjab Home department for interviewing and performing late tests of prisoners

Statistical Analysis

Data was entered by using SPSS 11. Frequencies and percentages of various variables were determined.

RESULTS

Socio-demographic profile

The respondents of this study comprised of 261 jail inmates imprisoned at District Camp Jail, Lahore. In this study all respondents were male. Most of the respondents (41.0%) were between 26 and 45 years of age, followed by 38.3% and 16.9% of respondents who were in age group 15 to 25 and 46 to 60 respectively. Only 3.8% of respondents were of age 60 or above. Respondents in almost equal number belonged to the categories of single and married (46.0% and 53.2%). Among them 47.1% of respondents had family size of more than 7, 36.8% had family size between 3 and 7, whereas only 16.1% belonged to the family size less than 3. Majority of respondents (73.6%) were of urban background. Only 25.7% belonged to rural areas. Majority of the respondents (46.4%) were illiterate, 27.2% were primary, 18.8% respondents were matriculate. Only 7.6% reached intermediate level or above (Table 1).

Majority of respondents (36.8%) were engaged in factory work previous to being locked up in the jail. Other occupations in which jail inmates had been engaged included agriculture (20.7%), shop keeping (19.2%) and office work (11.1%). The

unemployed among prisoners were 11.1%. Most of the respondents (88.5%) were earning more than Rs: 3000 per month with majority (47.1%) falling within income group 3001-5000.

Life style characteristics

Regarding life style characteristics including smoking and drug or alcohol abuse, the prevalence of smoking and drug/alcohol abuse was 63.1% & 37.9% respectively. Majority of the respondents (35.2%) smoked 10 to 20 cigarettes / day, 23.4% respondents less than 10 cigarettes, 5.1% smoked 21 to 40 cigarettes in a day. Only two respondents (0.8%) smoked more than 40 cigarettes in a day.

Personal and Family Medical Characteristics

The questionnaire distributed to the prisoners of Camp Jail elicited responses on family and personal medical history. Fifteen respondents (5.7%) stated that they had a family history of tuberculosis. Sixty one respondents (23.4%) had fever at the time of interviews, of them 17.2% of respondents had fever for more than two weeks.

One hundred and thirty seven respondents (52.2%) had cough, of these 43.7% had cough for more than two weeks. The history of expectoration was obtained in 30.7% respondents. Eleven respondents (4.7%) complained of night sweats, 6.7% stated loss of weight and 5.0% had loss of appetite.

Disease status

Serological Lab test done on jail inmates showed that six (6) of 261 respondents (2.3%) were HIV positive. However none of the jail inmates showed acid fast bacilli in their sputa.

DISCUSSION

Tuberculosis is known to be a disease of poverty, hitting those who live in crowded, ill-ventilated places, and those who are ill-fitted to combat tuberculosis in term of their immune status or whose nutritious level is so low that they easily succumbed to tuberculosis. Many studies have been carried out on jail inmates to find prevalence of tuberculosis among them. These studies were initiated and built on the thesis that jail inmates are exposed to risk factors leading to the development of tuberculosis. Not only this, jail inmates

Table 1: Medical Characteristics (n = 261).

	Frequency	Percent
Family history of TB		
No	94	74.3
Yes	15	5.7
Do not know	52	19.9
History of fever		
More than 1 week	16	6.1
More then 2 week	17	6.5
More then 3 week	17	6.5
More than 4 week	11	4.2
History of cough		
More than 1 week	23	8.8
More than 2 week	35	13.4
More than 3 week	47	18.0
More than 4 weeks	32	12.3
History of sputum production		
Yes	80	30.7
No	181	69.3
History of night sweats		
Yes	11	4.6
No	249	95.4
History of weight loss		
Yes	18	6.9
No	243	93.1
History of loss of appetite		
Yes	13	5.0
No	248	95.0

are frequently engaged in activities which make them prone to HIV/AIDS.

Pakistan ranks 8th among the 22 high-burden tuberculosis countries world-wide, according to the *World Health Organization (WHO) Global TB Report 2008*. Every year, approximately 280,000 people in Pakistan (primarily adults in their productive years) develop TB. The emergence of multidrug-resistant TB and TB-HIV co-infection are growing concerns in the country.³⁵

This study was done on the jail inmates of District Camp Jail situated at Lahore, 2nd major urban city of Pakistan and capital of Punjab province. The aim of the study was to find prevalence of tuberculosis among jail inmates and to correlate it with various risk factors incumbent upon their socio-demographic, life style and their incarceration in the jail. The study found nil prevalence of tuberculosis among inmates of District Camp Jail.

The nil prevalence of TB among respondents should be explained, viewing in the perspective that Camp Jail is a temporary abode for the pri-

soners, locked up for their hearing in the courts of provincial town; second, majority of the prisoners are locked owing to their residences in the vicinity of the jail, thereby overrepresented by the prisoners of urban background and third, by virtue of being residents of the urban areas, they belong to comparatively higher income groups. Better demographics of prison inmates may explain the nil prevalence of tuberculosis. Finding no evidence of tuberculosis on sputum examination among a smaller number of Jailers, it does not mean that our Jail population particularly is full of Tuberculosis. Hence studies are required particularly in highly congested district Jails in big cities, where results may be the other way round.

However, clustering of the risks was found among the jail inmates. Most of the jail inmates belonged to age groups which are considered high risk groups for the sexually transmitted infections. Most of the respondents smoke and take drugs or alcohol, a high risk behaviour making them prone to HIV/AIDS and which at the same time act as additive effect to activate latent TB or for new TB infection.

Though this study found nil prevalence of TB among the respondents of this study, sadly 2.3% of respondents were positive with HIV. No study has been done previously on jail inmates to find prevalence of HIV/AIDS in Pakistan. The finding of 2.3% HIV positivity is highly alarming and calls on health authorities and Provincial AIDS Control programme to be on high alert.

CONCLUSION AND RECOMMENDATIONS

- The study found clustering of risk factors among jail inmates which are conducive for the transmission of STIs, HIV/AIDS and tuberculosis. This study recommends to Home and Health Departments to conduct health campaigns aiming at promoting health education related to these high burden and high risk diseases.
- This study has found 6 of 261 jail inmates seropositive for HIV and recommends that voluntary counselling and testing services should be offered to all prisoners and to each prisoner on his entry into the jail.
- This study recommends that Jails in all four provinces of Pakistan be included in the next round of Integrated Behavioral and Biological Surveillance being conducted under the auspices of National AIDS Control Programme of Pakistan and HIV/AIDS Surveillance Project.
- HIV/AIDS positive jail inmates should be housed separately from other jail inmates to prevent transmission of mycobacterium Tu-

berculosis to HIV-positive cases. However, this recommendation needs further evaluation for its implementation in the light of inherent patients' rights.

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