

Prevalence of Pulmonary Tuberculosis in Karachi Central Prison

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Introduction

Tuberculosis is an increasing problem in Pakistan. Prisoners represent that segment of population who is at highest risk for exposure for active tuberculosis. So their screening for tuberculosis is a valuable clinical epidemiological tool.¹ The main reason for the high risk for M tuberculosis infection and active TB disease in prisons is the disproportionate number of inmates who have factors for exposure to the organism or, if infected, for development of active disease.² These risk factors include prison overcrowding,³ inadequate ventilation, malnourishment, infection with hepatitis B and C viruses and continued substance abuse.^{4,5} Beside late case finding and incomplete treatment compound the problem of tuberculosis control.

This study was undertaken to determine the extent of pulmonary tuberculosis among prisoners in Karachi central jail, so that strategy for targeted intervention can be planned as the jail is an important setting for TB control.⁶

Patients and Methods

This prospective observational study was done at the central prison situated in the centre of the mega city of Karachi. A team of doctors, laboratory and x-ray technicians visited the central prison from 7-2-2002 to 14-2-2002. The team members interviewed the prisoners through the chief medical officer of the jail to select patients according to the following inclusion criteria:

1. Age > 18 years.
 2. Clinical features suggestive of pulmonary tuberculosis i.e.
 - a. Cough for more than three weeks duration
 - b. Chest pain for more than 15 days
 - c. Haemoptysis
 - d. Weight loss
 - e. Fever especially low grade and evening rise.
 - f. History of contact with smear positive pulmonary TB case or past history of pulmonary TB
 3. Cough of less than three weeks with two of the features mentioned from 2 (c) to 2 (f).
 4. Abnormal chest x-ray, taken for any reason.
- A Performa was filled of all Tuberculosis "suspect".

Their chest x-rays were taken. They were asked to produce sputum for AFB smear for three consecutive days. All the three specimens collected "on spot" under supervision, were properly labeled and transported immediately, taking proper care not to expose the sputum specimen to direct sunlight, to the laboratory of Ojha Institute of Chest Diseases, a 350-bedded teaching hospital in Karachi.

Chest x-rays were reviewed and sputum AFB direct smear results collected from Ojha Institute of Chest Diseases, Karachi Laboratory. The following criteria were used to determine activity⁷:

- . Positive smears
- . The presence of symptoms like cough, haemoptysis, weight loss or tiredness along with suspected radiological lesion.
- . Radiologically:
 - a) Presence of a cavity (unless there has been previous effective treatment)
 - b) Soft shadows especially if widespread and shadows which extended on serial chest films.

Patients who were not expectorating but were highly suggestive of pulmonary tuberculosis on clinical and radiological grounds were also included in the study.

Results

A total of 4870 prisoners were in the jail during the study period. Of these, 79 (1.62%) were pulmonary tuberculosis suspects according to the inclusion criteria. All the suspects were male, as the study was conducted in the adult male jail. Their mean age was 32 years with the range of 22 to 75 years.

Fifty-seven suspects (72%) submitted their sputum for AFB direct smear examination. Of these 33 (58%) submitted three specimens and twenty-four (42%) two specimens. Out of these 147 specimens only one specimen was positive on direct smear examination. Radiologically, out of 79, thirty-nine (49%) chest x-rays were normal including those 22 who had not submitted sputum for AFB. Eight (10%) showed a healed lesion in the form of streaks, pleural thickening and two showed destroyed lung with negative sputum. Thirty-two (40.5%) chest x-rays were suggestive of active pulmonary tuberculosis. So on clinical and radiological basis 32 prisoners were suffering from active pulmonary

tuberculosis.

The prevalence of active pulmonary tuberculosis in Karachi jail population was 657 per 100,000, about 3.75 times more than the country prevalence.

Discussion

The prevalence of pulmonary tuberculosis in general population in Pakistan is 175 per 100,000.⁸ In this study the prevalence in Karachi central prison was 657 per 100,000, which is 3.75 times the country prevalence. It is quite high when compared with the county rate. There are reports of TB prevalence rate 5-10 times the national average and can be up to 50 times the reported national average in underdeveloped countries.⁹ The coverage rate in this study was 100% while it was 70% in a study from Malawi prison.¹⁰

The proportion of smear positive pulmonary tuberculosis is very low, {one (3.12%) out of 32}. This may be explained on the observation that 16 patients, already diagnosed on smear examination were on ATT at the time of the study. Eleven gave history of ATT in the past either irregularly or for incomplete duration (3-4 weeks to 3 months). Six of them were diagnosed at Chest clinics of Ojha Institute of Chest Diseases on sputum examination while five were diagnosed by their family physicians with improvement in their symptoms on ATT. Five cases were diagnosed during this study. About 50% of patients with active pulmonary tuberculosis suspected clinically or radiologically may fail to produce sputum or when it is available AFB may be negative on repeated AFB smear examination.¹¹ Sputum is sometime both smear and culture negative even when there are well marked radiological opacities, symptoms and a subsequent appropriate response to antituberculosis chemotherapy.⁷

The following diagnostic criteria for smear-negative pulmonary TB is recommended:¹²

- . At least three sputum specimens negative for AFB; and
- . Radiographic abnormalities consistent with active pulmonary tuberculosis; and
- . No response to a course of broad-spectrum antibiotics; and
- . A decision made by a clinician to treat with a full course of anti-tuberculosis chemotherapy.

In this study due to difficulties at jail it was not possible to collect sputum for more than three days in each case. Besides it was difficult to produce sputum on demand i.e. spot specimen, so documentation of all three negative specimens was not possible, while all the other criteria were followed.

A typical radiological pattern¹³ was found in 18/32 (56%) cases i.e., involvement of upper zone in the form of infiltration or nodules with or without cavitations, endorsing our previous observation in which 58% of the adults presented with a typical pattern.¹⁴

In prisons overcrowding, poor general health, high prevalence of risk groups, late case finding, and incomplete therapy, compound this problem. For case finding screening is a useful tool with a high yield.¹⁵ In this study five new cases were diagnosed.

When correlating the duration of detention and development of symptoms, 26 had symptoms before detention, while 6 developed symptoms after about 6 months of detention favouring Reyes's observation⁹ that majority of prisoners contracted tuberculosis before arrival in jail. In this study 6/32 (19%) contracted tuberculosis during detention, which is quite high.

The reason for the negativity of these 5 new cases seems to be the criteria of spot collection as most patients' produce sputum early in the morning.

Tuberculosis is common in the community and it is 3.75 times higher in the Karachi central prison population. It is suggested that concrete efforts should be made to control tuberculosis. In this regard TB control programme should be extended to the jail to cover the disease.

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Abstract

Objective: To determine the extent of pulmonary tuberculosis among prisoners in Karachi central jail, so that strategy for targeted intervention can be planned.

Methods: This prospective observational study was done at Karachi central prison from 7-2-2002 to 14-2-2002. A team of doctors, laboratory and x-ray

technicians visited the central prison. Patients who had symptoms suggestive of pulmonary tuberculosis were included in the study. Their chest x-ray was taken in the jail and three "spot specimens" of sputum were collected for three consecutive days. The sputum specimens were processed at the laboratory of Ojha Institute of Chest Diseases, Karachi.

Results: Out of 4870 prisoners, 79 (1.62%) were pulmonary tuberculosis suspects. All were male and their mean age was 32 (22-75) years. Sixteen suspects already diagnosed were on anti-tuberculosis treatment (ATT) while 11 suspects gave history of ATT in the past for incomplete duration varying from 3-4 weeks to 3 months either regularly or irregularly. Twenty-two (28%) suspects were not expectorating while fifty-seven (72%) submitted the sputum for AFB (Acid Fast Bacilli), of which only one was smear positive. Radiologically, 39 (49%) chest x-rays including those of 22 who were not expectorating were normal. Eight (10%) showed healed lesion. Thirty-two (40.5%) chest x-rays were suggestive of active pulmonary tuberculosis, so clinically and radiologically 32 prisoners were suffering from active pulmonary tuberculosis. The prevalence of active pulmonary tuberculosis in jail population determined by using the formula, number of persons with active TB in jail divided by the total number of persons booked into jail was 657 per 100,000, which is 3.75 times higher than general population.

Conclusion: Pulmonary tuberculosis is 3.75 times more common than general population in Karachi central prison and concrete efforts are needed to eradicate tuberculosis from this segment of population. The integration of provincial TB control program with that of jail health services is urgently required (JPMA 54:413;2004).