

## Review

## Status of Tuberculosis services in Indian Prisons



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## ARTICLE INFO

## Article history:

Received 25 January 2017

Accepted 25 January 2017

**Corresponding Editor:** Eskild Petersen,  
Aarhus, Denmark

## Keywords:

Prison

Tuberculosis

Active Case Finding

India

Project Axshya

## ABSTRACT

**Introduction:** Prisons are known to be a high risk environment for tuberculosis (TB) due to overcrowding, low levels of nutrition, poor infection control and lack of accessible healthcare services. India has nearly 1400 prisons housing 0.37 million inmates. However, information on, availability of diagnostic and treatment services for TB in the prison settings is limited. This study examined the availability of TB services in prisons of India. Simultaneously, prison inmates were screened for tuberculosis.

**Method:** The study was conducted in 157 prisons across 300 districts between July–December 2013. Information on services available and practices followed for screening, diagnosis and treatment of TB was collected. Additionally, the inmates and prison staff were sensitised on TB using interpersonal communication materials. The inmates were screened for cough  $\geq 2$  weeks as a symptom of TB. Those identified as presumptive TB patients (PTBP) were linked with free diagnostic and treatment services. **Results:** Diagnostic and treatment services for TB were available in 18% and 54% of the prisons respectively. Only half of the prisons screened inmates for TB on entry, while nearly 60% practised periodic screening of inmates. District level prisons (OR, 6.0; 95% CI, 1.6–22.1), prisons with more than 500 inmates (OR, 52; 95% CI, 1.4–19.2), and prisons practising periodic screening of inmates (OR, 2.7; 95% CI, 1.0–7.2) were more likely to diagnose TB cases. 19% of the inmates screened had symptoms of TB (cough  $\geq 2$  weeks) and 8% of the PTBP were diagnosed with TB on smear microscopy.

**Conclusion:** The TB screening, diagnostic and treatment services are sub-optimal in prisons in India and need to be strengthened urgently.

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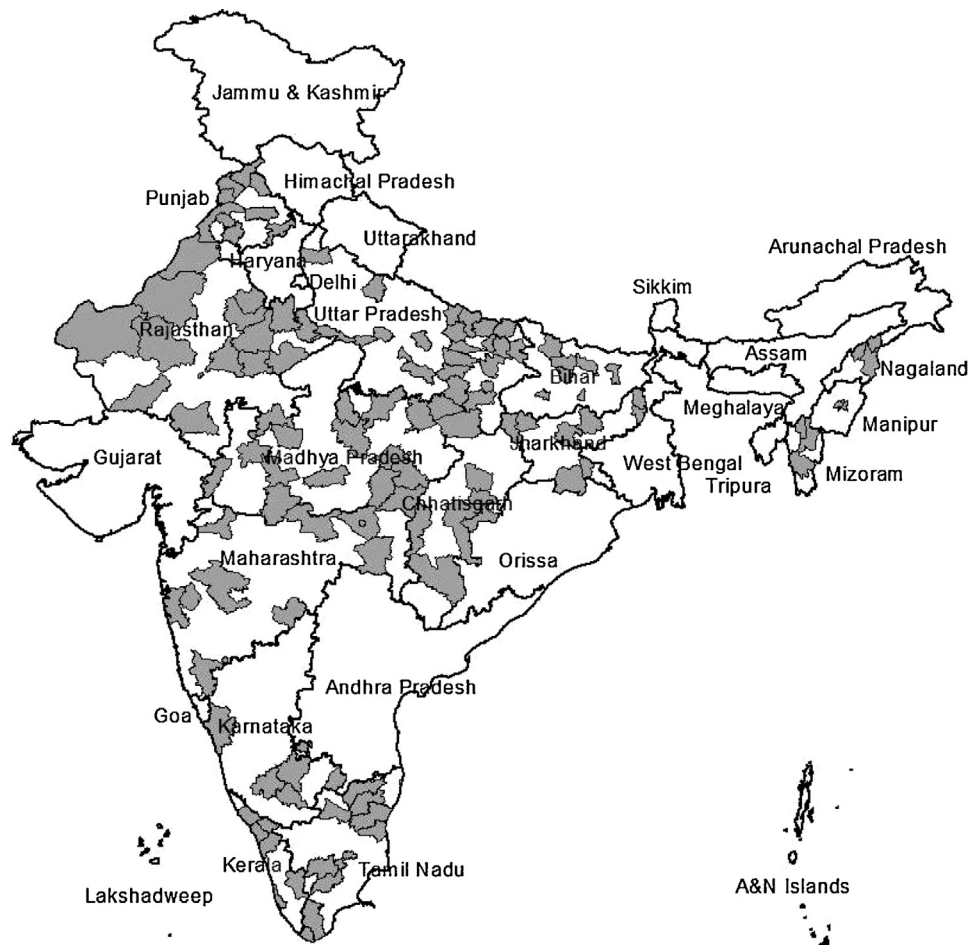
## Introduction

The incidence of Tuberculosis (TB) in prisons and correction facilities is much higher than in the community for known reasons – overcrowding, poor ventilation, low levels of nutrition, comorbid illnesses (eg HIV) and lack of healthcare services.<sup>1</sup> These factors could contribute for prisons to act as reservoirs of infection transmission.<sup>2</sup> Globally, WHO and The Union have recommended screening of all inmates to prevent infection transmission, isolation of infected person (known TB patients), right of inmates to access medical services, and to integrate TB services in prisons with national tuberculosis programmes.<sup>3–6</sup> However there is limited evidence about the measures taken or its implementation in a high TB burden country like India.

In India, there are 1401 prisons with a capacity to house 0.37 million inmates.<sup>7</sup> However, the latest prison statistics report indicates overcrowding in prisons (114%). More than 80% of inmates are in their productive age group.<sup>7</sup> Evidences from few studies among inmates have shown prevalence of TB in prisons between 2% to 7.5% and deaths due to TB between 9 to 18% of total deaths.<sup>8–11</sup> However, there is limited information on the availability of services for TB in prisons. The TB programme surveillance system does not capture this information. This study examined the availability of diagnostic and treatment services for TB in prisons of India. In addition we conducted active case finding exercise which included identifying presumptive TB patients (PTBPs) through symptomatic screening among inmates of the prisons visited and testing them for TB.

## Method

This study was conducted under Project Axshya, a Global Fund supported TB project being implemented in 300 districts across 21 states of India (<http://www.axshya-theunion.org/>) with the objective of enhancing access to TB services for high risk populations including prison inmates. Nearly, 210 prisons in the 300 project districts were line listed for the study. A formal approval was sought from all the individual prison authorities. Approval was received from 187 (89%) prison authorities. The study was conducted in 157 prisons during July and December 2013 by trained project staff who collected information on number of inmates, annual turn-over, age, sex, TB patients on treatment (if any), availability of services – regular or periodic and on entry TB screening, availability of doctor/s, diagnostic and treatment services for TB in the prisons. The project staff sensitized inmates and prison staff on basics of TB (symptoms, transmission, diagnosis and treatment) using flip charts and interpersonal communication materials. Following the sensitization, the inmates were verbally screened for symptoms of TB primarily cough  $\geq 2$  weeks. Those with symptoms of TB called presumptive TB patients (PTBP) were tested by sputum smear microscopy for which their sputum was collected and transported to the nearest designated microscopy centre (DMC) which is a public health facility under the National TB Programme where sputum tests are done at no cost. Those diagnosed with TB were initiated on DOTS (Directly Observed Treatment Short course) as per the programme guidelines.



**Figure 1.** Map of India showing districts where ACF was conducted in Prisons.

**Table 1**

Profile of prisons included in study along with available health services, Axshya intervention and number of Tuberculosis patients diagnosed.

Sl no	Indicator	Type of prison							
		Central	(%)	District	(%)	Sub-district	(%)	Total	(%)
A	Prisons in India <sup>a</sup>								
1	Distribution of Prisons	130		346		780		1256	90%
2	Inmate capacity	151421		126909		46993		325323	94%
3	Occupancy rate	183525	121%	170979		43281	135%	397785	122%
B	Prisons included in Study								
1	Number of prisons covered in study	37	28%	66		19%	54	7%	157
2	Number of Inmates	65261	43%	51623		41%	8710	19%	125594
3	Average number of inmates	1763		782		161		800	
4	Annual Turnover	10-8000 (data from 20 Prison)		0-8000 (data from 60 prisons)		10-9000 (data from 49 prisons)			
C	Health services								
1	Doctor available	36	97%	51	77%	42	78%	129	82%
2	Doctor trained in RNTCP	27	75%	38	75%	19	45%	84	65%
3	Entry level screening	22	59%	40	61%	17	31%	79	50%
4	Periodic screening	27	73%	45	68%	20	37%	92	59%
5	Diagnostic services available	11	30%	9	14%	9	17%	29	18%
6	DOTS services available	24	65%	48	73%	12	22%	84	54%
7	Prison intervention								
8	Number of TB patients taking treatment currently	149		255		20		424	
D	Project Axshya intervention								
1	Awareness Campaign/sensitization meeting	12		0		12		24	
2	Active case finding	7	19%	33	50%	21	39%	61	39%
3	Number sensitised	12576		11149		3544		27269	
4	Number screened	2502	20%	2124	19%	467	13%	5093	19%
5	PTBP identified	226	9%	765	36%	158	34%	1149	23%
6	PTBP tested	113	50%	690	90%	157	99%	960	84%
7	TB patients diagnosed	8	7%	69	10%	3	2%	80	8%
8	On DOTS	8	100%	68	99%	3	100%	79	99%

<sup>a</sup> From the Prison Statistics Report 2013<sup>7</sup> PTBP – presumptive TB patients. DOTS – directly observed treatment short course.

All information collected was reviewed for completeness during April to June 2014. The data from the 157 prisons was entered into SPSS (Figure 1 shows the location of prisons that were included in the study). Multiple logistic regression analysis was performed using SPSS to study the association of TB diagnosis in prisons (yes/no) and other co-variables (types of prisons and other facilities in the prisons). The results are expressed as frequencies, percentages and Odds's Ratio (OR) with 95% confidence intervals. P-value <0.05 was considered as significant. The authors adhered to international ethical considerations and ensured that the information submitted were without names of institutions or individual patient identifiers. The ethics committee of International Union Against Tuberculosis and Lung Disease reviewed the proposal and approved the study.

## Results

### Profile of Prisons

157 prisons were visited of which 37 (24%) were central, 66 (42%) district and 54 (34%) sub-district level prisons. The prisons visited covered 28% of all central prisons, 16% of all district prisons and 8% of all sub-district prisons in India. (Table 1) Nearly 0.2 million inmates were housed in these 157 prisons which is 39% of total prison inmates in India.<sup>a</sup> On an average, central prisons had 1,763 inmates, district prisons –782 inmates and sub-district prisons –161 inmates.

The annual turnover of inmates was reported from 82% of prisons and this varied depending upon the level and type of prison. Highest turnover was seen in sub-district prisons (10-9000) followed by district (0-8000) and central (10-8000) (Table 1).

On the day of the visit almost 55% (87) prisons had more than 500 inmates and 17% of these had >1000 inmates (in all central prisons).

### Prison Services

Screening of new inmates for TB at the time of their entry in prison, referred to here as entry level screening, was practiced in 79 (50%) of the prisons visited. The entry level screening was least in sub-district prisons (31%) and more in prisons (67%) which had a doctor. The periodic or regular screening of inmates for TB was practiced in 92 (59%) of the prisons. Overall 18% (n=29) of the prisons had diagnostic facility (microscopy center) within the premises. This was more common in central prisons (30%) as compared to sub-district (17%) and district prisons (14%). TB treatment (DOTS) services were available in 54% (n=84) prisons including 73% of district, 65% central and 22% sub-district prisons.

Doctor/s were available in 129 (82%) prisons. While 97% of central prisons had doctor/s, this was only in 77% of district and sub-district prisons. Doctor/s were available in 80% of prisons that had >1000 inmates. However, only 65% of doctors in the prisons were trained on the National Tuberculosis Programme.

### Diagnosed TB patients and association with practices and services

Of 157 prisons, only 102 (65%) had one or more TB patients who were on treatment at the time of visit. There was significant association between periodic screening and diagnosis of TB patients (OR 2.7; p=0.049). Entry level screening did not have a similar association. Following, this prisons visited were dichotomized into two groups (with or without TB patients) and the association between the prisons diagnosing TB and TB related services were measured by multiple logistic regression analysis. The prisons in the districts (OR, 6.0; 95% CI, 1.6-22.1), prisons

<sup>a</sup> The percentage is based on Prison Statistics of India report 2013.

**Table 2**  
Relation to Prisons type, inmate capacity and service availability to diagnosis of TB patients in Prisons visited.

Characteristics	Are TB patients diagnosed						OR (95% CI)	p-value
	Yes		No		Total			
	n	%	n	%	n	%		
<b>Prison type</b>								
Central	21	57	16	43	37	24	1	
District	54	82	12	18	66	42	6 (1.6–22.1)	0.007
Sub-district	27	50	27	50	54	34	1.3 (0.4–3.8)	0.632
<b>Total inmates</b>								
<500	49	56	38	44	87	55	1	
>501	53	76	17	24	70	45	5.2 (1.4–19.2)	0.014
<b>Services</b>								
Doctor Available	80	62	49	38	129	82	0.3 (0.1–1)	0.043
Entry Level screening	58	73	21	27	79	50	1 (0.4–2.6)	0.929
Periodic Screening	71	77	21	23	92	59	2.7 (1–7.2)	0.049
Diagnostic Facility	17	59	12	41	29	18	0.5 (0.2–1.3)	0.136
DOT service available	66	79	18	21	84	54	2.2 (0.8–6)	0.107

having more than 501 inmates (OR, 5.2; 95% CI, 1.4–19.2), and prisons with periodic screening (OR, 2.7; 95% CI, 1.0–7.2) were more likely to diagnose TB cases. The availability of diagnostic services and treatment services had no significant relation to diagnosis of TB (Table 2).

#### Active case finding for tuberculosis in Prisons

A total of 27,250 inmates were sensitized about tuberculosis prevention and care along with 1029 prison staff; in 61 prisons (39%). 5093 inmates were screened for TB of which 1142 (19%) were identified as PTBP and referred for sputum examination. Results were available for 960 (84%) inmates tested and among them 8% were found to be sputum smear positive. This exercise additionally identified 80 TB patients who could have been missed in the existing system.

#### Discussion

The results of this paper highlight some of the key points regarding the status of screening of inmates for TB in Indian prisons – central, district and sub-district. Central prisons, by definition are where inmates who serve more than 2 years of imprisonment are housed.<sup>12</sup> It is therefore, these prisons were having doctor/s (90%), regular or periodic screening of inmates (73%), and availability of TB services (65%) when compared to district prisons and sub-district prisons. The duration of imprisonment is not a criteria for district or sub-district prisons and had highest turn-over of inmates in these prisons. Evidences have shown that the risk of active TB cases increases with high turnover, re-imprisonment and with previous exposure to TB or latent TB infection (LTBI).<sup>1,13</sup> However, the data about turn-over in most of the prison (>60%) were poorly reported in our study as the focus was on sensitization and screening of inmates for TB. This was one of our limitations and therefore, no statistical analysis was done.

Entry level and periodic screening which are essential for early identification of TB and this was practiced in only just over half the prisons visited. During the visit, we were also informed that, as a routine procedure inmates will be asked to disclose about his/her health condition at the time of entry. Following discussion with prison authorities there were about 1707 inmates who had disclosed to have TB between 2010 to 2013. District prisons had highest number of TB patients. However, in this study we have used the data for 2013 only where 504 TB patients were identified (424 known TB patients on treatment and 80 identified through

ACF). In addition to these findings, there were 30 known MDR-TB patients (included in total) on treatment and about 14% of prison authorities interacted informed to have isolated active TB patients on treatment from other inmates.

Globally there is emphasis on regular screening and in this regard, The International Union Against Tuberculosis and Lung Disease (The Union) in 2013 through its official statement had stressed on conducting entry level screening and regular screening of inmates for PTBP or LTBI.<sup>16</sup> The same was also emphasized in World Health Organization status paper on prisons.<sup>14</sup> In this study we found these practices to be limited to few of central prisons and district level prisons and there is a need for advocacy with key stakeholders at various levels to ensure screening of inmates for PTBP (including Latent TB infection).

Doctors were available in 82% of prisons visited and were significantly associated with TB patients diagnosed. This availability of doctors may vary from daily to some days in a week. In addition, this study found that central level prisons were more likely to have a doctor trained in TB programme and equipped with TB related services. The presence of doctor could likely to encourage the inmates to seek healthcare more promptly and hence get diagnosed early.

The study found a high proportion of presumptive TB cases among the inmates although the smear positive rate was equivalent to the general community. This finding is limited by the likely bias in selection of inmates participating in the sensitisation and screening as not all inmates were allowed to participate due to security reasons. Additionally the number diagnosed could be higher if more sensitive diagnostic tools like Xpert MTB/RIF were used.

#### Conclusion

Globally there is a great concern to address TB in prisons and strategies proposed direct at establishing a system for early identification, through a process of screening at entry and/or at regular intervals.<sup>6</sup> The evidences of the study substantiate statement released by The Union emphasising a process of screening for identification of PTBPs among inmates. Along with screening there is also need for strengthening the diagnostic and treatment services across all prisons for containing the TB burden in this high risk group.

#### Conflict of Interest

None declared.

## Funding

The activity was carried as part of the on-going project, Project Axshya supported through The Global Fund grant to India.

## Acknowledgements

We would like to acknowledge the contribution of District level Project staff of Project Axshya partners – CBCI-CARD, CHAI, CMAI, EHA, MAMTA, REACH, VHAI, PSI, and The Union. We also take this opportunity to thank all prison authorities and RNTCP officers for supporting this initiative.

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