Experiences of TB Control in Two Prisons (Demonstration Sites) in Bangladesh: Support to Develop Policy Directions

Final Report

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USAID FROM THE AMERICAN PEOPLE

CHALLENGE TB

Acknowledgements

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CONTENTS

ACRONYMS

AFB	acid-fast bacilli
CNR	case notification rate
CTB	Challenge TB
DCJ	Dhaka Central Jail
DOTS	directly observed treatment, short course
GeneXpert	Xpert MTB/RIF assay
HIV	human immunodeficiency virus
icddr,b	International Centre for Diarrhoeal Disease Research, Bangladesh
IEC	information, education, and communication
IGP	Inspector General of Prisons
KCJ2	Kashimpur Central Jail 2
MDR-TB	multidrug-resistant TB
MOHA	Ministry of Home Affairs
MSH	Management Science for Health
NGO	nongovernmental organization
NTP	National Tuberculosis Control Program
RR	rifampicin resistant
SCJ	Sylhet Central Jail
TB	Tuberculosis
TRAction	Translating Research into Action
USAID	US Agency for International Development
WHO	World Health Organization

EXECUTIVE SUMMARY

Tuberculosis (TB) remains at large more than two and a half decades after being declared a global public health emergency. It has emerged as the leading cause of death from a single infectious agent. Prisons are well recognized as a reservoir of TB for many different reasons, including overcrowding, the poor general health of inmates, and the lack of adequate ventilation. Health is often a low priority in prisons, and, as a result, the rates of TB infection in prisons can be 5 to 10 times higher than national rates. In addition, high turnover in prisons extends this risk beyond the high walls.

Information on TB incidence rates in Bangladeshi prisons is limited. Although directly observed treatment, short course (DOTS) coverage by the National TB Control Program (NTP) includes all prisons, the TB case finding mechanism is insufficient and passive. The diagnostic support rendered by the implementing partners of the NTP is not very robust to fulfill requirements. A sustainable mechanism involving the existing health system within the prisons and linking that to mainstream health facilities is warranted.

In collaboration with NTP, icddr,b has been working in Dhaka Central Jail (DCJ) since 2005 to conduct active TB screening to find TB cases. In 2012, USAID supported scaling up icddr,b's active case finding strategy in three more prisons: Chittagong and Rajshahi Central Jails and Gazipur District Jail through the Translating Research into Action (TRAction) initiative. The existing transfer and referral mechanism was strengthened under this initiative, resulting in the detection of 273 TB cases with 84% treatment registration among identified patients and 76% treatment completion among the registered cases.

Along the same lines, under the patronage of NTP and in collaboration with the Directorate General of Prisons, icddr,b worked in Kashimpur Central Jail 2 (KCJ2), Gazipur and Sylhet Central Jail (SCJ) from July 2016 to June 2018. Funding support to this project was provided by the USAID's Challenge TB Bangladesh (CTB) Project. The aim was to establish two demonstration sites for a sustainable model for a TB control program in prisons by training and mobilizing the existing human resources in prisons (i.e., convicted inmates in charge of different prison cells who are known as "writers"). The major activities were to institute a sustainable active screening system, develop instruction and training materials, establish linkage with GeneXpert sites for TB diagnosis, create awareness inside prison facilities, and ensure treatment, referral, and follow-up of inmates inside and outside prisons.

During the project period, 11,575 inmates at entry points and 4,458 inmates inside the prisons were screened; 15 were diagnosed with TB and 14 were registered for TB treatment through the DOTS centers inside the prisons. The resultant case notification rates (CNRs) were two times higher in comparison with the general population in both districts. Awareness campaigns were organized to educate 1,130 inmates on symptom screening and sources of TB infection, referral for diagnosis, management of patients, and prevention of TB infection using information, education, and communication (IEC) materials used by NTP to strengthen case finding and creating awareness on TB. A training manual was also developed for training writers, which has been shared with the Prisons Directorate and NTP for review and endorsement. The project trained 27 writers who are continuing active TB screening in the prisons.

Working inside the prison has its own different set of challenges, in addition to those related to national health systems in Bangladesh. However, working with vulnerable groups inside prison cannot be avoided. Using existing resources, i.e., writers, to screen for TB was a good strategy

to energize TB case finding inside prison. This strategy can be scaled up in other prisons through collaboration between the Ministry of Home Affairs (MOHA) and Ministry of Health and Family Welfare. Interested donors and partners should also work in the same line for policy-level advocacy and initiating further projects or activities.

INTRODUCTION

TB is one of the most ancient diseases known to mankind and still remains a major global health problem. In Bangladesh, 244,201 TB cases were notified in 2017, which was only 67% of the estimated incidence. The overall CNR was 138 per 100,000 population. Over 55.7% of cases were new pulmonary bacteriologically confirmed TB. The rate of multidrug-resistant TB (MDR-TB) among the new cases was 1.6% and among retreatment cases was 29% (1).

Prisoners often originate from the most vulnerable sectors of society–the poor and those dependent on alcohol or drugs. An overcrowded environment, prevalent drug abuse, high-risk behavior, and population influx of internal migrants contribute to making prisoners especially vulnerable to TB infection. As a result, TB rates in prisons are often 5 to 10 times higher than national rates (2-4). Due to high turnover rates of under-trial prisoners in every prison in the country, this high rate poses a great threat to the general community (5). In addition, there is often no transfer mechanism in practice at the time of release or judicial transfer between prisons in the existing TB control system.

The current case finding strategy in prisons all over the country is passive, i.e., patients seeking treatment for cough and other respiratory ailments undergo sputum smear microscopy. Drug resistance patterns of these cases are unknown because culture and drug susceptibility tests for *Mycobacterium tuberculosis* are not done in prisons. Prison health centers are understaffed; laboratory diagnosis (i.e., smear microscopy) is facilitated by several nongovernmental organizations (NGOs) whenever requested by the medical staff of the prison, a physician in some prisons or medical support staff (pharmacists/paramedics/medical technologists) in others.

For the last ten years, icddr,b, in collaboration with NTP, has been conducting an active screening program inside the prisons to determine the prevalence of pulmonary TB and its drug resistance and prevent transmission in DCJ, the largest prison in Bangladesh. The study results showed a high rate of TB in DCJ, which was about 20 times higher than the national rate (6, 7). MDR-TB was found in 2% of the diagnosed cases, which is alarming in this crowded setting because drug-resistant strains can easily be transmitted from one inmate to others. One study finding indicated that 37% of TB cases were identified within the first six months of imprisonment, which suggests that a substantial number of inmates enter prison with active TB or are in the early stage of the disease. On the basis of recommendations from the findings of the study, an active screening program for all inmates was established at the entry point of DCJ in 2009, and a significant number of cases have been detected, isolated, and brought under treatment since then (6, 7). Active screening proved to be an effective tool in controlling TB inside the prison as the number of TB cases decreased significantly over the study period of four and a half years, from 49 cases during the first quarter to 8 cases in the final quarter of the study period ($p = 0.001$).

In 2012, with support from USAID under the TRAction initiative, we expanded our active case finding strategy in three other prisons, Chittagong and Rajshahi Central Jails (medium size) and Gazipur District Jail (small size), in addition to DCJ (large). Active case finding added to ongoing passive case finding, resulting in 2 to 10 times higher CNR than the population of same geographical area. Approaches to strengthen the existing transfer and referral mechanism were also incorporated in these jails. All the identified cases were closely followed to ensure treatment registration, proper referral upon release or during judicial transfer, and treatment completion. This resulted in a treatment registration of 84% among identified patients and 76% treatment completion among registered cases. Small group lectures were given utilizing NTP's IEC materials. An awareness campaign increased inmates' knowledge of different aspects of the

disease, treatment options, and services available. There is an urgent need to expand these activities to other large jails to enhance diagnostic capacity, increase case detection, increase level of awareness, and scale up TB control activities.

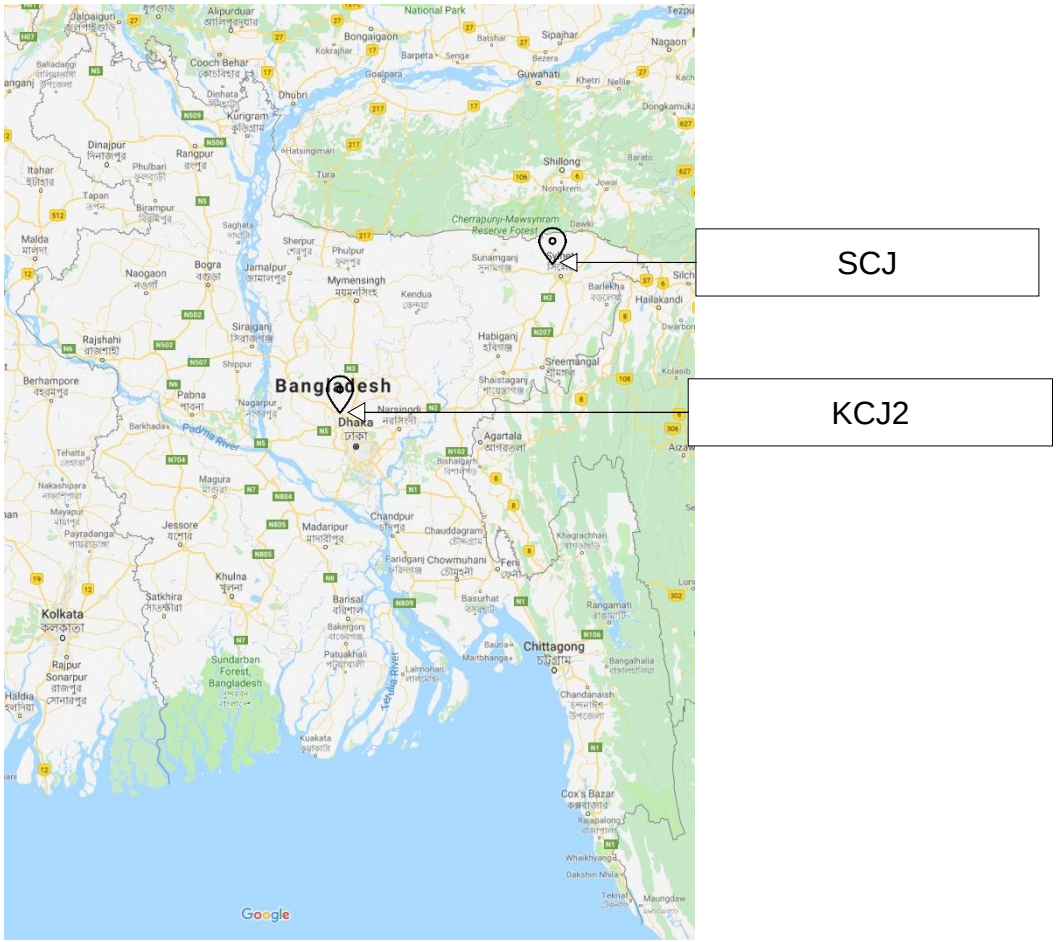
In line with the priorities of the NTP and CTB Bangladesh, activities under this study were primarily focused on improving TB case detection in one of the highest risk groups for TB—prisoners—to establish two demonstration sites built on a sustainable model for a TB control program in prison. This was possible by training the existing human resources in the prison health system (convicted inmates in charge of different prison cells known as “writers”) and mobilizing them to establish an effective TB control program in these settings. This study supplemented existing NTP activities and fostered collaboration with the Prisons Directorate. This final report presents project activities implemented from July 2016 to April 2018.

PROJECT PARAMETERS AND ACTIVITIES

For creating the demonstration sites, two different categories (based on size, infrastructure, and turnover of inmates) of central prisons were selected after discussion with the NTP and Directorate General of Prisons. They were:

- KCJ2 in Gazipur
- SCJ in Sylhet

Figure 1. Locations of SCJ and KCJ2



Project Duration and Preparation

The project ran for 24 months (July 2016–June 2018), divided into 8 quarters. The first four quarters (July 2016–June 2017) were spent obtaining the necessary approvals from MOHA, developing tools for different activities (structured questionnaires, instruction materials for sputum collection, referral forms, etc.), completing assessments of the sites, and conducting prison staff orientation or training. An application to conduct the project was sent to MOHA in mid-July 2016 after the contract was signed. Unfortunately, approval took a long time due to some unforeseen events, and security issues in the country forced the government to become more conservative. Approvals of any new project inside a sensitive setting like a prison were put on hold. With relentless persuasion from the organization, MOHA finally granted approval in late March 2017 (end of the third quarter) for conducting the project. Soon after approval, we communicated with the Prisons Directorate to initiate project activities. A meeting in the presence of representatives

from the CTB team, the Inspector General of Prisons (IGP), and other prison officials was held in the Prisons Directorate during the fourth quarter (April–June 2017). The project team made a presentation on the proposed activities, and the IGP then led a discussion on how the Prisons Directorate can facilitate project implementation. Because of the delay in starting project activities, we could not maintain the projected timeline and thus, the project team requested that CTB Bangladesh management extend the project, which was approved. Meanwhile, the prison staff orientation meetings and assessment of both prisons were being completed in the quarter.

Project Activities

Establish an active screening system at the entry point and for inmates inside prison cells to identify presumptive TB cases

We established an active screening system for TB at the entry point and inside the prison cells of KCJ2 and SCJ. The project team comprised one field research assistant and four field assistants. A medical officer supervised the day-to-day activities of the team, maintained close coordination with stakeholders, and frequently visited the prisons to ensure proper implementation of the project. The principal investigator and senior research investigator developed training manuals including a “writers manual” and trained the field team in detail on the implementation plan, questionnaires, sputum submission instructions, good quality sputum collection, temporary storage, safe transportation, and counseling on the importance of treatment adherence. (This was an implementation project, not a study or research. However, the principal and senior investigators worked as focal points for the CTB prison project and provided their LOE.) Then two field assistants each were placed at KCJ2 and SCJ. The field research assistant supervised the field assistants, coordinated with local authorities, and monitored treatment follow-up of patients at the two jails.

At the beginning of the field activities, the field team identified and trained the writers and the existing human resources in the prisons and mobilized them to establish active screening systems for TB at the entry point and inside the prison cells. Every detainee entering the prison and those staying inside the prison cells were verbally screened for symptoms of TB by the trained writers. Screening was done for TB symptoms by using simple standardized questionnaires. Those having symptoms, such as presence of cough for more than two weeks, low body mass index, haemoptysis, weight loss, and fever or night sweats, were considered as presumptive TB cases. The history and risk factors for getting TB, smear microscopy, and the GeneXpert test were used as part of the diagnostic algorithm. Sputum samples were collected from all TB presumptives (with a cough for two weeks or more and/or a body mass index less than 16 kg/m^2) for acid-fast bacilli (AFB) microscopy at the local DOTS. Positive cases were immediately brought under DOTS with the help of the jail authority.

Introduce innovative instruction materials for collecting quality sputum specimens for smear microscopy and/or GeneXpert testing

Instruction materials developed under a previous project to simplify and standardize the process of providing a good quality sputum specimen were used to enable presumptive TB cases to submit a good sample.

Establish linkage with GeneXpert facility

Linkage was established between the selected prisons and the existing GeneXpert facility at the local level. The prison health staff were trained on how and when to seek access to this advanced and rapid test. Inmates identified presumptive TB cases according to the national guideline were tested with GeneXpert, as well as those who tested negative on smear

microscopy but were clinically diagnosed as highly suggestive of TB by physicians. Sputum specimens were collected from the presumptive TB cases and transported to the nearby GeneXpert facility for testing.

Ensure effective treatment, follow up, referral, and reporting of identified TB cases

Bacteriologically positive cases identified through screening were immediately isolated and treated inside prison hospitals under DOTS and were closely followed to ensure treatment registration, proper referral upon release or during judicial transfer, and treatment completion. The management of transfers between prisons or between the prison and civilian sector were also ensured. A standardized transfer form (TB07) was used for this purpose. All patient management documents were recorded and reported quarterly to NTP using standardized forms by the concerned DOTS corners. Previous study findings showed a considerable number of inmates under treatment lost to follow-up (~24%) after release from prison, despite efforts to strengthen the current referral mechanism. This loss was mostly due to their unwillingness to report to the DOTS in their community. To address this issue, project staff and the writers counselled TB patients in the prisons and (hopefully) motivated them to overcome the social stigma associated with revealing their convict identity in the community.

Arrange awareness campaigns and monthly chest camps to convey information on symptoms, sources of TB infection, management, and prevention for inmates and prison staff and to conduct verbal TB screening

An IEC campaign was set up to make inmates aware of the symptoms, sources, and prevention of TB infection. The IEC materials included leaflets, flip charts, and posters. A training manual to conduct verbal TB screening included general information on TB (sources, signs and symptoms, management, and prevention of TB infection). The writers were trained on verbal TB screening through small group lectures. They were encouraged to conduct group discussions to share information inside the prison cells when they were confined after sunset. Separate counseling sessions were arranged for inmates who were on anti-TB treatment. These sessions focused on the importance of continuing treatment upon release back into the community and ways to address the stigma associated with revealing a history of imprisonment. Monthly chest camps were organized at the prison health facility where the prison staff could consult with a locally posted physician regarding any chest complaints.

Provide orientation for prison staff on TB and project activities

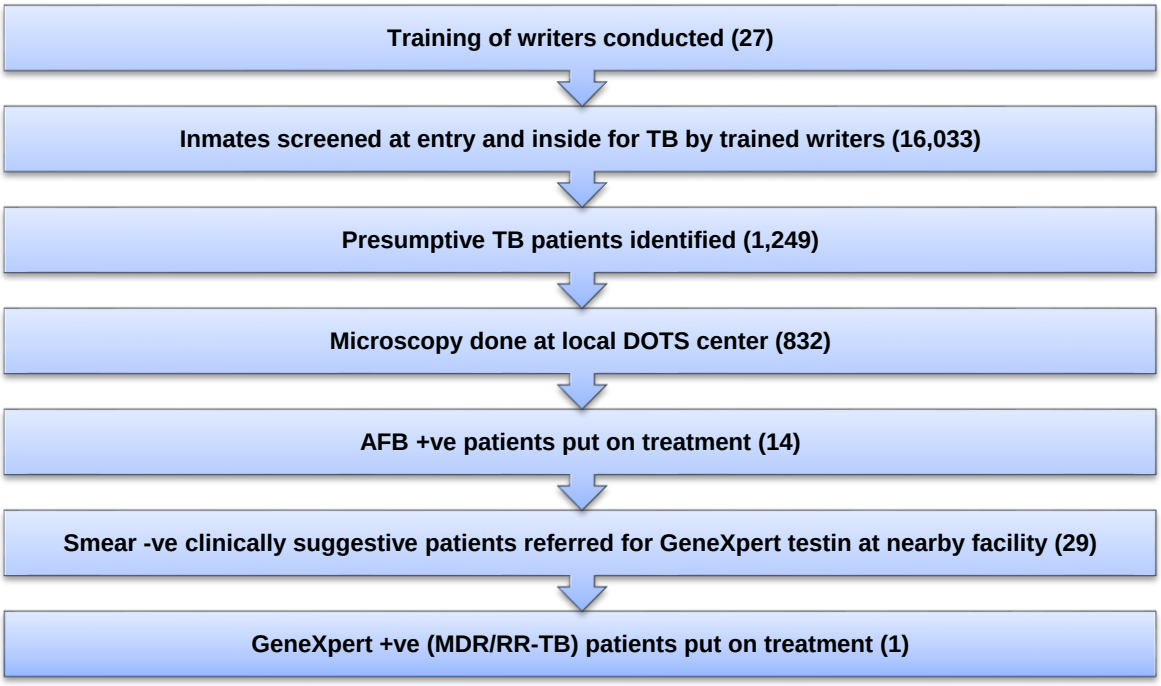
In 2017, a meeting was held at the Prisons Directorate regarding the project's implementation plan. The IGP, additional IGP, assistant IGP for development, and a representative from the CTB team attended. The icddr,b team made a presentation on the proposed project activities. The IGP then led a discussion on how the Prisons Directorate can facilitate project implementation and later assigned the assistant IGP for development to be the directorate's focal person for this project. He facilitated communication with the local prison authorities and higher authorities in the Prisons Directorate throughout the project period.

Following the meeting, a prison staff orientation meeting was organized at KCJ2 and SCJ during June and August 2017. The prison officers including the senior superintendent, jailer, deputy jailers, and prison hospital staff, including the assistant surgeon, nurses, and paramedics. The participants were trained on the general aspects of TB and the project activities.

RESULTS

Project activities (writers' training, active screening at entry and inside the prison by trained inmates, awareness campaigns, chest camps, and quarterly reports) commenced from the fifth quarter and continued beyond the seventh quarter. The results presented here cover July 2017 to April 2018.

Figure 2. Quantitative results over the tenure



It is important to highlight that despite the serious challenges faced during the implementation of this demonstration study due to the restrictive security protocols after the terrorist attack of July 2016 the teams that worked in this demonstration study inside the two jails were able to identify and put on teratment15 patients including one MDR/rifampicin-resistant (RR)-TB.

Writers trained and writers training manual developed

The writers' training took place at KCJ2 January 9–17, 2018, and at SCJ January 9–14, 2018. We trained 27 writers to do active screening in the prison currently. In addition, a writers' training manual was developed during the last quarter of the project, which was approved by the CTB Bangladesh team. It has been submitted to the Prisons Directorate and NTP for review before final printing.

Total active screening completed

Trained writers conducted active screening by using a questionnaire at the prison entry point (11,575 detainees) and inside the prison (4,458) from July 2017 to April 2018 and March to April 2018, respectively. By verbal screening, they identified 1,249 (8%) presumptive TB cases. All of them were referred to the DOTS for sputum smear microscopy. Among the presumptive cases, 832 (67%) produced good quality sputum specimens for testing. The rest (417, 33%) were either not able to produce sputum or bailed out before testing; 15 (2%) TB cases were identified among the sputum samples tested by microscopy (14 from entry point and 1 from inside). A total of 29 (out of 832, 4%) samples were referred for GeneXpert MTB/RIF assay and only one of them was

diagnosed as MDR/RR-TB (table 1). This translates to a CNR of new pulmonary bacteriologically confirmed cases at KCJ of 91.23; at SCJ 95.18; and overall 93.56 per 100,000 population. Out of the 15 TB cases, 14 (93%) started treatment and 1 patient left the facility before taking any anti-TB drugs. Of the patients who were on treatment, five were cured after completing the treatment successfully, four left prison before completing treatment (two each before the first and second follow-ups), four patients' treatment was ongoing during the reporting time (including the MDR-TB patient), and one died for reasons not related to TB. Monthly active screening results from KCJ2 and SCJ entry points can be found in appendix 1.

Table 1. Total active screening results (entry point and inside)

	KCJ2 (n, %)		SCJ (n, %)		Total (n, %)	
	Entry point	Inside	Entry point	Inside	Entry point	Inside
Inmates screened	3,822	2,755	7,753	1,703	11,575	4,458
Presumptive TB patients	360 (9%)	192 (7%)	469 (6%)	228 (13%)	829 (7%)	420 (9%)
AFB microscopy done	274 (76%)	123 (64%)	245 (52%)	190 (83%)	519 (63%)	313 (75%)
GeneXpert done	0	0	29 (12%)	0	29 (6%)	0
TB patients identified (AFB)	5 (2%)	1 (1%)	9 (4%)	0	14 (3%)	1 (0.3%)
RR-TB patients identified	0	0	1 (11%)	0	1 (7%)	0

Awareness campaigns organized

In addition to active screening, TB awareness campaigns were conducted among the convicted inmates to increase awareness and strengthen passive case finding. In the fifth through seventh quarters, 40 batches of awareness campaigns in two prison facilities were arranged where 1,130 inmates were educated about TB symptoms, sources, management, and prevention of infection through NTP's IEC materials. Another 24 batches of awareness campaigns (12 in each prison) were organized during the fifth quarter where more than 700 inmates participated. During the sixth quarter, 12 batches of awareness campaigns were conducted (6 in each prison), reaching more than 300 participants. In seventh quarter, only 4 batches of awareness campaigns in January 2018 (2 in each prison), where more than 115 inmates were present (table 2).

Table 2. Awareness campaigns

	Month		Batch		Participant	
Month/year	Batch	Participant	Batch	Participant	Batch	Participant
July 2017	6	173	6	150	12	323
August 2017	4	149	4	146	8	295
September 2017	2	41	2	50	4	91
October 2017	2	65	2	60	4	125
November 2017	2	41	2	40	4	81
December 2017	2	60	2	40	4	100
January 2018	2	50	2	65	4	115
Total	20	579	20	551	40	1130

Chest camps held

During the fifth through seventh quarters (July 2017–April 2018), 16 chest camps (8 in each prison) were arranged for screening prison staffs; 215 staff sought consultation for their chest complaints (table 3). Among them, 25 (12%) presumptive TB cases were identified by the physicians; 18 (72%) of the 25 staff were tested by AFB microscopy, and none were found to be positive. Physicians put two suspected presumptive TB cases on antibiotics before being referred for TB tests. Both staff improved with treatment, so they were not tested for TB (table 2).

Table 3. Chest camps

	KCJ2			SCJ			
	2017	2018	Total	2017	2018	Total	Total
Prison staffs screened	106	14	120	85	10	95	215
Presumptive TB patients	11	2	13	12	0	12	25
AFB microscopy done	8	0	8	10	0	10	18
GeneXpert done	0	0	0	0	0	0	0
TB patients identified (AFB)	0	0	0	0	0	0	0
RR-TB patients identified	0	0	0	0	0	0	0

KEY CHALLENGES

The biggest challenge for this project was getting approval from MOHA, which has to approve all projects inside prisons. Because of unforeseen events and security issues in the country after the terrorist attack of July 2016, the government became more conservative and restrictive on approving any new project inside sensitive settings like prisons, causing an unexpected delay in obtaining approval for the demonstration study to start. It took about eight months (March 2017) to get approval after application submission.

Because of this delay, the project team had to renegotiate with CTB to revise the project timeline, deliverables, and contract. Also, getting the go-ahead during shortened office hours during Ramadan and other extensive national holidays delayed meetings with prison officials, and thus, it took about a year to start field implementation (fifth quarter, July 2017). The small budget allocation, lack of skilled and motivated manpower for prison health services, lack of a suitable workplace, and high security inside prisons often jeopardized project activities. We chose to train writers to conduct verbal TB screenings to fill the gap in prison health service manpower. The load of daily assigned work as well as lack of freedom to work freely (due to security) often made it a challenge for the writers to manage time to conduct TB screenings. Local prison authorities had to be consulted to arrange time for the writers to conduct active screening. It was also a challenge to keep the writers motivated for such additional work without any incentive.

Because of varying levels of education, it was also a challenge for some writers to calculate the BMI of new inmates during screening. A BMI chart was provided to the writers during the training. However, even consulting the chart proved to be difficult in some cases. Another challenge was the low positivity rate among presumptive TB cases. In addition, the Directorate of Prisons organized some departmental events inside KCJ2, and on some of these days, the DOTS corner was advised to remain closed. Therefore, some of the identified presumptive cases were not tested because they were released from prison by that time, and testing was also delayed for the rest of the cases.

LIMITATIONS

This demonstration experience focused mainly on finding new pulmonary bacteriologically confirmed TB, on the recommendation of the jail authority. Because prison protocols/norms do not allow prisoners to go out and get a chest X-ray, the study included only sputum microscopy and GeneXpert testing at existing DOTS center within the prisons.

Training the writers and mobilizing them to screen inmates to identify presumptive TB patients was the prime aim of this project. However, testing the identified presumptive patients was beyond the direct scope of the project and was out of our control as well. The project only facilitated testing through existing DOTS centers. In addition, many other external factors contributed to not being able to test many of the presumptive patients identified and following them through their course of treatment. The project team was not allowed to work during the days that prison officials had other visitors or other programs. Also, because of training and sickness episodes, DOTS personnel were absent for long periods during the project timeline. Those identified as presumptive during these periods were not all tested because some of them left prison before the testing center was functional. Concerns were also raised regarding the quality of smear microscopy on their return as presumptives piled up and they had to test a lot more samples than usual. Health often does not get the priority it should in a prison system. The absence of chest X-ray as a screening tool was also a notable limitation as the inmates have a general tendency of hiding symptoms and might have skipped the verbal screening process.

DISCUSSION

An overcrowded environment, prevalent drug abuse, high-risk behavior, and high population turnover make prisoners highly vulnerable to TB infection (8, 9). Insufficient laboratory capacity and diagnostic tools, interrupted supply of medicines, weak integration between civilian and prison TB services, inadequate infection control measures, and low policy priority for prison health care adds to the challenges for TB control in prisons (10). The current case finding strategy in prisons in Bangladesh is passive (i.e., patients seeking treatment for cough and other respiratory ailments undergo sputum smear microscopy), which produces poor TB case finding (6, 7). The active screening program established at KCJ2 and SCJ was effective in identifying a good number of presumptive cases (8%), though the positivity rate (2%) was not that high. (There were difficulties obtaining good quality sputum samples and challenges associated with conducting AFB microscopy/GeneXpert; DOTS corner remained closed at SCJ because of staff training, sickness of personnel, and other events organized by the Prisons Directorate).

In addition, the overall procedure for screening and referral for diagnostics was done by the trained writers and not health staff. Because of these limitations, the positivity rate of screened inmates was quite low, which may not be consistent with findings from different studies in prison settings (6, 7). Another contributing factor for this low incidence rate may be the detention of special/high-profile inmates selectively at KCJ2 by the prison authority. Unlike other prisons in Bangladesh, KCJ2 does not receive inmates everyday directly from law enforcement agencies. Rather, they only receive a selected group of inmates once or twice a week from other prisons. The lower incidence at KCJ2 also supports that fact. However, the CNRs of new pulmonary bacteriologically confirmed cases in both prisons were still higher than the corresponding general population. At SCJ, the CNR was 95.18 compared to 67.39 in Sylhet district, according to the NTP annual report 2017. At the same time, the CNR in KCJ was 91.23 against 73.94 in Gazipur district.

In many cases, presumptive TB cases were released on bail before AFB microscopy was done. Added to that, the DOTS staff in KCJ2 were not interested in carrying samples for GeneXpert testing to the Gazipur District Hospital; despite several attempts, we could not convince them. So, no GeneXpert test was conducted at KCJ2. In contrast, only one MDR-TB was found among the small number of diagnosed cases, which even at that rate should ring alarms in this setting, as the drug-resistant strain can easily be transmitted from one inmate to others (11). The results, along with international recommendations, indicate that measures, like active screening at the entry point of the prisons and periodic active screening inside the prison, should be taken to detect TB cases early and limit transmission of the disease to control TB in this high-risk setting (9, 12). As well, adequate measures should be taken to ensure that staff participate in active screening (DOTS staff/NGO/prison staff/writers) and that required tests (smear microscopy/ GeneXpert) are conducted in a timely manner. Very few prisons in Bangladesh have microscopy centers on their premises. Because the prevalence of TB is higher in this setting (7), a microscopy facility should be established inside every prison, and adequate measures should be taken to ensure the quality of smear microscopy. Moreover, linkage with local GeneXpert facilities needs to be strengthened for better diagnosis (smear negative cases) and detection of MDR-TB cases.

We trained 27 writers to carry out active screening inside prison. Although prisoners are busy performing required duties, such as cooking and cleaning, they were able to carry out screening activities. Considering funding constraints in prisons, mobilizing existing resources has the potential to contribute greatly to overall TB control activities inside prisons. Though the prime mandate of this project was training, diagnosis and treatment enrollment were done only through

existing resources. No additional resources were dedicated for diagnostic purposes. X-ray was not used as part of the screening procedure because it is not a current practice in prison settings.

Once diagnosed, the delivery of drugs and management of TB cases are handled by the prison authority. Prison health staff follow up with patients under treatment with the help of NGO staff, but currently the practice is not robust. Also treatment adherence is another burning issue. Unavailability of hospital staff after regular office hours often leads to releasing patients without any referral, as prisoners are released at different times (sometimes even beyond office hours). Also, lack of proper counseling on the importance of completing TB treatment leads to discontinuation of treatment. Often, there is no transfer mechanism in practice at the time of judicial transfer between prisons in the existing system. We have discussed these issues with the concerned authorities and tried to establish a follow-up system for inmates undergoing treatment and also provide them with a referral form to use and inform the DOTS in their locality upon release from prison. Still, more effort and incentive are required to establish the system effectively.

We organized 40 awareness campaigns involving more than a thousand convicted prisoners. Small group lectures were given utilizing IEC materials from NTP. Awareness campaigns increased the knowledge of inmates in different aspects of TB, including treatment options and services available, and rectified some common misconceptions. Though it is difficult to organize such sessions inside the prison system, there is an urgent need to expand these activities to other large jails to enhance diagnostic capacity, increase case detection, increase TB-related awareness, and scale up interventions in Bangladesh prisons.

Throughout the project duration, quarterly chest camps were arranged for screening prison staff, but the challenge was participation. Because of their engagement in different activities, prison staff did not have time to come to the chest camp and wait in a queue. Especially at KCJ2, the staff had to wait on several occasions. There has not been a posted physician at KCJ2 for quite a long time and the physician coming to see them had this as an additional responsibility. Therefore, turnout at the chest camps has not been satisfactory.

Toward a Sustainable TB Control Program in Prisons in Bangladesh

NTP approved a five-year national strategic plan (2018-2022) for TB control and adopted the Zero TB Cities Initiative in October 2017 with the goal of drastically reducing the national incidence rate of 221/100,000 in 2015 to 110/100,000 by 2025 (5). The initiative has four major programmatic elements and, though much progress has been made in the first three, the fourth focusing on high-transmission areas and populations at risk remains neglected, especially regarding the population at risk. People living in correctional settings, like jails, prisons, and detention centers, are such a high-risk group. Around 11 million people are detained worldwide and TB remains a growing problem among prison systems (13).

For the community at large as well as the prison itself, prisons are considered reservoirs of *Mycobacterium tuberculosis* transmission (14). Several studies in Bangladesh also suggested high prevalence as well as transmission rate of TB inside prisons (6, 7, 15). Transmission occurs through prison staff, visitors, and released inmates (16). The estimated prevalence of latent TB infection and active TB disease in prison systems is reported to be much higher than the average estimates in the general population (17, 18). A 10-year active screening program by icddr,b in collaboration with NTP found that the rate of TB in DCJ was 20 times higher than the national rate (6). Studies published from Bangladesh also suggest that this high rate of TB can be effectively controlled with active case finding (15). It is important to mention that those high rates of active case finding were achieved under the TRAction project that was truly conducted with a

research approach that enjoyed free access to any place within the prison, deploying an adequate number of trained staff to do the screening, sample collection, and diagnosis. Under that project, diagnostic tools such as GeneXpert, culture, and microscopy were used. Every presumptive case underwent GeneXpert testing. Therefore, the yields were high, ranging from 2–10 times in 4 different jails. In this demonstration study, prisoners conducted the screening and made the referrals. The yield was two times higher after a fine correction (seven months of activities against one year).

Given the restrictions in this sensitive setting, it is difficult for the NTP or its implementing partners to station permanent staff in the prisons. To address this challenge, the idea of a sustainable TB control program in prisons involving the existing human resources inside the prisons was generated. With this study, we trained the inmates on basics of TB and on administering a standardized verbal screening questionnaire. They have also been able to perform active case finding using the standardized questionnaire and identify presumptive TB cases as evident from the screening numbers mentioned earlier. In line with the priorities of NTP and CTB, our activities under the CTB demonstration study in KCJ2 and SCJ identified a good number of presumptive cases. The awareness campaigns and using trained writers for active screening also proved to be effective in identifying presumptive cases and thus improving TB case detection in the prison setting.

Bangladesh's status has recently changed from a low- to a middle-income country. However, the economic growth that supports this change is nowhere near able sustain all the donor-funded activities going on in the country. But this status change will make it difficult to secure funds for conducting programmatic activities in future. So, in view of the already resource-poor setting of Bangladesh prisons, conducting active screening by existing human resources (trained writers) under supervision of prison medical staff instead of dedicated or study staff and arranging regular awareness campaigns by the trained inmates/prison medical staff/physicians working in government hospitals will minimize the cost of such activities. Considering the Zero TB Cities Bangladesh goal of reducing the current TB incidence rate by 50% in cities within seven years, scaling up the recommended approaches would maximize measurable impact and efficient use of resources and contribute toward overall TB control activities inside prisons and even beyond the high walls.

CONCLUSIONS AND RECOMMENDATIONS

Overall, even after implementing different strategies, including using available human resources to conduct active TB screening, it was challenging and difficult to provide national-level TB health service in prison settings where the health system is almost non-existent. However, experiences with this demonstration study and earlier initiatives regarding TB control in prison have generated considerable workable insights to continue and plan collaborative efforts to step forward. An improved health system in prison through political commitment and public perception toward prisons will be required to sustain these TB control efforts.

Recommendations to Prison Authorities and NTP

Nevertheless, we recommend adding TB screening at the prison entry point as well as periodic follow-ups of at-risk inmates, GeneXpert, and/or culture of AFB versus suspected cases on a regular basis; proper consultation and referral to DOTS after release/transfer of inmates; and periodic lung-health awareness campaigns among inmates and staff in all prisons. NTP should be inclusive and supportive to plan and formulate strategic plans covering special issues with prisons and collaborate with stakeholders within the government for an integrated system that uses existing resources to include missing TB patients inside prison in the national picture.

Recommendations to Partners and Donors

Effective TB control in prison is a yet-to-achieve outcome, which is dependent on the complex setting under the control of prison authorities and needs further continued attention from NTP and all partners working with TB. Interested donors should include in their mandate an increased liaison between the Prisons Directorate and NTP, along with the concerned ministries for policy-level advocacy and collaborative body formation to support further strengthening of linkage to TB diagnostic facilities and to work on ways out of the challenges in TB control within routine dealings of detainees.

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APPENDIX 1. MONTHLY SCREENING RESULTS

KCJ2 monthly active screening result (entry point)

	2017							2018					Total
	July	Aug	Sept	Oct	Nov	Dec	Total	Jan	Feb	Mar	April	Total	
Number of inmates screened	44	285	49	300	669	362	1709	385	1088	337	303	2113	3822
Presumptive cases identified	2	19	6	26	32	32	117	45	131	41	26	243	360
Microscopy done	2	19	6	26	32	32	117	45	66	38	8	157	274
Microscopy positive	0	1	0	1	0	2	4	0	1	0	0	1	5
GeneXpert done	0	0	0	0	0	0	0	0	0	0	0	0	0
GeneXpert positive	0	0	0	0	0	0	0	0	0	0	0	0	0

SCJ monthly active screening result (entry point)

	2017							2018					Total
	July	Aug	Sept	Oct	Nov	Dec	Total	Jan	Feb	Mar	April	Total	
Number of inmates screened	156	960	829	870	877	677	4369	766	808	886	924	3384	7753
Presumptive cases identified	8	45	3	12	12	8	88	78	125	116	62	381	469
Microscopy done	7	33	3	4	12	9	68	33	20	62	62	177	245
Microscopy positive	0	0	1	0	1	1	3	1	2	1	2	6	9
Xpert done	1	2	3	0	7	10	23	0	2	2	0	4	27
GeneXpert positive	0	0	0	0	0	0	0	0	0	0	0	0	0

Monthly chest camp screening result of KCJ2

	2017						2018					Total
	July	Aug	Sept	Oct	Nov	Dec	Total	Jan	Feb	Mar	Total	
Prison staff screened	0	20	36	11	29	10	106	14	0	0	14	120
Presumptive TB cases	0	0	0	4	3	4	11	2	0	0	2	13
Microscopy done	0	0	0	4	2	2	8	0	0	0	0	8
GeneXpert done	0	0	0	0	0	0	0	0	0	0	0	0
TB cases (AFB)	0	0	0	0	0	0	0	0	0	0	0	0
MDR-TB cases (GeneXpert)	0	0	0	0	0	0	0	0	0	0	0	0

Monthly chest camp screening result of SCJ

	2017						2018					Total
	July	Aug	Sept	Oct	Nov	Dec	Total	Jan	Feb	Mar	Total	
Prison staffs screened	0	14	27	6	9	29	85	10	0	0	10	95
Presumptive TB cases	0	0	1	0	3	8	12	0	0	0	0	12
Microscopy done	0	0	1	0	0	9	10	0	0	0	0	10
GeneXpert done	0	0	0	0	0	0	0	0	0	0	0	0
TB cases (AFB)	0	0	0	0	0	0	0	0	0	0	0	0
MDR-TB cases (GeneXpert)	0	0	0	0	0	0	0	0	0	0	0	0