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Tuberculosis: Active Case Finding Survey in an Urban Area of India, in 2012

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ABSTRACT

Background: Tuberculosis (TB) continues to pose a major global health problem and thus intensive action is needed to control and ultimately eliminate the disease.

Methods: An active case finding (ACF) survey was conducted in the urban slum areas of the R-South Municipal Ward of Mumbai City for a period of two months from June to July 2012. Micro planning for survey was done by District Tuberculosis Officer and Medical Officer of Health of R-South ward. The entire health post staffs of R-South ward were trained to perform the survey. TB suspects were identified by trained community health volunteers during their home to home visit. These suspects were referred to the designated microscopy centers (DMCs) for sputum examination and those diagnosed with TB were put on anti-TB treatment.

Results: A total of 278 TB suspects were identified on enquiring on the presence of symptoms suggestive of TB. Out of them 221(79.5%) patients got tested for sputum examination. Sputum positive TB was diagnosed in 29 suspects and the sputum positivity rate was 13.1%, which was slightly higher than the passive case finding norms of 10% as prescribed under Revised National TB Control Program.

Conclusion: Active case finding for tuberculosis in the general community was discouraged for several decades because of high costs of implementation. However, results of the survey suggest that periodic ACF should be incorporated in populations wherever tuberculosis incidence / prevalence is high as there was a definite improvement in the case detection rate.

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Introduction

Tuberculosis (TB) is currently the leading cause of death from a curable infectious disease[1]. TB continues to pose a major global health problem, causing an estimated 8.8 million new cases and 1.1 million deaths during 2010 [2]. TB is infectious and treatable disease, and therefore identifying, diagnosing and starting active cases on appropriate medication at the earliest is the core strategy in TB control [3,4].

Tuberculosis is characterized by a long period of infectiousness before diagnosis, leading to a high burden of infectious tuberculosis in the general community. Passive case finding is the standard strategy as per the World Health organization (WHO) recommended Stop TB Strategy [5]. Interventions such as active case finding (ACF) that screen large portions of the population for active disease have a long history in TB control [6]. ACF aims to reduce barriers for early TB case detection, including delays in presentation to health facilities, identification of the person as a TB suspect, and initiation of appropriate investigations [6]. The aim is to reduce the transmission of TB by screening high-risk populations (i.e. those at an increased risk of exposure to TB infection, most notably contacts of infectious cases) and to detect and treat active disease earlier than would otherwise occur [7,8].

Passive case finding in tuberculosis relies mainly on people seeking medical help because they feel unwell, which delays the diagnosis and treatment of tuberculosis and also favors the spread of the disease. By contrast, active tuberculosis case finding—where health workers seek out and diagnose individuals with TB who have not sought care on their own initiative, has the potential to

reduce tuberculosis transmission by improving case detection.

Active TB case finding in HIV infected individuals has been recommended by the WHO as part of the "Three I's" policy initiative [9,10]. Screening of household contacts of infectious TB cases has also been recommended [11], but population-wide mass screening has been widely discouraged because of high cost and poor sustainability [6,12,13]. Potential of ACF to reduce TB prevalence in contemporary settings with high HIV prevalence has been proven and thus its implementation in other settings is desired [12,14].

One of the main strategies to control TB is to find and treat people with active disease. Unfortunately, the case detection rates remain low in many countries. Thus, to improve the case detection and to supplement passive case finding efforts, ACF survey was conducted in R-South municipal ward of Mumbai where almost 74% of the people live in slums which is a potential high risk area for spread of tuberculosis.

Methods

An ACF survey was conducted in the R-South Municipal Ward of Mumbai City for a period of two months from June to July 2012.

In Mumbai, the health services are implemented by Public Health Department through an organized health structure including health posts, dispensaries, laboratories, municipal ward offices (headed by Medical Officer of Health) and hospitals. Municipal Corporation of Greater Mumbai (MCGM) has divided Mumbai City into 24 Municipal Wards for the administrative & electoral purposes. They are designated alphabetically like A, B, C etc. Each ward has its ward office which serves as nodal centre for civil administration as well as public health activities for that ward. Health Post is the primary health unit for all the public health activities in every ward. Each health post caters to around 50000 populations. The present survey was conducted in R-South ward with a total population of 712455 out of which 74.31% (529452) people live in slums. This ward has eight health posts and three designated microscopy centers (DMCs) which covers the entire population. Health Posts are manned by Assistant Medical Officer (AMO), Public Health Nurse (PHN), Auxiliary Nurse Midwives (ANM), Treatment Organizer (TO), TB Health Visitor (TBHV) and Community Health Volunteers (CHVs).

Micro planning for ACF survey was done by District Tuberculosis Officer (DTO - R-South ward) and Medical Officer of Health (in-charge of R-South ward). The entire health staff of R-South ward (health posts) was trained to carry out the survey in urban areas by DTO R-South ward. On an average each of the health post has 15 to 20 CHVs and their field areas are clearly demarcated from each other to perform routine health related outreach activities. Every day each of the CHVs were directed to cover fifty households in their demarcated area taking special care that no duplication occurs.

CHVs were instructed to visit each household coming under the purview of slum area of R-South ward. They were trained to enquire on the presence of symptoms suggestive of TB. The most common symptom of pulmonary TB is a productive cough for more than 2 weeks which may be accompanied by other respiratory symptoms (shortness of breath, chest pains, and hemoptysis) and/or constitutional symptoms (loss of appetite, weight loss, fever, night sweats, and fatigue)[15]. CHVs were asked to note the name, age, sex, address, contact number of the person in a line-list everyday if any one of these symptoms were present. This line-list (identified TB suspects) was then communicated to the AMO / ANM / TO / TBHV on the same day.

ANM / TO / TBHV visited the patient on the same day and reconfirmed the patients symptoms. They counseled TB suspects and their family members about the need of giving two sputum samples for laboratory examination [16]. Two sputum containers (one for early morning sample and another one for spot sample) along with a sputum examination laboratory form was provided to each of the TB suspects and were then referred to the nearest designated microscopy center (DMC) for sputum examination on the subsequent day[16]. In order to separate the TB suspects identified through ACF survey from the routine passive case finding services under Revised National Tuberculosis Control Program (RNTCP), a specific note/stamp was mentioned on the sputum examination form.

At the end of every day of ACF survey, PHN / AMO of the respective health post compiled the data from each of the CHVs under their health posts about the cumulative houses and population covered, total number of TB suspects identified and referred to the DMC. Out of the tested suspects how many were diagnosed to be sputum positive and finally how many were put on treatment.

On the next day, Senior TB Laboratory Supervisor (STLS) and Senior TB Treatment Supervisor (STS) of the R-South ward actively coordinated with each of the health post coordinators (PHN) in identifying those patients who underwent sputum examination from their respective health posts. STLS then cross-checked PHN list with the list prepared by LTs of the DMC and looked for any discrepancy. TB suspects who did not go to DMC themselves on the next day were again visited by the ANM and re-counseled to go for sputum examination. Throughout the survey every attempt was made by the health workers so that each of the identified TB suspect is subjected to either sputum examination or other laboratory investigations on prescription of medical officer according to the RNTCP guidelines so that TB if present, can be diagnosed at the earliest. If TB suspect was still unwilling for sputum examination, subsequent home vis-

its were paid by STS followed by AMO, Community Development Officer (CDO) and finally by DTO. Thus, every attempt was taken to subject all TB suspects identified during ACF survey to sputum examination.

TB suspects diagnosed as sputum positive pulmonary TB (either one or both sputum are positive), were visited by STS and were put on Category I ATT or Category II ATT based on the past history as prescribed under RNTCP revised guidelines[16]. Those patients whose both sputum were negative were referred to nearest dispensary. Medical officer of the dispensary managed such cases as specified in the RNTCP diagnostic and treatment algorithm[16]. Patients, who were not relieved even after consumption of 10-14 days of broad spectrum antibiotics, were subjected to repeat sputum smear examination[16].

A comprehensive daily report was prepared by DTO of R-South ward by compiling reports of eight health posts. This report comprises of the number of households/ population covered, number of TB suspects identified, total sputum examination performed, other investigations (X-ray/Biopsy etc. on prescription of medical officer as per RNTCP guidelines), number of positive sputum smears, number of patients diagnosed with sputum negative pulmonary TB or extra-pulmonary TB and number of diagnosed patients put on Category I/II treatment.

Data entry and statistical analysis were done using SPSS version 17. Frequency distributions and percentages were calculated for all the variables. Sputum examination rate, sputum positivity rate and percentage of diagnosed patients put on treatment were also calculated. The survey was conducted after taking approval from the public health department. Utmost care was taken to maintain privacy and confidentiality of the identified TB suspects and diagnosed TB patients.

Results

In the intensified active case finding survey (ACF survey), 529,452 population living in 124,710 households of urban slum area of R-South municipal ward were covered.

Table 1 show the comprehensive final report of complete ACF survey. Total 278 TB suspects were identified on enquiring about the presence of symptoms suggestive of TB. Out of them 221 patients actually reported at one of the three DMC of R-South ward. Sputum examination rate among the identified TB suspects was 79.5% (221/278) while 12 patients underwent either chest X-ray (based on RNTCP diagnostic algorithm) or lymph node biopsy by the medical officer[16]. Total 33 patients were diagnosed with any type of tuberculosis (27 – sputum positive TB; three – sputum negative pulmonary TB and three – extra-pulmonary TB {cervical lymph node}). Sputum positivity rate among initial sputum examination was 12.2% (27/221) while among repeat sputum examination (i.e. sputum examination done after consuming 10-14 days of broad spectrum antibiotics with no symptoms relieved) was 20% (2/10). It clearly signifies the need and public health importance of repeat sputum follow up examination as the sputum positivity rate is almost double than initial sputum smear examination.

Table 1: Comprehensive report of the survey

Type of subjects	Frequency
Total number of households covered	124,710
Total population covered	529,452
Number of TB suspects identified	278
Number of suspects with sputum examination done	221
Number of suspects with other investigation (X-ray/ Biopsy etc.)	12
Number of patients diagnosed with sputum positive pulmonary TB	27
Number of patients diagnosed with sputum negative pulmonary TB & extra-pulmonary TB	6
Number of diagnosed patients put on treatment under DOTS	33

All the 33 confirmed TB patients were put on treatment as prescribed under RNTCP guidelines within seven days of confirmation of their diagnosis and there were no initial defaulters. These diagnosed TB patients were also subjected to HIV testing as a part of intensified TB-HIV collaborative package. None of the patients were found to be co-infected with both TB and HIV.

Table 2 depicts the reasons cited by the remaining 56 (20.1%) suspects who did not come for sputum examination at the DMC despite intensive efforts by the health care staff. Majority of the identified suspects 29(51.8%) cited that their job timings clashes with the timings of the DMC.

Table 2: Reasons for non-utilization of laboratory services (N=56)

Reasons cited	Frequency (%)[a]
Symptoms were relieved	11 (19.6)
Had gone to native place	9 (16.1)
Timings of the job clash with DMC timings	29 (51.8)
Bad experience in the past with public health sector	22 (39.3)
Others	7 (12.5)

[a] Responses are not mutually exclusive

All contacts of patients diagnosed with sputum positive TB were also screened for tuberculosis. During the survey it was also observed that there were nine patients who were diagnosed as a case of tuberculosis and then started on ATT in private set-up. Out of these nine patients four were counseled and were brought under the RNTCP (these were not included in the survey final report).

Discussion

Directly Observed Treatment with short course chemotherapy (DOTS) uses passive case finding to detect TB cases, through health education and tracing contacts of index cases[17]. But the case detection rate was low in passive case finding probably because of low health service coverage, shortage of trained health workers and poor

health seeking behavior of the community[18,19,20]. The need of ACF and home to home survey has been highlighted even in the developed nations[6]. Alternatively the advantage of active case finding in improving case detection is limited due to the associated high cost in resource-constrained settings[6,21].

Periodic ACF for tuberculosis was widely implemented, mainly using chest radiography, during a period of rapid decline in tuberculosis incidence in the northern hemisphere and some Asian countries[6,22] and it remains an integral part of tuberculosis control in high-risk groups[6,23-25]. In a community randomized trial of Ethiopia, it was concluded that the involvement of health extension workers in sputum collection and treatment have significantly improved smear-positive case detection and treatment success rate[26].

Sputum positivity rate (initial + repeat) among the identified TB suspects of the ACF survey was 12.2% (27/221) which was higher than the RNTCP norm of 10%[27]. As per the TB India 2012, annual report, sputum positivity rate using passive case finding was 8%, 9% and 7% in India, Maharashtra and Mumbai respectively[28]. Thus clearly the intensified ACF survey results are promising and should be advocated on a regular basis in places like slums to maintain high case detection rate. The influence of confounding factors like dense population in slum settings cannot be ruled out. Major reason being slum areas are poorly ventilated resulting in higher rates of transmission of infection.

In the present survey repeat sputum examination positivity rate was 20%. It may be because of the less number of patients who actually underwent repeat sputum examination; still its importance cannot be ruled out. In another study done in Delhi the repeat sputum examination positivity was 12.3%[29].

Several ACF strategies for tuberculosis were tested and proved to be effective, both in urban and rural settings[12,26]. In a study done in Zimbabwe, decline in TB prevalence was observed associated with community-level active TB case finding[30].

The number of cases averted in a community by ACF increases with the overall burden and with the proportion of disease due to recent transmission. Every case averted represents a potential cost of treatment that the health system may be spared. On the other hand, finding TB cases and treating them both cost money. Effectiveness of such intensified ACF surveys should ideally be assessed as cases averted or reduction in prevalence, and these outcomes, not cases found, should be used for cost-effectiveness analysis together with capture of transmission dynamics[31].

The findings of the present study can be generalized among densely populated and poverty-stricken area of any city as these conditions may act as a potential sources of increased transmission. The call to scale up active case-finding outside health facilities has to be paired with increased political commitment for promotion of more and more high-quality basic and operational research in different settings. These research projects can contribute to the development of strategies advocating periodic ACF at-least in high risk areas that will ultimately revolutionize tuberculosis care and control, and foster progress towards its elimination.

Loss to follow up despite of all the efforts was the major limitation in the survey. In addition, the survey could have been expanded in non-slum area to have a more comprehensive understanding of the scenario.

Conclusion

Active case finding for tuberculosis in the general community was discouraged for several decades because of high costs of implementation and insufficient strength of treatment programs. With the successful global scale-up of effective tuberculosis treatment, however, our results suggest that active case finding needs re-evaluation in general populations wherever tuberculosis incidence or prevalence is high. Moreover, to target the complex and dynamic nature of the tuberculosis epidemic, the overlapping HIV epidemic, and emerging drug resistance, simultaneous innovations are needed in core functions of systems support and in disease control. The findings of our study clearly suggest that tuberculosis care and control will be definitely improved on incorporation of the periodic ACF in the routine passive case detection activities.

Conflict of interest statement

There was no conflict of interest to be stated.

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