

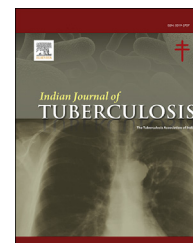


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## Review Article

# Case finding strategies under National Tuberculosis Elimination Programme (NTEP)

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## ABSTRACT

Case finding, an important parameter in fight against Tuberculosis (TB) has always remained a challenge despite advances in diagnostic modalities, access to health care and administrative commitment. We are still far from reaching the goals so set as per End TB Strategy and National Strategic Plan 2017–2025, and case finding is of paramount importance for achieving the said targets.

This article, after identifying the obstacles faced in case finding, explores the various case finding strategies in the perspective of diagnostics, feasibility, resource utilization and current recommendations. Need for prioritization of case finding in different settings with involvement and active participation of one and all has been discussed. Role of health education in an individual, general public and health care worker in the context of case finding has been highlighted. Research areas to strengthen case finding have been enumerated. The review concludes by bringing out the need for heightened efforts for case finding in TB as the resources are significantly diverted as the world is facing the corona virus disease 2019 (COVID-19) pandemic.

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Tuberculosis (TB) has been present in humans and causing suffering to the mankind since ancient times. Despite various measures being carried out continuously at every possible level to eliminate this disease from the world, we have been far from successful. It still remains either undiagnosed or untreated and underreported in a significant section/proportion of the population all over the globe.<sup>1</sup> The goal of the End TB strategy devised by the World Health Organization (WHO) is to end the global TB epidemic by the year 2035.<sup>2</sup> An effective step in this direction is prompt diagnosis so that the treatment

may be initiated before that person transmits infection to others in the society. To meet this goal, WHO has proposed early diagnosis of TB and systematic screening of contacts and high risk groups, and calls for achieving zero catastrophic cost for TB-affected families by the year 2035.<sup>2</sup> India is a high TB burden country and efforts are continuously being undertaken for elimination of this disease.<sup>3</sup> In the Indian National Strategic Plan (NSP) for TB elimination 2017–2025, it was announced that the national goal was to work towards elimination of TB in India by the year 2025 and achieve zero

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catastrophic cost for affected families due to TB by the year 2020.<sup>3</sup>

As with any other infectious disease, finding those suffering from the disease early in the course of illness, and treating them effectively is of paramount importance. A person suffering from TB, if left undiagnosed and untreated, can infect 5–15 individuals in his close contact over the course of one year.<sup>4</sup> TB thus affects the individuals, their families and also the society, directly or indirectly. Even after diagnosis and initiation of treatment, the long duration of chemotherapy and its tolerance and issues with compliance are obstacles to successful treatment outcomes. In addition, the problem of drug resistance has added significantly to the troubles of the TB control programs.<sup>5</sup> Breaking the chain of transmission is the key component of any TB elimination program. Treating only those patients who themselves present to the health care facilities with symptoms of the disease and are subsequently diagnosed with TB is not enough as this leaves out a large chunk of patients who don't report for a variety of reasons and are free to spread the disease to their contacts. Measures to find these 'Missing TB cases', who are infectious but not presenting to the health care facilities, is the need of the hour, to curtail further spread.

NSP for TB elimination has also taken a call on this very important phenomenon. Previously, the strategy of passive case finding (PCF) i.e. investigating only those who themselves reported to health care facilities was considered good enough to control TB. The initial objectives of Revised National TB Control Program were to achieve and maintain detection of at least 70% of the estimated new sputum positive people in the community.<sup>3,6</sup> But now, in the NSP for TB elimination, the importance of case finding has been highlighted, with particular emphasis on the need to shift from PCF to active case finding (ACF). Keeping in view the difficulties involved while dealing with such a huge population, certain more vulnerable target groups have been identified for the purpose of ACF. It has also been proposed that 100% of the identified targeted key affected population should undergo ACF by the year 2020.<sup>3</sup> However, we are still far away from our goals.

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## 1. Obstacles to case finding

TB is associated with an indolent course. Despite efforts, lack of awareness, stigma, apprehension and distrust persists amongst general public and those suffering from the illness. People avoid coming forward for the diagnostic workup, and prefer to suffer in silence, spreading the disease further to their close contacts and in the community.<sup>7</sup> Also, in a country like India, where a significant percentage of population relies on daily wages for livelihood, going to a health care facility is regarded as wastage of productive time because of poor transport options and difficult accessibility of health care centers in many cases. On top of that, these individuals usually being below poverty line, and living in congregate settings, spread the undiagnosed disease like a wild fire. These issues, even at the administrator level, are not easy to deal with, while formulating policies for TB elimination. Resource mobilization for decreasing the diagnostic delays in such

areas is quite challenging, and not an easy task.<sup>8</sup> There is also an evidence that some patients suffering from TB may be completely asymptomatic. So they may never present to the health care facility, or present after a significant delay after continuing the chain of transmission as super spreaders.<sup>9,10</sup> Sometimes, because of overlapping of non specific symptoms of TB with other chronic co-morbidities, TB goes undiagnosed and untreated for long periods of time. Failure to conduct testing even if the patient comes forward after overcoming all the geographical and financial barriers needs to be taken seriously and properly addressed.<sup>1</sup> Availability of investigations, flexibility in timings and behavior and support of health care personnel are all important parameters at the grass root level in such circumstances.

It is a well known that children under 5 years of age, elderly, people living with human immunodeficiency virus (PLHIV), diabetics, smokers, alcoholics, care takers, family members, co workers and home visitors of the index case, monks, nuns, slum dwellers, prison inmates, refugees, migrant workers, etc are more vulnerable to get infected as compared to the general population.<sup>8,10–15</sup> Early case finding in these groups particularly will decrease the transmission and hence decrease the secondary cases in the community. The NSP for TB elimination has also proposed ACF in such vulnerable groups and even sub-classified them into urban, rural as well as tribal areas, as per requirements of that specific area.<sup>3</sup>

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## 2. Case finding strategies: passive and active

**Passive Case Finding (PCF):** is defined as diagnosis of TB at health facilities among individuals who are aware of their symptoms and present for evaluation of the same on their own.<sup>16</sup> It accounts for the major chunk of patients diagnosed with TB and is the backbone of any TB control/elimination program. However, by the time the patient is diagnosed, he has undergone suffering and might already have infected a number of people who came in contact with him.

**Active Case finding (ACF):** is defined as systematic screening and clinical evaluation for TB in individuals who are at high risk of developing the same.<sup>16</sup> Interventions for ACF may encompass a variety of strategies, ranging from household or social contact tracing, door to door screening, facility based case finding, targeted screening of high risk groups or retrospective contact screening.<sup>17–19</sup> As a general rule, ACF has been found to be helpful as it has added to the case notification rate, in whatever subgroup/setting it has been conducted.<sup>18–21</sup>

Any type of the ACF strategy, whatever resorted to, will help to identify active TB patients at an earlier stage than during the natural course of their illness. Looking from the programmatic point of view, with the pre-defined targets set for TB elimination, ACF seems to be an attractive option for early case finding and subsequent treatment, particularly during first 3 years after exposure, when the chances of developing active disease and spreading the infection are the highest.<sup>21</sup> However, the application of any modality of ACF has to be carefully assessed for its actual feasibility in the existing real life case scenarios.

In a high TB burden country like India, with limited resources and the disease being extensively present in the community, indiscriminate mass screening of the whole population is a tedious and practically impossible task.<sup>14</sup> At the same time, if we aim to screen a specific subgroup of vulnerable individuals, the process needs to be continuous and has to be repeated periodically. A study in an Indian setting has found that patients diagnosed with TB through ACF were of older age, predominantly from rural background, poorly educated, financially constrained and stayed away from the designated microscopy centers.<sup>22</sup> Another study from Peru has found that ACF was particularly helpful in women.<sup>21</sup> The identification of the cases while screening hence should be guided by local epidemiology, requirements of the particular area and behavior of the people and the staff working there.<sup>22,23</sup> Contact tracing should start from household contacts, followed by close and then remote contacts. Also, the issue of 'missed cases' in the population left un-screened, after ACF needs attention and should be considered at every point during analysis.

The advantages and contribution of ACF are obvious as evidenced by a number of studies.<sup>14,24</sup> It has been found to decrease the time interval between first onset of symptoms and first access to health care services, especially when compared with PCF. However, even in ACF, a considerable time wastage has been observed in acquisition and transfer of data as the decision regarding diagnosis and initiation of treatment is taken at the higher levels.<sup>14,24</sup> Hence, there is an urgent need for decentralization of diagnostic services by use of mobile units and training of HCW's at the peripheral level. Interventions to frame patient friendly policies for provision of diagnosis and treatment at the door step, with minimal logistic delays is hence urgently required. It is pertinent to note that before more evidence is generated, patients diagnosed with TB through ACF should be particularly monitored for treatment outcomes when compared from those diagnosed by PCF, as studies in the past had reported variable treatment outcomes.<sup>24–26</sup>

In the Indian context, a variety of health care setups are available to which the patient first presents, and this opportunity to diagnose TB through ACF in such patients during their first health care visit should never be missed, irrespective of the complaints. The community volunteers, physicians in the private sector and in the alternate systems of medicine, who may be the point of first contact for the patients should be specifically sensitized regarding the suspicion of TB for an early and efficient screening and diagnosis, whatever be the reason for presentation/symptomatology.<sup>22,27</sup> Use of information and communication technology (ICT), in an era when smart phones and network connectivity have reached almost every nook and corner of the country can be of immense help.<sup>17</sup>

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### 3. Diagnostic modalities

Standard algorithms with clear cut guidelines have been proposed for PCF under the National TB Elimination Programme (NTEP)/Revised National TB Control Programme (RNTCP) from time to time. Initially we relied on chest

radiography, moving on to sputum smear examination with 3 samples, then to sputum smear examination with 2 samples, and now under universal drug susceptibility testing (UDST) for rifampicin, implemented throughout the country, nucleic acid amplification test (NAAT) is to be used.<sup>5,28</sup> But for ACF, it has been observed that various agencies have used a variety of diagnostic algorithms depending on the population being screened, local prevalence, feasibility and logistics.<sup>29</sup> Symptom screening, chest radiography, sputum smear microscopy and cartridge based nucleic acid amplification test (CBNAAT) in various combinations have been used by various researchers in different settings.<sup>1,8,12,19,27,30,31</sup> Despite having given promising results, such a use of varied algorithms in different subgroups has resulted a variable yield.<sup>29</sup> Rather than relying on different combinations of diagnostic modalities in different algorithms, we need to have a rapid, convenient and resource saving point of care screening/diagnostic tool for better ACF.<sup>7,10</sup> Innovative ways like the use of mobile units, thus bringing the health care facilities at the door step, have already been proposed and can be of immense help in scaling up testing and decreasing diagnostic and treatment delays.<sup>30,32</sup> Framing clear cut recommendations for ACF, and testing the vulnerable population on priority, without any diagnostic dilemmas which are currently prevailing, is bound to serve as a major leap in our efforts to TB elimination.

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### 4. Benefits of case finding versus resource utilization

So far as the patient is concerned, immediate benefit of PCF is apparent, in terms of improvement in day to day symptomatology and overall morbidity. Mortality and other long term indicators are also known to show improvement. However, immediate benefit of ACF is difficult to quantify, as these cases may be apparently healthy, with minimal or no restrictions in their day to day activities. We need very specific indicators and the benefit over long term needs to be particularly measured for a broader vision and better planning of strategies for the coming future.

TB has a devastating financial impact, in terms of direct as well as indirect costs.<sup>17</sup> Rationale use of resources becomes a major concern, as we diagnose and treat people in their natural course of disease either by PCF, or even earlier by ACF. ACF is associated with huge expenditure and resource utilization. However, PCF also doesn't come for free and has its own costs. Comparative cost analysis of ACF vs PCF in the long run is urgently required, as contradictory literature on its cost effectiveness in different sub groups, from different parts of the world is available.<sup>17,33</sup> Neither ACF nor PCF can be totally discarded. Rather it is required that both the strategies complement each other. As we shift our focus to ACF, strengthening of the traditional PCF is also simultaneously required as ACF cannot cover the entire population.<sup>15</sup>

ACF in vulnerable groups should be integrated with various other national level activities/programs. Integration with national program on prevention and control of diabetes, national Acquired Immunodeficiency Syndrome (AIDS) control program, national tobacco control program etc is destined to improve the case finding in patients with these co-morbidities

and thus help in management of the patients in totality. Role of non Government organizations (NGO's) also needs a special mention here, as they can serve as a huge pool of easily available resources.

Close monitoring and rapid evaluation of innovative interventions, long term follow up of existing campaigns and carrying out randomized controlled trials in different epidemiological settings for studying the impact of different approaches for effective screening/case finding is urgently required, as we struggle to meet the goals so set forth in the End TB strategy.<sup>33,34</sup> Universal health coverage and social protection with a patient centered approach for one and all should be the prime concern. Standardization of protocols and tailored approaches as per local needs need to be worked up. Collective efforts in this direction will ultimately help us in formulating clear cut guidelines for case finding, which can be confidently relied upon and thus help us in taking another giant leap towards TB elimination.<sup>19</sup>

## 5. Health education

As we deal with the index case, it is generally noticed that there is very limited participation of the contacts. It is understood that contact tracing in such situations may lead to considerable anxiety. Formal focused health education should routinely be a part of PCF as well as ACF. Understanding the psychology of the patient and the community is indispensable to the development of education strategies. Intensive education to inculcate awareness and health seeking behaviors amongst TB patients and general public needs to be carried out.<sup>23</sup> Special attention should be given to cough etiquettes, respiratory hygiene and ventilation.<sup>12</sup> Patients should be counseled to bring their contacts for screening, and for diagnosis and treatment if screened positive. Proper sessions on diagnosis, treatment and the accompanied dangers if left untreated, need to be conducted time and again targeting for a final behavioral change amongst masses.<sup>35</sup> Training and mobilization of patients, their contacts and socially active persons in the community as peer educators may work wonders in case finding and TB elimination.

At one end, when we focus on the role of patients and the general public, we should be fully aware that the role of a health care worker (HCW) is equally important. Generally, at administrative levels, there is staff shortage, poor infrastructure and diagnostic equipments. Poor knowledge, attitude and practices of HCW's add to the problems.<sup>20</sup> The whole hearted active participation and alertness of the HCW needs special attention, and needs to be emphasized during their training sessions. They should focus on health education during household visits, and at every point of contact with the patient and/or general public.<sup>10</sup> The approach of the HCW should be sensitive enough to counter the apprehension and psychosocial barriers so encountered at different steps.

Information education and communication (IEC) encompassing relevant local field problems with continuous interpersonal communication can thus play a pivotal role in creating awareness, changing the attitudes and encouraging preventive behaviors at the individual and community levels.<sup>20</sup>

## 6. National Strategic Plan (NSP) for tuberculosis elimination 2017–2025

Some of the aspects as detailed above have already been considered during formulation of policies at the national level. The NSP for TB elimination has proposed key strategies for ACF. Community screening (by inviting people to a mobile facility or a fixed facility or door to door household visits) and institutional screening (of vulnerable population in health care facilities or congregate settings) has been proposed. It is to be followed by confirmation of diagnosis by linkage to nearest TB diagnostic facilities. However, there are no clear cut guidelines regarding the use of screening/diagnostic tests for ACF in India, NSP for TB elimination has highlighted and tried to deal with this issue to a certain extent with emphasis on chest radiography and CBNAAT. Partnership with NGO's and private sector is expected to play a key role in ACF by optimal utilization of resources and skills. Various activities have been specified and include sensitization at the administrative level, ACF in campaign mode conducted in 3 rounds per year, large scale IEC, identification of hotspots, prioritization and mapping of local vulnerable populations and use of highly sensitive tools for case finding. One community volunteer for communicable diseases for every 1000 population is appointed to undertake community focused activities like ACF.<sup>3</sup>

'Go where the patients go' - Since around half of the TB patients go to the private practitioners, involvement of private sector has been emphasized, with the Government acting more as an enabler than a provider. Novel strategies like designating pockets within a district/state or institution for intensified case finding, CBNAAT Lab on Wheels, reviews of accessibility issues, sputum collection and transport in difficult areas, workshops for local practitioners, child reverse contact tracing (search of any active TB case in the household of the child), repeating contact tracing at end of treatment and subsequent follow ups of the index case, ensuring follow up visits of contacts and periodically repeating ACF are other important areas of focus for case finding in TB under NSP.<sup>3</sup>

## 7. Case finding and corona virus disease 2019 (COVID-19)

COVID-19 was declared a global pandemic on 11th March, 2020, by the WHO.<sup>36</sup> Strict nationwide lockdown in India was announced on 24th March, 2020 as a preventive measure to mitigate the spread of the virus.<sup>37</sup> Except for the essential services, there was a complete closure of the work, with activities of day to day living and social interactions coming to a sudden standstill. The focus of the health care shifted entirely to deal with the pandemic, rest all health related issues going to an unexpected and unprecedented backdrop. The nation still continues to be going through different phases of the lockdown, with anxiety and panic in the minds of the patients as well as the HCW's. Routine out-patient departments (OPD) in many institutes still remain closed, with partial closure of the private sector as well. The in-patient services earmarked for drug sensitive and drug resistant TB patients at many

health care facilities have also been converted temporarily to COVID-19 patient care wards.

As far as the case finding in TB is concerned, since there was a complete shutdown of the public transport, with multiple restrictions to move out of the houses, there is a possibility that except for emergencies, even the symptomatic patients stayed indoors, suffered silently and avoided consulting a health care facility, thus adversely affecting the PCF. Either there was a total non-availability/highly restricted availability of the OPD services in public and private sector or the HCW's were busy in dealing with the pandemic and the TB related services suffered badly as a result. The quantum of spread of infection due to such a scenario is hard to measure, and its long term implications are yet unknown.

The effect on ACF is expected to be even graver. Every HCW, starting from the grass root level, to the topmost in hierarchy, is busy in addressing COVID-19 problem. Even the laboratory services dealing with testing of TB are channelized to meet the demands of the pandemic. Under such circumstances, there is hardly any possibility of ACF in the community, or door to door tracing till the pandemic is over as there is a complete reallocation of manpower, finances and nationwide resources towards fighting the COVID-19.

The pandemic seems to have significantly decreased the access of TB patients for medical care, and achieving the targets so set, seems far from reality. The long term impact on TB case finding, both passive and active, needs particular attention. Though various agencies have warned regarding the serious implications on TB control, yet, strategic measures are yet to be taken to prevent a surge in active TB infections in the community.

## 8. Conclusion

Interrupting the chain of transmission by early case detection and prompt treatment is the cornerstone to achieve TB elimination. Ongoing PCF needs to be strictly complemented with ACF, especially in the vulnerable population and predefined subgroups according to local epidemiology, at least till the time we strengthen our health care system to be capable of mass screening. In a resource constrained setting like ours, a clear cut line of action for ACF, with the use of novel approaches, is urgently needed to screen, diagnose and subsequently treat these patients in the minimum possible time frames, with due consideration to cost effectiveness and optimal utilization of resources. In addition, a sensitive and patient centered approach, with formal focused health education for the general public inculcating awareness, positivity and preventive behaviors is expected to give long term dividends.

In the existing nationwide fight against COVID-19, when the health care system is grossly diverted to meet the needs of the pandemic, we need to diligently continue and strengthen our efforts for TB case finding at every level, to avoid a sudden unexpected surge in patients with TB. Slightest of the inattentiveness in TB case finding in these testing times is bound to be extremely detrimental in realizing our goal of TB elimination in the near future.

## Conflicts of interest

All authors have none to declare.

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