

# Private Sector Involvement in Tuberculosis Control in An Urban City of Western India- A Cross-Sectional Study

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## ABSTRACT

**Background:** In India, TB diagnosis and treatment practices among Private Practitioners (PPs) vary widely and are not properly regulated by the national TB program. Despite their irrational and inequitable practises, PPs remain an important and preferred primary care provider for many people. The study was done to with the objectives to describe different diagnosis and treatment practices of Tuberculosis among private practitioners and their involvement in National Tuberculosis Elimination Program (NTEP).

**Material and Methods:** A cross sectional study was performed among 303 PPs during October 2020 to March 2021 by using stratified random sampling to select private practitioners based on their speciality.

**Results:** Most preferred investigation was Chest X ray (45.2%) followed by sputum smear microscopy (29.7%). Only 71.3% PPs practiced the correct regimen for new cases of Pulmonary TB according to NTEP. More than half of the PPs had TB training (59.7%). Majority of the PPs (90.1%) were involved in NTEP mainly by referral of TB patients to local government centres for treatment purpose.

**Conclusion:** Preferred investigation for diagnosis of pulmonary TB was chest X-ray followed by sputum examination among PPs. The treatment regimen and duration of treatment varies among PPs as per their clinical judgement and practice.

**Keywords:** Cross sectional study, National Tuberculosis Elimination Program, Private practitioners, sputum smear microscopy

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## INTRODUCTION

Tuberculosis is a major public health problem in India. India accounts for one fourth (27%) of the global incident cases annually and is the highest Tuberculosis burdened country globally.<sup>1</sup> A large proportion of patients with tuberculosis (TB) in countries with high TB prevalence first seek care with a private practitioner.<sup>2</sup> In India, it is estimated that 46% of patients with TB seek care in the private sector.<sup>3</sup> In India, TB diagnosis and treatment practices among PPs vary widely and are not properly regulated by the national TB program. More than half of the patients initially attend private facilities for TB care and often managed inadequately.<sup>4</sup>

In 2002, India's Revised National Tuberculosis Control Programme (RNTCP) introduced guidelines for involvement of Private Practitioners (PPs) through an initiative called 'Public Private Mix' which encompasses training activities and formal collaboration with the RNTCP.<sup>5</sup> Almost half of the RNTCP-notified retreatment patients are treated in the private sector before reaching RNTCP, implying insufficient treatment and likely amplification of drug resistance.<sup>6</sup> Despite their irrational and inequitable practises, PPs remain an important and preferred primary care provider for many people due to their accessibility in terms of distance and opening hours, responsiveness to patients, privacy and confidentiality, and the generally poor quality of public sector services.<sup>7,8</sup>

This study was conducted to understand the different diagnosis and treatment approach, and involvement in National Tuberculosis Elimination Program (RNTCP has been renamed NTEP) of the private practitioners which would help to address the problem effectively.

### Objectives:

The study objectives were to describe different diagnosis and treatment practices of Tuberculosis among private sector and also to appraise private practitioners' involvement in National Tuberculosis Elimination Program and factors affecting uptake of TB training among private practitioners.

## METHODOLOGY

It is a cross sectional study which was performed in private clinics and hospitals of Surat city during October 2020 to March 2021. Study frame was Hello Doctor directory, which contained the contact details of Private Practitioners of Surat City. Private Practitioners registered in Hello Doctor Directory who practiced allopathic medicine and those who had diagnosed, treated Tuberculosis patients in last three year in Surat City were included in the study, while non allopathic private practitioners, private practitioners who do not treat TB and private practitioners who are not accessible even after two visits were excluded. Total number of private practitioners were

1796 as per the directory, of which 258 were excluded, as they were not involved in treatment of Tuberculosis. Total number of private practitioners eligible for the study were 1538. Sample Size was calculated in Open Epi software based on private practitioners' involvement in NTEP. Taking RNTCP involvement 57% according to previous study<sup>9</sup> and Confidence limit as 5%, Total sample size calculated was 303 as per open epi software<sup>10</sup>. Names and contact information for PPs was obtained from Hello Doctor directory. Eligible participant was confirmed with prior appointment over the phone, a participant information sheet was handed over them and written consent for her/his participation was obtained before the interview. When practitioner was not available during the first visit, at least two visits was made. In case selected participant was not available for interview or a non-responder, the next consecutive participant from the list was included in the sample. Stratified random sampling was used to select private practitioners based on their speciality by using probability proportionate to size method. The samples selected is as shown in the table below.

| Qualification            | No. of PPs  | PPs recruited in this study |
|--------------------------|-------------|-----------------------------|
| Chest Physician          | 29          | 6                           |
| Physician MD             | 227         | 45                          |
| M.B.B.S.                 | 474         | 95                          |
| Pediatrics               | 201         | 40                          |
| General Surgeon          | 121         | 24                          |
| ENT                      | 46          | 9                           |
| Orthopedics              | 30          | 6                           |
| Obstetric & Gynecologist | 364         | 72                          |
| Gastrologist             | 10          | 2                           |
| Urologist                | 16          | 4                           |
| Neurophysician           | 12          | 0                           |
| Nephrologist             | 08          | 0                           |
| <b>Total</b>             | <b>1538</b> | <b>303</b>                  |

During pilot study, which involved 20 participants, we came to know that neurophysician and nephrologist directly referred tuberculosis patients to government sector or pulmonologist. Thus, they were not recruited in the study.

Pre-designed, pre-tested, semi structured questionnaire was used for the data collection. The questionnaire had following sections: 1. Socio demographic profile of private practitioners 2. Questions pertaining to investigations used by private practitioners 3. Questions regarding treatment adopted by private practitioners for a. new patient b. old patients c. MDR TB patients 4. Questions pertaining to NTEP training by private practitioners.

The data was entered in Microsoft Office Excel and analysed using SPSS version 26 and openepi software. Study was approved by Scientific Research Committee (SRC) and Human Research Ethics Committee (HREC), Government Medical College, Surat bearing the reference number No.GMCS/STU/ETHICS/Approval/4218/20 dated 24/2/2020. All eligible participants were explained about the study and its objectives. Written consent was taken who

were willing to participate in the study in Participant Information Consent Form (PICF).

## RESULTS

This study was conducted among 303 private practitioners. Highest proportion of private practitioners (39.3 %) were of age group 31-40 years. Mean age of the study participants was 45.0 ± 10.6 years. The age of study participants ranged from 26 to 72 years. About four fifth of study participants (80.9 %) were males. Out of 303 PPs, practitioners with M.B.B.S. and M.D. General Medicine were in the ratio 2:1 and were 95 (31.4%) and 46 (15.2%) respectively. There were obstetrician and gynaecologists (23.1%), paediatricians (13.2%), general surgeons (7.9%), ENT surgeons (3%), orthopaedics (2.3%), TB and Chest physicians (2.0%), urologists (1.3%) and gastrologists (0.7%). Majority (61.7%) PPs had more than 10 years of professional experience. Mean practice experience was 16.78 ± 10.34 years. Out of 187 PPs with more than 10 years of experience, 28.4% had 11-20 years of experience, 22.1% had 21-30 years of experience, 10.6% had 31-40 years of experience and only 0.7% had more than 40 years of experience.

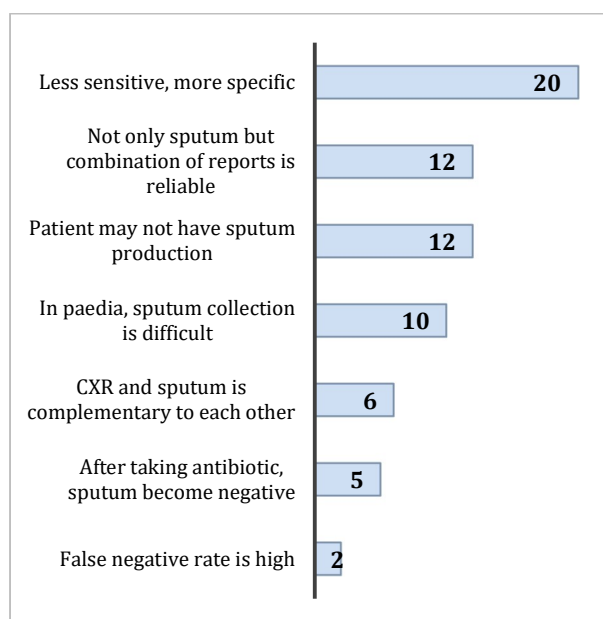
**Table 1** denotes that almost all (97.0%) private practitioners advised Chest X-ray for diagnosis of pulmonary TB followed by sputum smear microscopy (88.8%), ESR (48.5%), CBNAAT (38.9%), AFB culture (22.1%) and other tests (11.9%) like Mantoux test (10.5%), gastric lavage (0.6%), SGPT and HRCT tests (0.33%) for diagnosis of pulmonary TB. Almost half (45.2%) of the study participants preferred chest X-ray for diagnosis of pulmonary TB, followed by sputum smear microscopy (29.7%), rapid diag-

nostic molecular test (13.8%), AFB culture (7.3%) and other tests (4%) like MT, HRCT for diagnosis of pulmonary TB. About three fourth of PPs (77.9%) believe that sputum microscopy is reliable for diagnosis of pulmonary TB. However, rest PPs (22.1%) believe that sputum microscopy is not reliable for diagnosis of pulmonary TB. It was observed that, 31.4% private practitioners believe that chest X-ray is more reliable investigation than sputum examination.

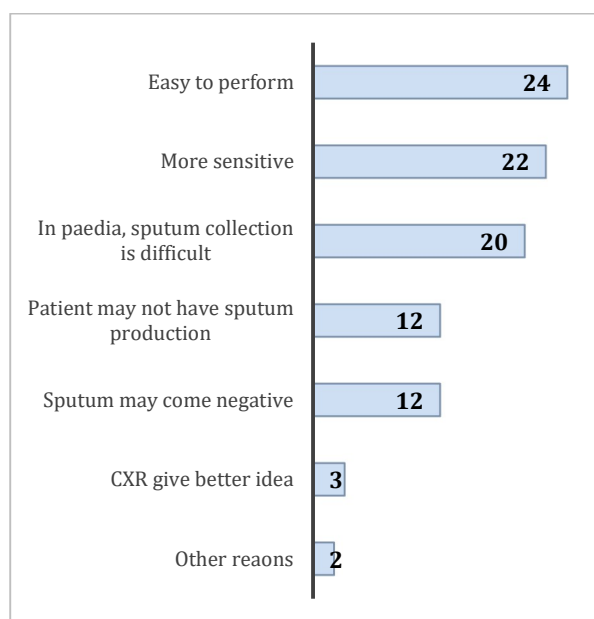
**Table 1: Distribution of different aspects of Diagnosis of TB among private practitioners (PPs)**

| Investigation  | No. of PPs <sup>a</sup> (n) (%) |
|--|---------------------------------|
| <b>Investigations advised for diagnosis of pulmonary TB among PPs*</b>   |                                 |
| Chest X ray  | 294 (97)                        |
| Sputum Smear microscopy  | 269 (88.8)                      |
| ESR <sup>b</sup>   | 147 (48.5)                      |
| Rapid diagnostic molecular test  | 118 (38.9)                      |
| AFB <sup>c</sup> culture   | 67 (22.1)                       |
| Other  | 36 (11.9)                       |
| <b>Preferred method of diagnosis of TB among PPs</b>   |                                 |
| Chest X ray  | 137 (45.2)                      |
| Sputum Smear microscopy  | 90 (29.7)                       |
| Rapid diagnostic molecular test  | 42 (13.8)                       |
| AFB culture  | 22 (7.3)                        |
| Other  | 12 (4)                          |
| <b>Perception regarding reliability of sputum microscopy for diagnosis of pulmonary TB among PPs</b>               |                                 |
| Reliable   | 236 (77.9)                      |
| Non-Reliable   | 67 (22.1)                       |
| <b>Perception regarding reliability of CXR more than sputum microscopy for diagnosis of pulmonary TB among PPs</b> |                                 |
| More reliable  | 95 (31.4)                       |
| Less reliable  | 208 (68.6)                      |

\*Multiple responses; <sup>a</sup>PPs- private practitioners; <sup>b</sup>ESR- Erythrocyte Sedimentation Rate; <sup>c</sup>AFB- Acid Fast Bacilli



**Figure 1: Reasons of non-reliability on perception regarding sputum microscopy for diagnosis of pulmonary TB among PPs (n=67)**



**Figure 2: Reasons for perception regarding reliability of Chest X Ray for diagnosis of pulmonary TB among PPs (n=95)**

**Figure 1** represents that, out of 67 PPs who believe that sputum microscopy is not reliable, more than one fourth of private practitioners (29.8%) gave reason that sputum is less sensitive and more specific. Other reasons denoted were combination of reports is reliable (18%); patient may not have sputum production (18%); in paediatrics, sputum collection is difficult (15%); after taking antibiotic, sputum become negative (7.5%) and only 2 PPs (3%) gave reason that sputum examination has high false negative rate. **Figure 2** represents the reasons that were reported by PPs who believe CXR is more reliable. One fourth of PPs reported that CXR is easy investigation (25.3%); followed by other reasons like chest X ray more sensitive than sputum examination (23.3%); in paedia, sputum collection is difficult (21%); patient may not have sputum production (12.6%); sputum report may come negative (12.6%); CXR give better idea about diagnosis (3.2%) etc.

**Table 2** represents distribution of different aspects of Treatment of TB among private practitioners. Majority of the PPs (91.4%) reported that they followed NTEP guidelines for treatment of TB patients. Almost all (99.3%) PPs used daily drug regimen for treatment of TB patients while only 2 PPs (0.7%) still used alternate drug regimen for TB treatment. About three fourth of PPs (73.3%) prescribed TB treatment from private drug store while 57.4% PPs collaborated with NTEP for TB treatment. Majority of PPs prescribed TB regimen for total 6 months of duration (83.2%) for pulmonary TB. About three fourth of PPs prescribed 6 months TB regimen for 6 months of duration for Extra pulmonary TB. Total 19 different regimens were prescribed by private practitioners for new cases of pulmonary TB. Out of 303 PPs, 71.3% of the PPs followed regimen 2 HRZE + 4 HRE. 36 different regimens were prescribed by private practitioners for new cases of extra pulmonary TB. Out of 303 PPs, 67% of the PPs followed the regimen 2 HRZE + 4 HRE. More than half (58.4%) of PPs didn't maintain records of TB patients.

**Table 3** represents distribution of PPs according to different aspects of involvement in NTEP. Majority of PPs (90.1%) reported that they are involved in NTEP. However, around one tenth of PPs (9.9%) were not involved in NTEP. Government health staff visited almost four fifth of PPs' (78.9%) private clinic. Out of 273 PPs who are involved in NTEP, majority of PPs (92.3%) involved by referral of TB patients to local government treatment centres for treatment purpose. About more than one third of PPs (36.6% and 35.8%) involved in NTEP by using microscopic centres for diagnostic evaluation of patients and referral of presumptive TB patients to NTEP centre for diagnosis respectively. Almost one fourth of PPs (27.4%) involved by provision of 99 DOTS/ DOTS with drugs and supervision provided by NTEP. Almost two third of the PPs (67.7%) are involved in NTEP due to monetary benefits to patients and around three fifth of the PPs (58.6%) are involved because they have faith in NTEP. Out of 30 PPs who

**Table 2: Distribution of different aspects of Treatment of TB among private practitioners (PPs) (n=303)**

| Variable   | No. of PPs* (%) |
|--|-----------------|
| <b>NTEP<sup>d</sup> Treatment guideline followed by PPs</b>                              |                 |
| Yes  | 277 (91.4)      |
| No   | 26 (8.6)        |
| <b>Regimen used by PPs for TB treatment</b>  |                 |
| Daily  | 301 (99.3)      |
| Alternate  | 2 (0.7)         |
| <b>Different treatment durations prescribed by PPs for new cases of pulmonary TB</b>     |                 |
| 6 months   | 252 (83.2)      |
| 7 months   | 6 (2)           |
| 8 months   | 8 (2.6)         |
| 9 months   | 27 (9)          |
| 10 months  | 1 (0.3)         |
| 12 months  | 1 (0.3)         |
| No response  | 8 (2.6)         |
| <b>Different treatment durations prescribed by PPs for new cases of EPTB<sup>a</sup></b> |                 |
| 6 months   | 231 (76.2)      |
| 7 months   | 2 (0.7)         |
| 8 months   | 19 (6.3)        |
| 9 months   | 27 (8.9)        |
| 11 months  | 2 (0.7)         |
| 12 months  | 15 (4.9)        |
| 15 months  | 2 (0.7)         |
| 17 months  | 1 (0.3)         |
| No response  | 4 (1.3)         |
| <b>Different treatment regimen used by PPs for new cases of pulmonary TB</b>             |                 |
| 2HRZE (IP) + 4HRE (CP)   | 216 (71.3)      |
| Other regime   | 87 (28.7)       |
| <b>Different treatment regimen used by PPs for new cases of EPTB</b>                     |                 |
| 2HRZE (IP) + 4HRE (CP)   | 203 (67)        |
| Other regime   | 100 (33)        |
| <b>Maintenance of records of TB patients among PPs</b>                                   |                 |
| Maintained   | 126 (41.6)      |
| Not maintained   | 177 (58.4)      |
| <b>TB training received by PPs in last three years</b>                                   |                 |
| Yes  | 181 (59.7)      |
| No   | 122 (40.3)      |

\*PPs- private practitioners; <sup>a</sup>EPTB- Extra Pulmonary Tuberculosis;

<sup>b</sup>HRZE - Isoniazid, Rifampicin, Pyrazinamide and Ethambutol;

<sup>c</sup>HRE - Isoniazid, Rifampicin and Ethambutol; <sup>d</sup>NTEP - National Tuberculosis Elimination Programme

were not involved in NTEP, most common reason for non-involvement were due to lack of patients' willingness (63.3%) followed by confidentiality issues (23.3%). About three fourth of PPs (59.7%) attended training related to TB in last three years

**Table no 4** shows effect of various factors like age group, gender, qualification, years of practice, timing for attending clinic, related to PPs knowledge about JEET project, awareness about TB notification and notification of TB cases by PPs on uptake of TB training by Private practitioners. It was observed that younger age group (< 45 years) had 0.61 times lesser odds of having exposure to TB training than older age group (> 45 years) of PPs [OR: 0.61, 95% CI: 0.38-0.98, p < 0.05]. Male had 1.26 times higher odds of having TB training than female PPs [OR: 1.26, 95% CI: 0.70-2.24] which was not significant (p > 0.05).

**Table 3: Distribution of PPs according to different aspects of involvement in NTEP**

| Variable  | No. of PPs* (%) |
|---|-----------------|
| <b>PPs involvement in NTEP</b>  |                 |
| Yes   | 273 (90.1)      |
| No  | 30 (9.9)        |
| <b>Way of involvement in NTEP among PPs</b>   |                 |
| Use of microscopic centres for diagnostic evaluation of patients                    | 100 (36.6)      |
| Provision of 99 DOTS/ DOTS <sup>a</sup> with drugs and supervision provided by NTEP | 75 (27.4)       |
| Referral of presumptive TB patients to NTEP centres for diagnosis                   | 98 (35.8)       |
| Referral of TB patients to local government treatment centres for treatment         | 252 (92.3)      |
| <b>Reasons for involvement in NTEP among PPs (n = 273)</b>                          |                 |
| Monetary benefits   | 185 (67.7)      |
| Faith in NTEP   | 160 (58.6)      |
| Good quality drug   | 115 (42.1)      |
| Compulsion due to notification  | 66 (24.1)       |
| For better compliance and follow up   | 19 (6.9)        |
| <b>Reason for non-involvement in NTEP among PPs (n = 30)</b>                        |                 |
| Due to lack of patients' willingness  | 19 (63.3)       |
| Confidentiality issues  | 7 (23.3)        |
| Very few patients of TB   | 7 (23.3)        |
| Bad quality of drug   | 6 (20)          |
| More work load  | 5 (16.6)        |
| No faith in RNTCP   | 3 (10)          |
| Losing monetary benefits  | 3 (10)          |
| <b>TB training received by PPs in last three years</b>                              |                 |
| Yes   | 181 (59.7)      |
| No  | 122 (40.3)      |

\*PPs- private practitioners; <sup>a</sup>DOTS- Directly Observed Treatment, Short course

**Table 4: Variables associated with the uptake of TB training in last three years among private practitioners**

| Variable                                      | Total (n=303) (%) | Exposed to TB related Training (%) | Not exposed to TB related Training (%) | p value     | OR (95% CI)*             |
|---|-------------------|------------------------------------|--|-------------|--------------------------|
| <b>Age group</b>                              |                   |                                    |  |             |                          |
| ≤45 years                                     | 175 (57.8)        | 96 (54.9)                          | 79 (45.1)                              | <b>0.04</b> | <b>0.61 (0.38-0.98)</b>  |
| >45 years                                     | 128 (42.2)        | 85 (66.4)                          | 43 (33.6)                              |             |                          |
| <b>Gender</b>                                 |                   |                                    |  |             |                          |
| Male  | 245 (80.8)        | 149 (60.9)                         | 96 (39.1)                              | 0.43        | 1.26 (0.70-2.24)         |
| Female  | 58 (19.2)         | 32 (55.2)                          | 26 (44.8)                              |             |                          |
| <b>Qualification</b>                          |                   |                                    |  |             |                          |
| MBBS  | 95 (31.3)         | 77 (81.1)                          | 18 (18.9)                              | <b>0.00</b> | <b>4.27 (2.39-7.64)</b>  |
| MS, MD  | 208 (68.7)        | 104 (50)                           | 104 (50)                               |             |                          |
| <b>Years of practice</b>                      |                   |                                    |  |             |                          |
| ≤ 10 years                                    | 126 (41.6)        | 70 (55.6)                          | 56 (44.4)                              | 0.21        | 0.74 (0.46-1.18)         |
| >10 years                                     | 177 (58.4)        | 111(62.8)                          | 66 (37.2)                              |             |                          |
| <b>Timing for attending clinic</b>            |                   |                                    |  |             |                          |
| Morning & evening hours                       | 272 (89.8)        | 160 (58.8)                         | 112 (41.2)                             | 0.33        | 0.68 (0.30-1.50)         |
| No evening hours                              | 31 (10.2)         | 21 (67.7)                          | 10 (32.3)                              |             |                          |
| <b>NTEP involvement of PPs</b>                |                   |                                    |  |             |                          |
| Involved                                      | 273 (90.1)        | 167 (61.1)                         | 106 (38.8)                             | 0.12        | 1.80 (0.84-3.84)         |
| Not involved                                  | 30 (9.9)          | 14 (46.7)                          | 16 (53.3)                              |             |                          |
| <b>Knowledge about JEET project</b>           |                   |                                    |  |             |                          |
| Yes   | 166 (54.7)        | 110 (66.2)                         | 56 (33.8)                              | <b>0.01</b> | <b>1.82 (1.14-2.90)</b>  |
| No  | 137 (45.3)        | 71 (51.8)                          | 66 (48.2)                              |             |                          |
| <b>Awareness about TB notification in PPs</b> |                   |                                    |  |             |                          |
| Aware   | 291 (96.0)        | 179 (61.6)                         | 112 (38.4)                             | <b>0.00</b> | <b>7.99 (1.71-37.14)</b> |
| Not aware                                     | 12 (4.0)          | 2 (16.7)                           | 10 (83.3)                              |             |                          |
| <b>Notify TB cases</b>                        |                   |                                    |  |             |                          |
| Yes   | 255 (84.1)        | 160 (62.7)                         | 95 (37.3)                              | <b>0.01</b> | <b>2.16 (1.16-4.04)</b>  |
| No  | 48 (15.9)         | 21 (43.8)                          | 27 (56.2)                              |             |                          |

\*Odds Ratio (95% Confidence Interval); NTEP - National Tuberculosis Elimination Programme; JEET- Joint Effort for Elimination of Tuberculosis

On the other hand, MBBS qualified PPs were more likely to have been exposed to TB training than specialist PPs (i.e., M.D, M.S.) [OR: 4.27, 95% CI: 2.39-

7.64] which was statistically significant ( $p < 0.01$ ). PPs who had knowledge about JEET project and awareness about TB notification reported 1.82- and

7.99-times higher odds of having exposure to TB training than who had no knowledge about JEET project and were not aware about TB notification respectively [OR: 1.82, 95% CI = 1.14-2.90, OR: 7.99, 95% CI = 1.71-37.14], both were statistically significant ( $p < 0.01$ ). PPs who were involved with NTEP were more likely to have been exposed to NTEP training than PPs who were not involved with NTEP [OR: 1.80, 95% CI: 0.84-3.84], however it was not found to be statistically significant ( $p > 0.05$ ).

## DISCUSSION

Involvement of PPs in National TB Elimination Programme plays a crucial role in increasing case detection and improving treatment outcomes. Since a large proportion of TB patients in India is first seen by PPs and are treated by them, TB control programme in a given area cannot achieve a major success without their support.<sup>11</sup> In the present study, the total participants were 303. The participants were private practitioners and, in this study, the information was collected among private practitioners about the different diagnosis and treatment approach, involvement and perception regarding NTEP.

In this study, most common investigation advised for pulmonary TB diagnosis was chest X-ray (97%) followed by Sputum smear microscopy (88.8%) and most preferred investigation for diagnosis was also chest X-ray (45.2%) followed by sputum smear microscopy (29.7%). A similar study conducted by Murrison LB et al (2016), 97% PPs used chest X-ray and 83% PPs used sputum smear microscopy for diagnosis<sup>12</sup> and in a study by Datta K et al (2010) conducted in Hooghly, most common investigation preferred by PPs was chest X-ray (68%) followed by sputum examination (17%)<sup>13</sup>. In study done by Prakash et al, smear microscopy and chest radiography were mentioned by 85.94 % and 45.31 % of the private practitioners.<sup>14</sup> PPs rely more on chest X-ray for diagnosis as sputum microscopy is not done in private laboratories usually and most of the private labs are not designated as microscopic centres for diagnosis of TB too. Hence, chest X-ray which is commonly available in all private diagnostic centres and easy to perform is relied upon more by the PPs. In this study, majority of PPs believe that sputum microscopy is reliable for diagnosis of pulmonary TB (77.9%) and only 31.4% PPs believe that chest X ray is more reliable. However, in their practice they prefer doing chest X ray more than sputum examination. Contrast finding was observed in a study by Datta K et al (2010) which stated that 19% of PPs believed that sputum examination is more reliable for diagnosis of TB<sup>13</sup> and in a baseline KAP study under RNTCP, it was found that 22% of participants confirmed that chest x- ray was more reliable.<sup>15</sup> Improving the knowledge of the private practitioners regarding X-ray radiology and sputum examination is required. Probably, more important is to provide easy access to high-quality sputum examination, but this exposes

private patients to the public system which both patients and private providers may resist.

In our study, majority of PPs used daily drug regimen for TB treatment (99.3%). Although majority PPs told that they followed NTEP guidelines, practices were different for prescribing drug regimen. Total 19 and 36 different regimens were prescribed by PPs for new cases of pulmonary and extra pulmonary TB respectively. Only 71.3% and 67% PPs followed regimen 2 HRZE + 4 HRE as per current NTEP guidelines. In a similar study done by Vandan N et al (2009), it was documented that 74% doctors in the private sector recommended 6 months of treatment for TB, in accordance with the RNTCP guidelines and 69% reported that they followed DOTS methodology for TB treatment<sup>16</sup> and Murrison LB et al (2016) stated that 27 different regimens were noted<sup>12</sup>. In a study by Greaves F et al (2007), it was observed that 43% treat all of their patients according to the treatment regimens recommended by the DOTS strategy<sup>17</sup>. In this study, majority of PPs prescribed TB regimen for total 6 months of duration (83.2% and 76.2% for pulmonary and EPTB cases, respectively) with minimum of 6 months to maximum of 12 months for pulmonary and minimum of 6 months to maximum of 17 months for EPTB respectively. Most studies conducted among PP in India show wide variation in self-reported diagnosis and treatment practices.<sup>18,19</sup> The treatment regimen and duration of treatment varies among PPs as per their clinical judgement and practice. PPs prefer daily drug regimen due to reasons like better cure rate and better compliance. They do not prefer any uniform guideline and treat patients as per the clinical response, their experience and radiological investigations. The drawbacks of added toxicity, non-compliance due to a high number of tablets that need to be swallowed for a longer time and an increased financial burden need to be considered.

In our study over 90 % private practitioners reported involvement in NTEP. In our study, 36 % of the PPs mentioned referral of patients to government centres for TB treatment as a way of involvement in NTEP. In study done by Stallworthy et al, they also observed low rates of referral of patients to Tb programme of government.<sup>20</sup> In one similar study done in Vietnam by Quang Vo et al, only 7.6 % of patients detected with Tb were referred to government facilities.<sup>21</sup> Contrasting findings were observed in Nigeria in study done by Chijioke-Akaniro et al, where 75 % of the patients diagnosed as Tb were referred to government facilities. In our study<sup>22</sup>, over two third of the participants reported financial incentives as the reason for involvement in NTEP. In study done by Kelamene et al, they reported low incentive as one of the challenges of involving PPs in Tb programme of the Government.<sup>23</sup>

This study represents the Private practitioners' perspectives in the tuberculosis prevention and control which is very much essential as for majority of patients, first point of contact is PPs. This study in-

cludes PPs self-reported practices and not the actual practices so actual treatment practice for Tuberculosis management and notification practice is questionable. Qualitative component like in-depth interviews, would have added more vision into the validity of the perceptions of private practitioners.

## CONCLUSION

The success of TB control programs in specific areas heavily relies on the support and involvement of PPs. Chest X-ray is the most commonly advised and preferred investigation for pulmonary TB diagnosis among PPs, followed by sputum smear microscopy. However, there is a reliance on chest X-rays due to the limited availability of sputum microscopy in private laboratories, despite PPs expressing belief in the reliability of sputum microscopy. While the majority of PPs claim to follow NTEP guidelines, there is significant variation in prescribing drug regimens for TB cases. Despite most PPs preferring daily drug regimens, there is a wide range of regimens prescribed, indicating a lack of uniformity in adherence to treatment guidelines. Over 90% of PPs reported involvement in NTEP, with a notable portion referring patients to government centers for TB treatment. Financial incentives were cited as a significant factor driving PPs' involvement in NTEP. Challenges in involving PPs in NTEP include varying referral rates to government facilities and concerns about financial incentives.

## REFERENCES

- Global tuberculosis report 2020 [Internet]. [cited 2024 Feb 18]. Available from: <https://www.who.int/publications-detail-redirect/9789240013131>
- Uplekar M, Pathania V, Raviglione M. Private practitioners and public health: weak links in tuberculosis control. *Lancet* [Internet]. 2001 Sep 15;358(9285):912–6. Available from: [https://doi.org/10.1016/S0140-6736\(01\)06076-7](https://doi.org/10.1016/S0140-6736(01)06076-7).
- Satyanaarayana S, Nair SA, Chadha SS, Shivashankar R, Sharma G, Yadav S, et al. From where are Tuberculosis patients accessing treatment in India? results from a cross-sectional community-based survey of 30 districts. *PLoS One*. 2011;6(9).
- Hazarika I. Role of Private Sector in Providing Tuberculosis Care: Evidence from a Population-based Survey in India. *J Glob Infect Dis*. 2011 Jan;3(1):19–24. doi: 10.4103/0974-777X.77291.
- Chauhan LS. Public-private mix DOTS in India. *Bull World Health Organ*. 2007 May;85(5):399. doi: 10.2471/06.036277.
- Sachdeva KS, Kumar A, Dewan P, Kumar A, Satyanarayana S. New vision for Revised National Tuberculosis Control Programme (RNTCP): Universal access “Reaching the un-reached.” *Indian J Med Res*. 2012;135(5):690–4.
- Bhat R. Regulation of the private health sector in India. *International Journal of Health Planning Management*. 1996; 11(3): 253–74.
- Fochsen G, Deshpande K, Diwan V, Mishra A, Diwan VK, Thorson A. Health care seeking among individuals with cough and tuberculosis: A population-based study from rural India. *International Journal of Tuberculosis and Lung Diseases*. 2006;10(9):995–1000.
- Bharaswadkar S, Kanchar A, Thakur N, Shah S, Patnaik B, Click ES, Kumar AM, Dewan PK. Tuberculosis management practices of private practitioners in Pune municipal corporation, India. *PLoS One*. 2014 Jun 4;9(6):e97993. doi: 10.1371/journal.pone.0097993.
- Dean AG, Sullivan KM, Soe MM. *OpenEpi: Open Source Epidemiologic Statistics for Public Health, Version*. www. OpenEpi.com, updated 2013/04/06, accessed 2024/02/12.
- Grosse U. Attracting and retaining staff for TB work-role of governments: Experiences from India, 37th Union World Conference on Lung Health; *J Tuberc Lung Dis*.2006; 10(11):149.
- Murrison LB, Ananthkrishnan R, Sukumar S, Augustine S, Krishnan N, Pai M, et al. How do urban indian private practitioners diagnose and treat tuberculosis? A cross-sectional study in Chennai. *PLoS One*. 2016;11(2):1–14.
- Datta K, Bhatnagar T, Murhekar M. Private practitioners' knowledge, attitude and practices about tuberculosis, Hooghly District, India. *Indian Journal of Tuberculosis*. 2010; 57(4): 199–206.
- Prakash, M., Rajagopal, A., Vasudevan, K., Subramani, S. K., & Basu, M. Extent of Involvement of Private Practitioners in Public-Private Mix-Directly Observed Treatment Short Course (PPM-DOTS) for Tuberculosis Management in South Coastal India: A Mixed-Method Study. *Medical Journal of Dr. D.Y. Patil University*. 2022; 15 (5): 713. [https://doi.org/10.4103/mjdr.dypu.mjdrdypu\\_7\\_21](https://doi.org/10.4103/mjdr.dypu.mjdrdypu_7_21)
- Baseline KAP Study Under RNTCP Project—CMS | PDF | Tuberculosis | Clinical Medicine. (n.d.). Scribd. Retrieved March 1, 2024, from <https://www.scribd.com/document/62696882/Baseline-KAP-Study-Under-RNTCP-Project-CMS>
- Vandan N, Ali M, Prasad R, Kuroiwa C. Assessment of doctors' knowledge regarding tuberculosis management in Lucknow, India: A public-private sector comparison. *Public Health [Internet]*. 2009;123(7):484–9. DOI: 10.1016/j.puhe.2009.05.004
- Greaves F, Ouyang H, Pefole M, MacCarthy S, Cash RA. Compliance with DOTS diagnosis and treatment recommendations by private practitioners in Kerala, India. *International Journal of Tuberculosis and Lung Diseases*. 2007;11(1):110–2.
- Krishnan N, Ananthkrishnan R, Augustine S, Vijayalakshmi NK, Gopi PG, Kumaraswami V, Narayanan PR. Impact of advocacy on the tuberculosis management practices of private practitioners in Chennai City, India. *Int J Tuberc Lung Dis*. 2009 Jan;13(1):112–8. PMID: 19105888.
- Das J, Hammer J. Location, location, location: residence, wealth, and the quality of medical care in Delhi, India. *Health Aff (Millwood)*. 2007 May-Jun;26(3):w338–51. doi: 10.1377/hlthaff.26.3.w338.
- Stallworthy G, Dias HM, Pai M. Quality of tuberculosis care in the private health sector. *J Clin Tuberc Other Mycobact Dis*. 2020 Jun 13;20:100171. doi: 10.1016/j.jctube.2020.100171. Erratum in: *J Clin Tuberc Other Mycobact Dis*. 2021 Jun 03;24:100250.
- Vo LNQ, Codlin AJ, Huynh HB, Mai TDT, Forse RJ, Truong VV, et al. Enhanced Private Sector Engagement for Tuberculosis Diagnosis and Reporting through an Intermediary Agency in Ho Chi Minh City, Viet Nam. *Tropical Medicine and Infectious Disease*. 2020; 5(3):143. Doi: 10.3390/tropicalmed5030143
- Chijioke-Akaniro O, Onyemaechi S, Kuye J, Ubochioma E, Omoniye A, Urhioke O, et al. Challenges in engaging the private sector for tuberculosis prevention and care in Nigeria: a mixed methods study. *BMJ Open*. 2023 Sep 13;13(9):e069123. doi: 10.1136/bmjopen-2022-069123..
- Kelamane S, Satyanarayana S, Nagaraja SB, et al. Engaging Informal Private Health Care Providers for TB Case Detection: Experiences from RIPEND Project in India. Drlica K, ed. *Tuberculosis Research and Treatment*. 2021; 2021: 9579167. doi:10.1155/2021/9579167