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Awareness on Tuberculosis/DOTS among Private Practitioners In and Around Chennai.

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ABSTRACT

Background: Tuberculosis [TB] continues to be a major public health problem in India with an estimated 2.7 million new cases and approximately 2.2 million deaths in 2015.The private sector caters to more than 50% of the TB care in India. Various studies done have shown that the awareness and the knowledge of the private practitioners are not adequate. Aim: This study was done to assess the awareness and knowledge of PPs [Private Practitioners] in and around Chennai with regard to TB diagnosis, treatment, monitoring and DOTS [Directly Observed Therapy, Short-course]. **Methods:** Questionnaire on different aspects of tuberculosis management and DOTS was given to participants who are medical doctors and managing patients of TB and the results were analysed. **Results:** 41.6% suspect tuberculosis based on cough and expectoration more than 2 weeks. 60.4% preferred CXR [Chest X-ray] for diagnosis and monitoring pulmonary TB patients. There was overreliance on Mantoux and other investigations not recommended by RNTCP [Revised National Tuberculosis Control Program]. 65.3% would not screen contacts of TB patients. 76.2% would treat the patients but don't prefer DOTS. 96% of PPs had not maintained any record for the TB patients and 97% preferred daily therapy. **Conclusion:** Awareness and knowledge about tuberculosis and DOTS is low among PPs in and around Chennai is low. The PPs need adequate training on RNTCP/DOTS and they need to be properly motivated. The public sector needs to collaborate and coordinate with the private practitioners for better diagnosis and treatment of tuberculosis patients so that it not only gives a cure for the patients but also prevents drug resistance.

Keywords: Tuberculosis, RNTCP, DOTS, Private Practitioners

INTRODUCTION

India has the highest burden of Tuberculosis and tops the list of 22 high burden countries in the world, as per the Global Tuberculosis Control Report 2015.[1] As per this report, one fourth of the global TB incident cases occur in India annually. Tuberculosis is a major cause of mortality in India, with an estimated incidence of 2.7 million new cases/year. Early detection and correct treatment is very essential for the control of the disease. As per RNTCP status report, most of these deaths can be prevented by timely diagnosis and correct treatment. In India, approximately 80% of the outpatients are seen by the private sector and more than 70% of the tuberculosis cases are being seen by the private practitioners (PPs).[2,3] The various reasons for this include the convenience of the services, poor knowledge of these patients on the various services available through national programme and a desire for confidentiality and personalised services. Various studies have shown that there is a large lack of knowledge about the diagnosis and treatment of tuberculosis among the PPs.[2,3] The PPs over rely on Chest X-ray for the diagnosis as well as the monitoring of tuberculosis treatment, whereas the utility of sputum microscopy is low, ranging from 12 to 50%.[3] Also, the treatment of tuberculosis by PPs is often based on regimens which are unproven and untested.[4] Various studies have shown that the PPs do not practice internationally recommended TB management practice.[5-7]

The RNTCP was launched in 1997 and by March 2006, the entire country was covered by the programme. Government of India has implemented DOTS through RNTCP. Globally DOTS strategy has been recognised as the best cost effective approach to control tuberculosis. Currently, under RNTCP, 4 different treatment regimens (Cat.I/Cat.II/ Cat.IV/ Cat.V) depending on the type of the patient and eligibility criteria (New/Re-treatment/ MDR/ XDR) are prescribed under the program. The program recommends investigations like sputum examination, Culture & Sensitivity testing and other investigations like Chest X-ray for the diagnosis and monitoring of the TB patients. The success of DOTS depends on a particular health care system's ability

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to identify and follow TB suspects.[11] Delay in the diagnosis or initiating an effective treatment transmits the infection to others members of the community. This not only increases the patient expenditure, but also increases the burden of the health system and aggravates the mortality. A study done in China by Liang L et al clearly shows that inappropriate and inadequate treatment or non-adherence to the guidelines prescribed under National TB program has contributed to the emergence of drug-resistant forms.[12] As the private health sector is involved in managing most of the patients, knowledge about the diagnosis and treatment as identified by the national program, for these PPs, is vital in the effective management for tuberculosis.

A study conducted by Uplekar et al revealed that lack of adequate knowledge among private practitioners about the risk factors, clinical presentation and disease process is the most important weak link in TB control.[13] A community based study among Russian TB health care workers revealed that lack of knowledge about TB and infection control may result in higher risk of TB.[14] In another cross sectional study done by Hashim DS et al, it was revealed that in spite of 95.5% of health care workers had good knowledge about TB, only 38.2% handled suspected TB cases correctly.[15] This suggests that there is a wide knowledge-practice gap which needs to be addressed for better outcome of TB patients.[15] In India, the private medical sector, due to incorrect diagnostics like blood tests, incorrect regimes and lack of supervision to ensure all TB patients complete their TB treatment, has been a source of mismanagement of TB and drug resistance. Every effort is being made to engage the private sector in India and improve the quality of care provided by private practitioners.[17]

Since 2012, TB has been declared to be a notifiable disease. In spite of this most of the private practitioners do not notify tuberculosis. It has been estimated that only 58% of the TB cases are notified. The WHO estimates that around a million Indians with TB are not notified. One of the reasons for this low case notification could probably be due to the largely unregulated and unmonitored private sector which accounts for almost half of the TB care delivered in India.

In a study conducted by National Institute of Tuberculosis, Chennai it has been found that the prevalence of Tuberculosis in Chennai is 259 per lakh of the population as against the national average of 256 per lakh population.[16] The study also showed that one in every 100 population in Chennai aged between 55 and 64 has infectious pulmonary tuberculosis with the incidence being higher in men than in women. Only few studies have been undertaken to study the knowledge, awareness and prescribing patterns of PPs in and around Chennai. Thus this study was conducted to know the awareness and knowledge of PPs practice in and around Chennai.

MATERIALS AND METHODS

This is a cross sectional study conducted on 110 private practitioners practicing in and around Chennai during January to December 2016. Only General practitioners, Internists and Paediatricians were included in the study. PP's with other specialities and those working in the government hospitals were excluded. Out of these 110 participants, 65 were those who had attended the CMEs and 45 were contacted in their clinics. All the participants, after obtaining their consent, were given a structured validated questionnaire set by the author and was used for data collection. Every participant was asked to fill the entire questionnaire completely and it was retrieved immediately after completion. The answers were kept confidential. The questions were of MCQs and open ended questions. The responses were obtained from the participants and the data derived was tabulated and analyzed.

RESULTS

A total of 110 doctors participated in the study and of which 101 were eligible as 9 doctors had not completed the questionnaire properly. Of the 101 respondents, 77 (76.2%) were general practitioners, 20 (19.8%) were Internists and 04 (3.9%) were Paediatricians. The average age of the respondents was 46.34 [Table 1].

Table 1: Participant details.

Total Participants	**101**
Sex	
Male	64
Female	37
Age	
25-34	12
35-50	59
51-72	30
Speciality	
General Practitioners	77
Internists	20
Paediatricians	4

Majority of them [59 (58.4%)] were between the age group of 35 – 50 years. 30 (29.7%) of them were between 51-72 years and 12 (11.9%) of them were between 25 – 35 years of age. The average age of all participants was 46.34. The average years of practice were 20.9 years. Of the 101 respondents, 64 (63.4%) of them were males and 37 (36.6%) were females. On an average, most of the PPs see at least 3 – 5 TB patients per month.

48 (47.5%) of the PPs had answered wrongly regarding the magnitude of the tuberculosis situation in India. Only 17 (16.8%) answered this correctly. 48 (47.5%) answered wrongly transmission of tuberculosis was correctly answered by majority [89(88.12)] of the respondents, while 7 (6.9%) answered it wrongly and 4 (3.96%) did not know the

answer. While 65 (64.36%) of the doctors were concerned about contacting Tuberculosis from their patients, 36 (35.6%) were not concerned about this.
42 (41.6%) of the PPs had answered that they would suspect tuberculosis if the patient had cough and expectoration for more than 2 weeks. 22 (21.8%) of the PPs had answered that evening rise of temperature would be their criteria for suspecting tuberculosis, while 21 (20.8%) had answered haemoptysis & Chest pain and 16 (15.9%) had answered weight loss and loss of appetite of the patients would make them suspect tuberculosis.
Regarding the question on Mantoux, 69 (68.3%) had answered that they rely on Mantoux. Only 5 (7.3%) of these 69 had answered that they would specify the tuberculin units and the remaining 64 (92.6%) doctors had informed that they will not specify the tuberculin units and would let the lab decide on it. Out of the 69 doctors who had answered 'yes', 58 (84.06%) had informed that they diagnose TB based on Mantoux and to start patients on treatment.
For the question on the best investigation to confirm Pulmonary TB, 61 (60.4%) of the respondents had said that they rely on Chest x-ray alone while 14 (13.9%) had said they would do sputum AFB. 11 (10.9%) had said they would do a combination of Chest X-ray and Sputum AFB and 15 (14.9%) of them had said that they rely on serological tests. For the next question whether serological tests can be used for TB diagnosis, 77 (76.2%) of the 101 participants had informed that serological tests can be used for diagnosing tuberculosis [Figure 1].

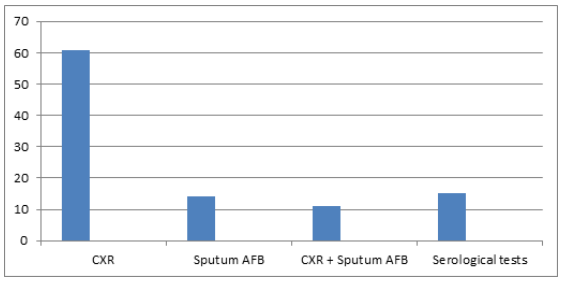

Figure 1: Percentage of respondents preferring type of investigations

Only 29 (28.7%) of the respondents had stated that they would screen for Diabetes and HIV in newly diagnosed TB patients. The question life time risk of TB in HIV Positive individuals was answered correctly by 12(11.6%) of the participants. 89 (88.1%) of them had answered this wrongly.
For monitoring the TB patients after starting the therapy, 85 (84.2%) of the PPs had answered that they would do routine Chest x-ray. 6 (5.9%) of the respondents had preferred to do Sputum AFB. 8 (7.9%) said that they would do both Chest X-ray and Sputum AFB, while 2 (1.98%) stated that they would rely on Mantoux for monitoring the TB patients on treatment. 66 (65.3%) of the PPs had said that they will not routinely screen the family members of the TB patients. 35 (34.7%) of them had informed that they screen the family members and of these, 19 (54.3%) had said they would screen the family contacts with Chest X-ray, 12 (34.3%) would do a Mantoux and 4 (11.4%) would do Sputum AFB as an investigation to screen the family members of TB patients [Figure 2].

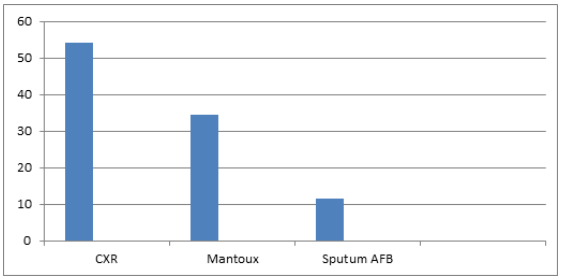

Figure 2: Percentage of respondents (35 nos) screening family members

Of the respondents, for the question would the PPs start the treatment by themselves or refer them to DOTS centre, 77 (76.2%) had stated that they would treat the newly diagnosed TB patients by themselves and 24 (23.8%) answered that they will refer the patients to DOTS Centres. For the open response why these PPs did not prefer to send the TB patients to DOTS centres, 25 (32.5%) doctors stated was that DOTS is ineffective as it is given on alternate days, 22 (28.6%) felt that the compliance was not good, 14 (18.2%) felt the quality of the drugs given under RNTCP was not good and 16 (20.8%) stated the reason for treating by their own is fear of losing patients [Table 2].

Table 2: Reasons for not following DOTS.

Ineffective as it is given intermittently	**32.5%**
Patient compliance not good	28.6%
Quality of drugs not good	18.2%
Fear of losing patients	20.8%

For those respondents who had answered to treat the TB patients by themselves, only 18 (23.4%) had used the 4 first line drugs (INH, Rifampicin, Ethambutol and Pyrazinamide). 10 (12.9%) of the PPs had given prescriptions not involving either Ethambutol or Pyrazinamide. 42 (54.6%) of the PPs had included antibiotics like Fluoroquinolones, injectibles like streptomycin in their prescriptions [Table3].

Table 3: Drug regimen prescribed by PPs

Regimen with H,R,E,Z	**23.40%**
Regimen without E or Z	12.90%
Regimen with Fluoroquinolones	54.60%
H: INH R: Rifampicin E: Ethambutol Z: Pyrazinamide	

For the question on the dosage of Anti Tubercular drugs, only 21 (27.3%) had answered correctly

regarding the dose of the I line anti-tubercular drugs. Concerning the duration of treatment recommended for newly diagnosed TB patients, 69 (68.3%) of the private practitioners had answered wrongly and only 32 (31.7%) had answered correctly.

For the question on how to define a cure for the newly diagnosed TB patients, Only 23 (22.8%) PPs had stated the correct answer and the remaining 78 (77.2%) had answered it wrongly.

Upon starting treatment for the newly diagnosed TB patients, out of 77 respondents, 41 (53.2%) has stated that they would be using individual drugs and the remaining 36 (46.8%) would be choosing fixed dose combinations.

73 (94.8%) of the 77 respondents had informed that they do not notify and only 4 (5.19%) of the PPs notify the disease to the concerned authorities. 74 (96.1%) of the PPs do not maintain any record of these TB patients and only 3 (3.9%) maintain records of their newly diagnosed TB patients.

When asked about the expansion of RNTCP/DOTS, only 78 (77.2%) knew the correct expansion of DOTS/RNTCP. 42 (41.6%) of the PPs were aware of the different regimens in DOTS and the remaining 59 (58.58%) were unaware of the regimens. On asking if the participants felt DOTS was effective, 24 (23.8%) of the PPs who had responded felt that DOTS is effective and 77 (76.2%) felt it was ineffective. For the question if the participants knew the nearest DOTS centre, 63 (62.4%) were not aware of the nearest DOTS centre [Table 4].

Table 4: Knowledge about RNTCP

	Correct response	Wrong response / don't know
Expansion of RNTCP / DOTS	78 (77.2%)	23 (22.8%)
Awareness on different regimens of DOTS	42 (41.6%)	59 (58.58%)
Awareness on the nearest DOTS centre	38 (37.6%)	63(62.4%)
Able to define MDR-TB	23 (22.8%)	78 (77.2%)

For the question whether the participants preferred daily therapy or intermittent therapy, 75 (97.4%) preferred daily therapy and 2 (1.3%) preferred intermittent therapy.

Only 23 (22.8%) of the PPs were able to define MDR-TB correctly. 42 (41.6%) answered it wrongly and 36 (35.6%) did not know the answer. Only 12 (11.9%) respondents had answered that they had received RNTCP training.

When the participants were asked if they would like to participate in any training/awareness programme in future, 96(95.1%) had said that they would to participate.

DISCUSSION

Our study shows that the level of awareness on diagnosis and management of tuberculosis amongst the PPs practicing in and around Chennai is low. In a study published in National J of Research in Community Medicine,[18] 34% of the participants answered the correct incidence of Tuberculosis, whereas in our study, only 16.8% of the respondents knew the magnitude of the situation of tuberculosis in India.

Our study shows that most of the respondents were aware of the mode of spread of TB. 88.12% of the participants had said that Pulmonary TB spreads through air-borne route. A study among General Practitioners in Pakistan showed that only 68% knew Pulmonary TB spreads as air-borne infection.[19] Similarly studies in India and Philippines showed that the knowledge on the mode of transmission was poor that only 21% of the physicians were aware that droplet infection was the route of transmission of pulmonary TB.[20,21] In a study done by Ahmed Esmael et al, 79.9% of the respondents had identified TB spreads by droplet infection.[22]

In our study, 64.36% of the participants were concerned about getting infected from the TB patients. On enquiring about the ways they would prevent this, most of them had answered that they would ask the patients to close their mouth while coughing (91.1%), providing patients with a mask (20.8%), wearing a mask on themselves (57.4%). 5 (6.2%) PPs had mentioned of having air sterilisation system in their clinics.

As per the WHO guidelines, cough with expectoration of more than 2 weeks duration should be considered as the primary symptom of pulmonary TB. In our study, only 41.6% of the respondents identified this correctly. In a study done by Shrivastava et al, 56.9% of the respondents had cited the most important criteria for suspecting pulmonary TB was cough of more than 2 weeks duration.[23] However, in a study conducted among private medical practitioners on TB in Kenya, it was observed that only 7.8% of the respondents clearly stated that cough for more than two or more weeks should be used as a criteria to suspect pulmonary TB.[24] In another cross-sectional descriptive study by Shah SK et al, it was reported that less than 1% of the physicians were aware of the duration of the cough for suspecting pulmonary TB.[25]

It is a well accepted and established fact that Mantoux should not be considered as a diagnostic tool in adults with tuberculosis. In our study, 68.3% of the respondents had stated that they would rely on Mantoux. Only 5 (7.3%) of the participants had answered that they would specify the tuberculin units. 64 (92.6%) doctors had informed that they will not specify the tuberculin units and would let the lab decide on it. Also, out of the 69 doctors who had answered that they would do Mantoux, 84.06% had informed that they diagnose TB based on Mantoux and to start patients on treatment. In a study by Shrivastava et al, 31.4% of the clinicians felt that Mantoux can be used for initiating treatment.[23] In a study done by Hussain R et al, it was reported that the tuberculin response in TB-endemic area cannot

be used as a diagnostic marker for active TB.[26] In a questionnaire based survey done by Khan J et al, similar results had been reported.[27] These studies including the present one clearly show that the private practitioners over rely on Mantoux, which as per guidelines should not be used to diagnose pulmonary tuberculosis.

Our study shows that there is a over-reliance on Chest x-ray among the private practitioners for diagnosis of Pulmonary TB. 61 (60.4%) PPs preferred Chest x-ray as investigation for the diagnosis of Pulmonary TB whereas 14 (13.9%) preferred Sputum AFB alone and 11 (10.9%) stated that they would prefer a combination of Chest X-ray and Sputum AFB for diagnosis. In a study done by Kisalay Datta et al in West Bengal, 68% of PPs preferred Chest X-ray, 17% preferred Sputum AFB for the diagnosis of Pulmonary TB.19% of PPs believed that sputum test was more reliable than CXR.[28] In another study done by Thakur et al in Chandigarh showed that 40% of the respondents stated that Chest X-ray would be first choice of investigation for Pulmonary TB.[10] Also, in our study, 15 (14.9%) PPs preferred only serological tests like TB-Quantiferron Gold for the diagnosis for PT clearly showing that PPs utilize different investigation methods for pulmonary TB diagnosis which are usually not recommended as per RNTCP guidelines.

When asked whether the respondents would check the newly diagnosed pulmonary TB patients for HIV or Diabetes mellitus, only 28.7% of the respondents had stated that they would screen for Diabetes and HIV in newly diagnosed TB patients and the remaining 71.3% of the PPs had stated that they would not do so. With the incidence of pulmonary TB increasing with disease states like HIV and diabetes, patients should be routinely screened for these diseases. In a study done by, Harries et al showed that about 10% of the global TB cases are linked to diabetes.[29] Lots of studies have proven the association between HIV and tuberculosis. The life time risk of progressing from latent to active TB is estimated to be between 12 and 20 times greater in people with HIV than those without HIV.[30] In our study, 88.1% of the respondents did not know the life time risk of TB in HIV patients and most of the PPs would not screen HIV in newly diagnosed TB patients. This proves that the awareness and knowledge of HIV and TB is poor amongst the PPs.

Also, 66 (65.3%) of the PPs had said that they will not routinely screen the family members of the TB patients. 35 (34.7%) of them had informed that they would screen the family members and of these, 19 (54.3%) had said they would screen the family contacts with Chest X-ray, 12 (34.3%) would do a Mantoux and 4 (11.4%) would do Sputum AFB as an investigation to screen the family members of TB patients. In a study done by Singla et al in Delhi, 18% of PPs had recommended CXR and 7% of them had recommended Mantoux for screening the family members.[3]

84.2% of the PPs stated that they would do routine CXR for monitoring the patients and only 5.9% had stated that they would do sputum AFB for monitoring the patients. In a study done by Shimeles et al, it was shown that 40% of the respondents preferred chest x-ray as the primary tool for the monitoring of pulmonary TB patients.[31] In a study published in Indian Journal of Tuberculosis by Kisalay Datta et al,[28] 91% of the PPs had informed that they would perform Chest x-ray for monitoring the patients on treatment.

In our study, out of the 101 respondents, 76.2% had stated that they would treat the newly diagnosed TB patients by themselves. Multiple reasons were cited by the respondents for not relying on DOTS. 32.5% PPs stated was that DOTS is ineffective as it is given on alternate days, 28.6% felt that the compliance was not good, 18.2% felt the quality of the drugs given under RNTCP was not good and 20.8% feared losing their patients if they were sent to DOTS Centres.

In a study published in Indian Journal of Tuberculosis by Kisalay Datta et al,[28] the common reasons cited by PPS not involving in RNTCP included unacceptability of supervision by government machineries (91%), difficulty in maintaining documents of TB patients (89%), increased workload if involved in RNTCP (79%), no faith on government system(75%) and quality of drugs given under the programme was not good (40%). Another study done by Vinayak Nagaraja et al had cited 64.9% of the doctors had doubts regarding the potency of drugs given through DOTS and the majority of the doctors felt DOTS was ineffective as drugs were not given daily.[32]

The respondents were asked about the drugs and the posology of anti-tubercular therapy that these PPs used to treat their pulmonary TB patients. Of the 77 respondents Respondents who would treat the patients, only 23.4% had used the 4 first line drugs (INH, Rifampicin, Ethambutol and Pyrazinamide). 12.9% of the PPs had given prescriptions not involving either Ethambutol or Pyrazinamide. In a study published in Indian Journal of Tuberculosis by Kisalay Datta et al,[28] only 21% of the participants were using four-drug regimen. Also in a study published by Uplekar et al in Int. Journal of Tuberculosis and Lung diseases, it was shown that PPs prescribed different regimens, mostly inappropriate and expensive.[5] A study conducted in Delhi showed that only 29% of the PPs RNTCP recommended regimen and only 8% knew the correct dosage combination of tuberculosis treatment. In a study done by Achanta S et al, only 33% prescribed the correct treatment regimen for a new case of tuberculosis with no prior history of TB treatment and the remaining prescribed different prescriptions in terms of drugs, duration and

dosages.[33] In the same study it was observed that more than 50% of the respondents had used II line drugs like Fluoroquinolones. In our study 54.6% of the PPs had included antibiotics like Fluoroquinolones, Aminoglycosides like Streptomycin in their treatment regimen. Our study also shows that only 27.3% of the respondents knew the correct dosage of the anti tubercular drugs. A study conducted in Delhi found that only 29% of the PPs used a proper regimen as per RNTCP and only 8% knew the correct dosage of anti-tubercular treatment.[34] In a study done by Shimeles et al, it was shown that 63% of the respondents had listed treatment regimens that were completely different from the National TB Programme guidelines.[31] In a study conducted by Uplekar in Mumbai had reported a small sample of practitioners had produced more than 80 different prescriptions.[35] The various treatment regimens prescribed showed that the treatment given by the PPs is by large not standardised and inconsistent. The improper use of drugs and different regimens adopted by the PPs is one of the main reasons for the emergence of drug resistance.

The present study shows that 69 (68.3%) of the private practitioners were not aware of the treatment duration for newly diagnosed TB patients. In a Croatian epidemiological study, it was reported that 62% of the primary health care physicians were not aware of the exact duration of the treatment.[36] Another study done in Turkey showed that only 33.5% of the doctors knew correctly about the treatment duration.[37] In a study done by Shrivastava et al, 49% of the participants could not correctly ascertain the duration of treatment.[23] In another study done by Gupta et al,[38] it was shown that only 17% knew the correct duration of treatment under various regimens.

For the question whether the participants were able to define cure for a newly diagnosed pulmonary TB patient, only 22.8% PPs had stated the correct answer. 77.2% had answered it wrongly, of which 19 (24.4%) of the respondents had answered that they would consider a patient as cured if the patient is asymptomatic with a normal Chest X-ray, not considering the sputum examination as a criteria at all. In a study conducted in Delhi by Singla N et al,[34] only 23% of the respondents used sputum examination but almost always with a chest x-ray and 35.5% of them depend on chest x-ray clearance with clinical improvement for stopping treatment. These findings show that there is an over-utilization of chest x-ray and an under-utilisation of sputum examination for stopping treatment. For the question whether the respondents preferred daily or intermittent therapy, of the 77 respondents who had informed that they would be treating the newly diagnosed TB patients, 53.2% has stated that they would be using individual drugs and the remaining 46.8% would be choosing fixed dose combinations, of which 75% of them were not sure of the no. of tablets (FDC) to be taken by the patients based on the weight. In a study done in Hooghly, majority of the PP had prescribed daily regimen.[28] Similar results were obtained in another study conducted in Delhi by Singla N et al.[34] In a study conducted by Shrivastava et al, 47.1% respondents had opined that the effectiveness of daily therapy is comparable to intermittent therapy.[23] However in a survey conducted by Dosumu EA et al, only 11.5% of the doctors opined that the effectiveness of daily therapy is similar to intermittent therapy.[39] In another study by Datta K et al, it was revealed that only 27% of PPs prescribed alternate day regimen.[40] In the study done by Kisalay et al, 77% of the respondents preferred daily regimen.[28]

Of the 77 respondents who had answered that they will treat newly diagnosed TB patients, 94.8% of the respondents had informed that they do not notify and only 5.19% of the PPs notify the disease to the concerned authorities. 96.1% of the PPs do not maintain any record of these TB patients and only 3.9% maintain records of their newly diagnosed TB patients. From a study done by Singla et al, it was shown that the PPs do not maintain any records of their TB patients and they do not follow any methodology for retrieval of the defaulters.[3] Another study done by Datta K et al showed that very few PPs had maintained any records pertaining to the tuberculosis patients. All these results show that the PPs are very poor in notifying the disease and maintaining proper records of these patients. The notification of TB cases is estimated to be only 58% in India. TB has been declared to be a notifiable disease in India since May 2012, with the aim of improving collection of patient care information. This signifies that every doctor treating TB patients had to report every case to the government.[41] Hence, the PPs who treat tuberculosis patients should be informed and trained adequately to maintain records of the tuberculosis patients and to notify it to the concerned authorities.

In our study, questions were asked about the awareness and knowledge of respondents on DOTS. 78 (77.2%) knew the correct expansion of DOTS/RNTCP. In a study published in Int. Journal of Collaborative Research on Internal Medicine,[32] it was shown that 26.9% of the participants did not know the correct expansion of DOTS. In another study done by Gupta et al,[38] it was stated that only 15% knew the correct expansion of DOTS. For the question on awareness on different regimens on DOTS, 42 (41.6%) of the PPs were aware of the different regimens in DOTS and the remaining 59 (58.58%) were unaware of the regimens. In a study published in National Journal of Research in Community Medicine,[18] it's been stated that 54.7% of the respondents knew the number of treatment categories, 38.7% gave wrong answers and 6.7% did not know. Asked on whether they thought DOTS

was effective, only 23.8% of the PPs who had responded felt that DOTS is effective and hence they refer their patients who are newly diagnosed as pulmonary TB to DOTS Centres. In a study published in Indian Journal of Tuberculosis by Kisalay Datta et al,[28] it was shown that 27% of the respondents felt that DOTS is cost effective, has less side effects and easy to administer. In a study done by Vinayak Nagaraj et al, it was shown that 33.75% of the private hospital doctors felt that DOTS was not reaching all sections of the society. Also in the present study, when the respondents were asked if they were aware of the nearest DOTS Centre, 62.4% were not aware of the nearest DOTS centre and surprisingly more than half (54.5%) of the 22 respondents who had answered that they would be referring the newly diagnosed patients to DOTS centre, were not aware of the nearest DOTS centre.

For the question on definition of MDR-TB, only 22.8% of the PPs were able to define MDR-TB correctly. 41.6% answered it wrongly and 35.6% did not know the answer. In a study done by Shrivastava et al, correct knowledge about MDR-TB was found in only 33.3% of the participants.[23] While the drug resistance surveys in several states showing that the prevalence in India 2-3% among new cases and 12-17% among reinfection cases, it is very essential for the PPs to know about MDR-TB.

For the question asked on training received on TB management or DOTS, only 11.9% respondents had answered that they had received RNTCP training. 44.6% respondents had attended awareness programmes in the form of CMEs organised by various bodies like IMA whereas 43.6% had never attended any awareness programme. In a study by Datta et al, it was shown that only 25% attended a modular programme in RNTCP.[28] In another study done by Anamika Majumdar et al, it was shown that less than 11% of the PPs had training in RNTCP in the previous 5 years.[42] In the study done by Shrivastava et al, it was shown that only 7.8% of the participants had training in RNTCP. In a Public-private sector comparison regarding doctors' knowledge about TB management in India, doctors in the public sector who had received RNTCP training had 2.1 times better knowledge than private sector doctors.[43] The participants were asked if they would like to participate any awareness on Tuberculosis/RNTCP/DOTS. 95.1% of the participants would like to attend awareness programmes in the future and all those who received RNTCP training had informed that they would like to attend any other awareness programmes on tuberculosis. This willingness could be utilized so that they can be given training and this could be of use in better management and control of tuberculosis.

The limitations of this study is the number of participants involved were less in number and from a small geographical area. We recommend to have a similar study involving a large number of participants from a bigger geographical area.

CONCLUSION

PPs play an important role in providing healthcare services to a majority of patients with tuberculosis. This study clearly shows that there is a deficiency in awareness and knowledge in diagnosing and treating pulmonary tuberculosis patients by the private practitioners. There is a definite need to increase the participation of these PPs and periodical sensitization in the TB control programmes. Majority of the PPs who treat new TB cases are not aware of and treat the cases as per the guidelines set by RNTCP.[10] They have many misunderstandings about the efficacy of RNTCP/DOTS. The available studies show that the basic knowledge and understanding about DOTS is lacking among PPs.[10] This results in incorrect diagnosis and inefficient treatment causing emergence of drug-resistant tuberculosis. As the PPs provide the primary contact care and continuous care for majority of patients, their role in treating pulmonary TB patients cannot be ignored. The government should involve the PPs in planning and implementing the TB control activities. More collaborative efforts are needed between the public health sector and the private sector for better control of tuberculosis. The PPs should be offered proper and periodical training on tuberculosis management by ways of having simulated workshops, They should be familiarized with different aspects of RNTCP/DOTS so that their concerns and doubts regarding the programme are cleared. This can be done by medical associations and medical colleges through CMEs, conferences and other interactive programmes. Emphasis should be made on suspecting tuberculosis in patients, diagnosis of tuberculosis and treatment as per RNTCP guidelines.

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