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Original Article

Community Medicine Section

Factors Related to Non-Referral of Patients with Presumptive Pulmonary TB to Designated Microscopy Centers (DMCs) by Registered Private Practitioners in Urban Areas of Punjab, India

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ABSTRACT

Background: Early diagnosis and proper treatment under RNTCP guidelines, forms the mainstay of management of a TB patient. A large proportion of patients with presumptive tuberculosis (TB) visit a Private Practitioner (PP) in the first place. Studies have shown that PPs rely more on X-rays and other diagnostic tools rather than referring the patient to the nearest Designated Microscopy Centre (DMC) for sputum microscopy.

Aim: The present study was planned to look in to factors responsible for non-referral of patients with presumptive pulmonary TB to the DMCs for diagnosis by PPs.

Materials and Methods: Present study was a case-control study conducted over a period of one year among registered PPs in urban areas of Punjab. The study was carried out in five major cities which have approximately half of the urban population of Punjab. Forty three Private Practitioners per city for referral group and 43 matched PPs for non-referral group were selected.

Results: Knowledge regarding RNTCP was low in both the referral (38.1%) as well as non-referral (25.6%) group of PPs. Allopathic doctors had significantly higher knowledge regarding TB as compared to ayurvedic and homeopathy doctors, and Registered Medical Practitioners (RMP). Both the knowledge of PPs regarding nearest DMC as well as perception about accessibility of the nearest DMC for the patients were found to be significantly higher in the referral group. Only 15.3% of practitioners in the non-referral group said that they had been contacted by RNTCP staff.

Conclusion: The main factors responsible for non-referral of pulmonary TB suspects to DMCs for diagnosis in the present study included low knowledge regarding RNTCP, lack of awareness regarding place and accessibility of nearest DMC, and inadequate sensitization of PPs by the RNTCP staff.

Keywords: Awareness, Knowledge, Revised National Tuberculosis Control Programme

INTRODUCTION

India, with nearly one-fifth of the global incidence, is the highest tuberculosis (TB) burden country in the world. WHO statistics in 2013 show that out of the estimated global annual incidence of nine million TB cases, 2.1 million were estimated to have occurred in India [1]. The Revised National Tuberculosis Control Programme (RNTCP), based on the internationally recommended Directly Observed Treatment Short-course (DOTS) strategy, was launched in 1997, in India, and expanded across the country with nationwide coverage being achieved in 2006 [2]. The Government of India has envisioned a "TB free India" during 12th Five Year Plan (2012-2017) with reduction in burden of the disease until it is no longer a major public health problem [3]. So the programme has adopted a new objective of 'universal access' to quality diagnosis and treatment for all TB patients which requires extending the reach and quality of services in the community with successful engagement of the private sector [1,4]. In India, the private sector, which is estimated to include 80-85% of all qualified doctors, 93% of the hospitals and 80% of the outpatient clinics, remains an important health care provider [5]. This sector caters to 75-80% of those seeking health care in urban and rural areas [6]. Nearly two-third of the patients treated under RNTCP is diagnosed by private sector which mainly relies on X-rays for diagnosis as well as monitoring of treatment, and use of sputum microscopy is only between 12-50% [7].

Studies across India have documented that diagnostic and management practices for TB are not standardized, particularly in private care settings as RNTCP guidelines are not followed uniformly [7,8]. Therefore this study was planned to elucidate the factors responsible for non-referral of patients with presumptive pulmonary TB to DMCs for diagnosis by PPs as per RNTCP recommendations.

MATERIALS AND METHODS

The present study was a case-control study conducted over period of one year from January 2012 to December 2012. The study was carried out in five major cities i.e. Ludhiana, Jalandhar, Amritsar, Patiala and Bathinda, which inhabit approximately half of the urban population of Punjab and have a large network of private practitioners. For this study the PPs were divided into two groups, referral group and non–referral group. Referral group involved the registered PPs who referred at least one patient with presumptive pulmonary TB per quarter for first two quarters of the study period to the nearest DMCs for diagnosis. Non Referral group included PPs who did not refer any patient to DMC during this period.

Sample size, as calculated with Epi info, was 165 for referral and 165 for non-referral group which came out to be 33 per city for each group. So to address the problem of non-response and incomplete data, 43 PPs for referral group and 43 matched PPs for non-referral group were selected per city.

List of DMCs was obtained from District Programme officer –Tuberculosis (DPO-TB) of the particular district. Laboratory technicians (LTs) of DMCs in the selected cities were sensitized to correctly record the details (name and address) of referring doctors for two quarters (January 2012 to June, 2012). Referral group of

practitioners was identified from laboratory records of these two quarters and subsequently 43 PPs per city were selected from this list by population proportionate to sample size method based on qualification. Simultaneously a list of all registered PPs was obtained from the Civil Surgeon's office and respective professional bodies (e.g. Indian Medical Association, National Integrated Medical Association etc.) to which PPs in a particular area were registered.

Non-referral Group was selected by a process of one to one matching. The criteria of matching was the nearest (by distance in either direction) registered PP in the same Tuberculosis Unit (TU), with the same qualification (allopathic, ayurvedic, homeopathic etc.) as the PP from referral group, and who had not referred even a single patient with presumptive pulmonary TB to DMCs for diagnosis during these two quarters. The distance and accessibility of nearest DMC was comparable in both groups. Tuberculosis Unit (TU) is an administrative unit under RNTCP which has five DMCs under it with each DMC catering to a population of one lakh.

Five field investigators (FIs) belonging to respective cities with graduate medical qualification (BSc, BSc (Nursing), GNM etc.) were recruited and trained by the principal investigators for the study. The training included sensitization regarding TB, RNTCP, study protocol and filling the proforma and questionnaire. To minimize inter-observer bias, the comprehension of FIs about the study and proforma was evaluated during these sessions before sending them in field. The interviews of the PPs, collection and analysis of data were conducted during last two quarters (July 2012 to December 2012) of the study period. Lists and mapping of non-referring PPs in the locality were prepared by FIs with the help of Senior Treatment Supervisor (STS) and Senior Tuberculosis Laboratory Supervisor (STLS) of the respective areas. The non-referral group was selected from this list as per definition. The data collection was done using a pre-tested, structured proforma containing information about age, sex, professional qualification, experience etc. of the PP and questionnaire regarding their knowledge of TB and RNTCP (Annexure 1 & 2). The selected PPs (43 referral and 43 non-referral) were visited by the FIs and the proforma administered and various possible reasons for the referral/non-referral of the pulmonary TB suspects to DMCs were investigated. Field investigators collected the information and reported to the respective District Program Officer-Tuberculosis (DPO-TB) who supervised the whole process of data collection and transportation. The quality of the data collection was ensured by random visits of Principal investigator/ Co-investigators to 10-20% of the PPs visited by the FI. The project initiation was done after approval by institutional ethics committee. Written informed consent was taken from the participants after informing the scope of the study. The data so generated were entered into Microsoft excel by a data entry operator and further analyzed using Statistical Package for Social Sciences (SPSS package), version 20 (IBM SPSS statistics 20.0.0, 2011). Chi-square test and Odd's ratio was estimated for each variable.

RESULTS

A total of 430 private practitioners (215 each in referral and non-referral groups) were interviewed. Demographic characteristics (Age, gender) of two groups were comparable. The participants (PPs) comprised of 220 allopathic doctors, 170 ayurvedic doctors, 26 homeopathic doctors and 14 other Registered Medical Practitioners (RMPs) who did not have formal medical qualification but were licensed with state medical council to practice medicine. The two study groups were also comparable with respect to qualification and experience in years [Table/Fig-1]. Knowledge regarding TB and RNTCP was assessed on the basis of questionnaire. Only 46.5% of practitioners from referral group and 37.7% from the non-referral group had adequate knowledge regarding TB. Although knowledge was higher in the referral group but the difference between the two groups was not significant statistically. A 38.1% PPs from referral group and 25.6% PPs from non-referral group had adequate knowledge regarding RNTCP and this difference was highly significant [Table/Fig-2]. The difference in knowledge regarding TB and RNTCP with respect to age and gender distribution in the study groups was not statistically significant. Allopathic doctors had significantly higher knowledge regarding TB as compared to ayurvedic, homeopathy and RMP doctors whereas the difference in knowledge regarding RNTCP was not statistically significant in these four streams of doctors [Table/Fig-3].

In the referral group, both the knowledge of PPs regarding nearest DMC as well as perception about its accessibility for the patients were found to be significantly higher than the non-referral group. 98.6% of PPs in the referral group knew about the nearest DMC whereas 82.8% of PPs from non-referral group had knowledge

Experience (Y)	Referral Group (%)	Non-referral Group (%)	Total (%)
1-15	60 (27.9)	59 (27.4)	119 (27.7)
16-30	105 (48.8)	103 (47.9)	208 (48.4)
31-45	42 (19.5)	47 (21.9)	89 (20.7)
>45	8 (3.7)	6 (2.8)	14 (3.2)
Total	215	215	430

[Table/Fig-1]: Experience of the Private Practitioners
χ^2 = 0.594, p=0.898 (NS);

Variable	Referral Group (%)	Non-Referral Group (%)	χ^2	p value	Odds ratio (95% confidence limits)
Adequate Knowledge regarding TB	100 (46.5)	81 (37.7)	3.44	0.07 (NS)*	1.44 (0.97-2.11)
Adequate Knowledge regarding RNTCP	82 (38.1)	55 (25.6)	7.81	0.01 (HS)*	1.79 (1.19-2.71)

[Table/Fig-2]: Knowledge of the Private Practitioners regarding Tuberculosis and RNTCP
*NS-Not Significant, HS-Highly Significant

Qualification of PPs	Adequate Knowledge regarding TB* (%)	Adequate Knowledge regarding RNTCP** (%)
Allopathy	108 (49.1)	80 (36.4)
Ayurvedic	65 (38.2)	51 (30.0)
Homeopathy	6 (23.1)	4 (15.4)
RMP	2 (14.3)	2 (14.3)

[Table/Fig-3]: Knowledge regarding TB and RNTCP with respect to qualification of Private Practitioners
*χ^2 =13.756, p=0.003 (HS); **χ^2 =7.569, p=0.056 (NS)

Variable	Referral Group (%)	Non- referral Group (%)	χ^2	p-value	Odds ratio (95% Confidence intervals)
Knowledge of the PPs regarding nearest DMC	212 (98.6)	178 (82.8)	31.86	0.00 (HS)*	14.69(4.45-48.45)
Perceived accessibility of nearest DMC	202 (94.0)	163 (75.8)	27.57	0.00 (HS)*	4.96 (2.61-9.42)
Fear of Losing Patients	14 (6.5)	17 (7.9)	0.31	0.71 (NS)*	0.81 (0.39-1.69)
Ever contacted by RNTCP staff	87 (40.5)	33 (15.3)	33.71	0.00 (HS)*	3.75 (2.37-5.94)
Faith in Govt Health Sector	187 (87.0)	180 (83.7)	0.91	0.41 (NS)*	1.30 (0.76-2.22)

[Table/Fig-4]: Comparison of Referral and Non-Referral Group of Private Practitioners with respect to selected variables
*NS-Not Significant, HS-Highly Significant

regarding nearest DMC. Most of practitioners (92.7%) from both groups were not fearful of losing patients if the patient was referred to DMC for diagnosis. Previous bad experience on referral was not the reason for non-referral of patients to the nearest DMC in 86% of PPs from the non-referral group. Only 15.3% of PPs in non-referral group had ever been contacted by RNTCP staff. Comparison of two groups with respect to faith in Government Health Sector was not significant statistically [Table/Fig-4].

DISCUSSION

Most of the patients with suspected pulmonary TB contact a private practitioner in the first place. Despite the role that the private sector plays as a major health care provider, it continues to be neglected by the public health system in the delivery of care [9]. Sputum smear examination is the most reliable way to diagnose patients with pulmonary TB, as it has a higher specificity though lower sensitivity. The positive predictive value of sputum smear result is more than 90%, while that of chest X-ray is around 66% [10]. There were about 13,000 DMCs in the country during 2012 and sputum microscopy forms the backbone of RNTCP [11].

Majority of the PPs do not refer their patients to the DMCs for sputum examination leading to lesser case detection [12-14]. In a study conducted in Andhra Pradesh (India), compliance to internationally recommended standards of TB (ISTC) among private physicians was quite poor as only 34%, meaning only few practitioners rightly suspected TB and prescribed sputum microscopy for diagnosis of TB as their first choice [12]. Studies show that most of the PPs generally rely on other investigations like X-ray, ESR and serological tests for diagnosis of TB [13]. In another study conducted in Gwalior district, more government practitioners relied on sputum examination for diagnosis and follow-up as compared to PPs [14].

Study conducted in Ballabgarh, Haryana (India), documented that among 242 pulmonary TB suspects, 61.6% were not prescribed a sputum AFB test, even after they had presented with complaints suggestive of pulmonary TB [15].

In the present study, overall knowledge regarding TB (37.7%) and RNTCP (25.6%) among PPs was very low in the non-referral group. Allopathic stream of PPs had significantly more knowledge regarding TB. Similarly, a knowledge, attitude and practice study conducted among non-allopathic private practitioners in a rural setting stated that though majority of the non-allopathic practitioners knew the causative agent, only 5% of the 128 practitioners could answer the correct full form of DOTS under RNTCP and only 14% could tell sputum examination to be the first investigation of choice in suspected TB case indicating a low knowledge among non-allopathic PPs. [16]

While evaluating some of the other factors responsible for not referring suspected TB patients to the nearest DMCs in the present study, lack of awareness and accessibility about nearest DMC, lack of contact and sensitization by RNTCP staff emerged as important factors. Fear of losing patients and loss of faith in government sector were not the factors responsible for non-referral of patients in our study. Majority of practitioners from the non-referral group denied being ever contacted by the RNTCP staff. Given the magnitude of the problem of TB and the size of the private sector in India, ignoring the private sector or dealing with it in a superficial manner cannot be an option. So, more awareness generation about RNTCP, training workshops by RNTCP and establishing new DMCs to cater to the ever growing population may be the need of the hour. Parallel mechanisms should be developed within the private sector to support it to diagnose TB patients properly as per RNTCP guidelines.

LIMITATIONS OF THE STUDY

1. Rural and unregistered PPs were not included in the present study.
2. Significant factors responsible for non-referral in high risk areas like slums, could not be highlighted separately.
3. All the factors responsible for non-referral of patients with presumptive pulmonary TB to DMCs for diagnosis could not be elucidated.

CONCLUSION

The main factors responsible for non-referral of pulmonary TB suspects to DMCs for diagnosis in the present study included low knowledge regarding RNTCP, lack of awareness regarding place and accessibility of nearest DMC, and inadequate sensitization by the RNTCP staff. Orientation of PPs to the policies and practices of national programmes must be carried out through continuing medical education and accreditation programmes in collaboration with their professional associations in order to build capacity of the private sector to effectively contribute to national disease control efforts.

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REFERENCES

[1] Global Tuberculosis Report 2014, World Health Organization, Geneva. Available from: www.who.int/tb/publications/global_report/en (last accessed on May 17, 2015).
[2] Tuberculosis India 2010. Annual Report of the Revised National Tuberculosis Control Programme. New Delhi: Central Tuberculosis Division Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India, 2010.
[3] Universal access to TB Care- A practical guide for programme managers. New Delhi: Central Tuberculosis Division, Directorate General of Health Services, Ministry of Health & Family Welfare; 2010.
[4] 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;135:690-64.
[5] Lawrence CL, Cesar UG, Kwame D. Private sector contributions and their effect on physician emigration in the developing world. Bulletin of the World Health Organization. 2013;91:227-33. Available from: http://www.who.int/bulletin/volumes/91/3/12-110791/en/ (last accessed on May 17, 2015).
[6] Involving Private Practitioners in Tuberculosis Control: Issues, Interventions and Emerging Policy Framework. 2001, WHO/CDS/TB/2001.285. World Health Organization, Geneva. Available from: whqlibdoc.who.int/hq/2001/WHO_CDS_TB_2001.285.pdf (last accessed on May 12, 2015).
[7] Involvement of private practitioners in the RNTCP - the rationale, problems encountered and likely operational models. The Centre for Health Research and Development (CHRD). *Health Administrator.* 2003;15(1-2):61-71. Available from: medind.nic.in/haa/t03/i1/haat03i1p61o.pdf (last accessed on May 10, 2015).
[8] Udwadia ZF, Pinto LM, Uplekar MW. Tuberculosis management by private practitioners in Mumbai, India: has anything changed in two decades? *PLoS ONE*. 2010;5(8):e12023. doi:10.1371/journal.pone.0012023.
[9] Uplekar M. Involving private health care providers in delivery of TB care: Global Strategy. *Tuberculosis*. 2003;83:156-64.
[10] Anurag B, Lancelot P, Madhukar P. Mismanagement of tuberculosis in India: causes, consequences, and the way forward. *Hypothesis.* 2011;9(1):e7. Available from: http://www.hypothesisjournal.com/?p=989#sthash.Gte0rCvf.dpuf (Last accessed on May 15, 2015).
[11] Central TB Division; Ministry of Health and Family Welfare. Annual report TB India 2012. Available from: medind.nic.in/nac/t13/i1/nact13i1p1.pdf (Last accessed on May 10, 2015).
[12] Achanta S, Jaju J, Kumar AMV, Nagaraja SB, Shamrao SRM, et al. Tuberculosis management practices by private practitioners in Andhra Pradesh, India. *PLoS ONE.* 2013;8(8):e71119. doi:10.1371/journal.pone.0071119.
[13] Thakur JS, Sitanshu SK, Alka S, Kumar R. Private Sector involvement in Tuberculosis control in Chandigarh. *Indian J of Tuberc*. 2006;53:149–53.
[14] Srivastava DK, Mishra A, Mishra S, Gour N, Bansal M, Mishra S, Adhikari P. An assessment of knowledge and practices regarding tuberculosis in the context of RNTCP among non-allopathic practitioners in Gwalior district. *Online J Health Allied Scs*. 2011;10(2): 5.

[15] Singh AK, Salve H, Selvaraj K, Rai SK, Kant S. Quality of diagnostic and treatment practices of pulmonary tuberculosis management amongst health practitioners in Haryana, north India. *Rural and Remote Health*. 2014;14:1-9.
[16] Palve SB, Parkhad SB, Phalke VD, Phalke DB, Reddy BN. Knowledge, attitude and practice about Tuberculosis (TB) and Revised National TB Control Programme (RNTCP) among rural based Non-allopathic private practitioners. *International Journal of Research in Health Sciences*. 2015;3(2):241-46.

Annexure 1 : Definition of variables

S.No	Variable	Definition	Type of variable	Source of Data	Reduction of Bias
1.	Age of PP	As quoted by the PP	Continuous	Questionnaire	Records
2.	Sex of PP	As quoted by the PP	Discrete	Questionnaire	
3.	Qualification	As quoted by the PP	Discrete	Questionnaire	Records
4.	Experience	As quoted by the PP	Continuous	Questionnaire	Records
5.	Knowledge regarding TB	Correct responses to 5 questions in the questionnaire is adequate knowledge (proforma)	Discrete	Questionnaire	Definition of knowledge
6.	Knowledge regarding RNTCP	4 or more correct responses out of 5 questions in the questionnaire is adequate knowledge ≤3 correct responses will be taken as inadequate knowledge (proforma)	Discrete	Questionnaire	Definition of knowledge
7.	Do you know the nearest DMC to your place of practice?	Area wise list of DMCs	Discrete	Questionnaire	List
8.	Accessibility of DMC	Distance more than 2.5 Km by road was taken as inaccessible while ≤2.5 Km was taken as accessible	Discrete	Questionnaire	Accessibility of DMC
9.	Fear of losing patients	If I send my patient to DMC for diagnosis, the patient will not come back to me	Discrete	Questionnaire	
10.	Unsatisfactory experience with respect to previous referral	I had sent my patient to DMC for diagnosis and the report was delayed/ inaccurate	Discrete	Questionnaire	
11.	Unsatisfactory faith in Govt health sector	I do not rely on Govt health schemes and policies	Discrete	Questionnaire	
12.	Previous effort by RNTCP staff to involve PP	Attended any sensitization meeting/ CME/ any visit by staff of RNTCP to the PP will be taken as effort done by RNTCP to involve PP	Discrete	Questionnaire	

Annexure 2 : Questionnaire Regarding Knowledge about TB and RNTCP

Questionnaire regarding Knowledge about TB: Correct response to following five questions was considered as adequate knowledge regarding tuberculosis:

Q 1 Mode of spread of TB is
a) Air borne b) Food borne c) Vector borne d) Fomite borne

Q 2 What is the most common symptom of Pulmonary TB?
a)Cough b)Fever c)Haemoptysis d) Loss of appetite/weight

Q 3 What is the most reliable and practicable tool for diagnosis of Pulmonary TB?
a) X-ray Chest b) Montoux test c) Sputum examination d) ESR

Q 4 Open case of TB refers to:
a) Pleural TB patient b) Sputum –ve TB patient c) Sputum +ve TB patient d) Lymph node TB patient with discharging sinus

Q 5 Who is a pulmonary TB suspect?
a) Patient having pain in chest for two weeks or more b) Patient having fever for two weeks or more
c) Patient having cough for two weeks or more d) Patient having suspected pleural effusion

Questionnaire regarding Knowledge about RNTCP: Correct response to following at least four out of following five questions was considered as adequate knowledge regarding RNTCP:

Q 1) Under RNTCP how many sputum samples are required for diagnosis?
a)1 b)2 c)3 d)4

Q 2)If the sputum samples of a pulmonary TB suspect are found to be negative on initial examination, then the next course of action should be:
a) An X-ray Chest immediately b) S end sputum for culture c) Put the patient on ATT based on symptoms and wait for improvement
d) Put the patient on general antibiotics and do sputum examination again after two weeks if cough does not improve

Q 3) What is the cost of diagnosis and treatment of TB for a patient under RNTCP?
a) Diagnosis is free but treatment is paid b) Diagnosis is paid but treatment is free c) Both are free d) Both are paid

Q 4) What is the frequency of treatment given under DOTS?
a) Once daily b) Biweekly c) Thrice weekly d) Once a week

Q 5) How many treatment categories are prescribed under DOTS?
a)1 b)2 c)3 d)4

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