

To investigate the knowledge, attitude and practices regarding tuberculosis case notification among public and private doctors practicing of modern medicine in South Delhi

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Abstract

In India, tuberculosis (TB) notification has been required since 2012. Notwithstanding, notification rates remain low. Non-reporting of tuberculosis cases not only results in an underestimation of cases, but also impedes the country's TB control strategy. Our research aims to assess practitioners' awareness, perception, and practice of tuberculosis case notification, as these factors can help reduce the TB burden. A cross-sectional study of 142 physicians was conducted between August 2018 and December 2019. Doctors were interviewed and given evaluation forms. Seventy-seven percent of the 142 physicians polled worked in medicine-related specialties, while 33% worked in surgery. Public sector physicians (64.7%) knew more about the Nikshay App than private practitioners (40.8%). Most public-sector doctors notified through their hospital's National Tuberculosis Elimination Programme (NTEP) centre. The majority of private practitioners (47.8%) notified cases directly through the hospital, the local District Tuberculosis Officer (DTO) or NTEP medical officer (24 percent), or the Nikshay portal (28%), whereas the majority of public sector doctors notified only through the hospital NTEP centre (85.9%). The primary reasons for non-notification are the high patient load on doctors, a lack of understanding about Nikshay App and its functioning, technological difficulties in using the Nikshay App, and the stigma associated with tuberculosis. The Nikshay App must be popularized as a notification mechanism through the NTEP program. To increase notification rates, practitioners must overcome the challenges they face. In terms of notification, more seminars and training, particularly hands-on training, should be held on a regular basis.

Introduction

Tuberculosis (TB) remains a major public health problem globally; it is the 13th leading cause of death worldwide and ranks 2nd among the leading infectious causes of death after COVID-19 in 2020 [1]. As per Annual TB Report India 2022, 2021 witnessed a 19% increase in TB patient's notification from the previous year with an incidence of 1.9 million as opposed to that of 1.6 million in 2020 [2], out of an estimated 10 million cases worldwide representing 23% of the global TB burden [3].

It is found that 40% of TB patients seek treatment from the private sector and around 80% of the TB patients consult a private

practitioner before approaching the public sector due to poor knowledge about the disease, services available, confidentiality and desire for personalized care [4]. TB became a notifiable disease in 2012 [5] with strict legal provisions that can be punishable under the section 269 and 270 of the Indian Penal Code (IPC) (45 of 1860) by the Government of India (GOI) regarding notification in March 2018 [6]; however, the notification rates remain low, where only 25% of the TB cases were notified by the private sector in 2018 [7]. Currently, TB notification remains to be low among the private sector in states like Karnataka, Tamil Nādu, Uttar Pradesh, Madhya Pradesh, Rajasthan Puducherry and West Bengal [3,8]. With the introduction of Nikshay, an electronic notification system in 2012, along with a greater awareness among the health care personnel and efforts from the government, the case notification rate is steadily increasing; still a vast number of cases from the private healthcare setups go unreported.

Therefore, the study aimed to assess the awareness, attitude and practices of TB case notification among public and private sector doctors practicing modern system of medicine in south Delhi.

Materials and Methods

Study setting

The study was conducted in various government hospitals and private clinics/hospitals in South Delhi after obtaining ethical approval from Institutional Research and Ethical Committee (Office letter no. NITRD/PGEC/2018/6620).

Study design and study population

This was a cross-sectional study. Doctors practicing modern system of medicine having a minimum of MBBS qualification and working in any of the government hospital, NGO's and private clinic/hospital in South Delhi who has treated any TB case in the past with or without notifying the case were included in this study. Doctors not willing to participate in the study and doctors practicing outside Delhi were excluded from the study. The doctors who were not available for interview even after 3 visit attempts were also excluded.

Study sample and data collection

This was a time bound study done between August 2018 to December 2019. An appointment was sought over phone as per the doctor's convenience and a direct visit was made to the hospital/clinic. Among 169 doctors, 146 agreed to participate in the study and 23 refused. However, even after three visits 4 doctors could not be interviewed. Thus, 142 doctors were interviewed. The doctors were interviewed individually at their place of work in hospital/clinics and data was collected using a pre-tested structured questionnaire. The doctors were not briefed anything about Nikshay before the interview. Data regarding the background information of the participants, awareness, attitude and practices of TB case notification, including utilization of Nikshay was collected.

Data entry and statistical analysis

The collected data were transformed into variables, coded, and entered in Microsoft Excel. The data were analysed and statistically evaluated using SPSS (Statistical Package for Social Studies) Windows version 23.0. Quantitative data were expressed in mean and standard deviation while qualitative data were expressed in percentage. The differences between the proportions were tested

using Chi-square test and Fisher's exact test. A p-value less than 0.05 was considered statistically significant.

Results

A total of 169 doctors were interviewed. Among them, after applying the inclusion and exclusion criteria, the results of interview of 142 doctors were taken for further evaluation. Among these 142 doctors, 71 each were from the private and government healthcare institutions.

Baseline characteristics

Among the study participants, 110 (77.5%) were males and most were in the age band of 24-30 years (85, 59.8%). Among them 76.7% were from medicine and related specialities while 33.3% were from surgical specialities. Most had started their practice in the last 5 years, with an experience of 0-5 years (89, 62.7%), while 24.6% interviewed doctors had been practicing for 6-10 Yrs. 6.3% each had been practicing for 11-20 years and more than 20 years. Most doctors (78, 54.9%) have been providing services to more than 40 patients per day, and 115 (81%) had seen less than 10 presumptive or confirmed tuberculosis cases in the last 2 months. Baseline characteristics of the study participants is shown in Table 1.

Awareness

Most of the doctors, (68, 95.8% each) from both the government and private sector knew that tuberculosis is a notifiable disease and this notification is compulsory. Knowledge regarding imprisonment was more among private practitioners 38 (53.5%) compared to public/government sector doctors 25 (35.2%), this difference was statistically significant ($p=0.028$). Knowledge regarding Nikshay was relatively more among government doctors 65 (91.5%) compared to private practitioners 43 (60.6%) ($p=0.001$) semi colon government doctors had better idea regarding Nikshay working on unique code generated to the patient 51 (71.8%) compared to private practitioners 36 (50.7%) which was again statistically significant ($p=0.009$). Government doctors knew

Table 1. Basic information of the study participants.

Variable	Subgroup	n (%)
Age	<30	85 (59.8%)
	31-40	43 (30.3%)
	>40	14 (9.8%)
Gender	Male	110 (77.46%)
	Female	32 (22.54%)
Practice	Government/public	71 (50%)
	Private	71 (50%)
Specialization	Medical	109 (76.76%)
	Surgical	33 (23.24%)
Years of practice	0-5	89 (62.67%)
	6-10	35 (24.64%)
	11-20	09 (6.33%)
	>20	09 (6.33%)
Number of patients attending per day	<40	64
	>40	78
Number of tuberculosis confirmed cases seen in last 2 months	<10	115
	>10	27

that Nikshay is a web-based portal 46 (64.7%) compared to private practitioners 29 (40.8%) ($p=0.004$) (Figure 1). Awareness regarding TB notification is shown in Table 2.

Attitude regarding notification

Both government and private doctors had similar attitude regarding notification, requirement of training and better utilization of Nikshay services. However, 27 (38%) of government doctors as compared to 6 (8.5%) of private setup doctors felt that Nikshay is not a good approach ($p<0.001$). Attitude regarding TB notification is shown in Figure 2.

Practice

All the private doctors responded that all the TB cases would be notified either via Nikshay 20 (28.2%), via local DTO/NTEP 17 (24%), or the hospital notifies 34 (47.8%), whereas 10 (14.1%) government doctors never notified any cases and dedicated NTEP centre of the hospital would notify the cases among the rest 61 (85.9%). Regarding the timing of notification, approximately the private doctors would notify on diagnosis 33 (46.5%), and the rest 34 (47.9%) had no idea as the hospital would notify the cases, whereas all the government doctors who notify the cases 61 (85.9%) commented that the cases will be notified at diagnosis. Practices regarding TB notification is shown in Table 3.

Issues with notification

The most common reasons behind low notification were lack of proper knowledge, high patient load and stigma, while other reasons were lack of simplified mechanism, and fear of losing patients. 47.9% and 38% of the doctors of private and government setup respectively felt that lack of proper knowledge of NIKSHAY

was a hindrance to case notification ($p=0.235$). 45.1% of government doctors felt that high patient load in government hospitals was an important hurdle to notification as compared to 2.8% of private setup doctors who felt the same ($p<0.001$); 29.6% of private practitioners felt that stigma of tuberculosis on part of both the patients and the doctors is a barrier to notification while only 1.4% of the government setup doctors felt the same ($p<0.001$). 9.85% of the private practitioners also had the fear of losing patients, so they were not notifying the cases (Table 3).

Updating themselves about the notification

Journals and study materials were the most common source of updating knowledge among private practitioners (56.3%) while 38% of government setup doctors updated themselves using this method ($p=0.028$). 52.1% of the government setup doctors responded that they updated themselves via seminars while 32.4% of the private doctors used the same ($p=0.017$). Other methods employed for updating were textbooks and obtaining information from colleagues or hospital staff (Table 3).

Discussion

It has been reported that a substantial number of TB cases in India are not notified. The targeted elimination of TB in India by 2025 necessitates better case notification to know the real magnitude of tuberculosis to develop more suitable programs and guidelines. The programme Nikshay was launched in 2012 by the government of India to create a database of all TB cases, better case notification, systematic management of tuberculosis and it also

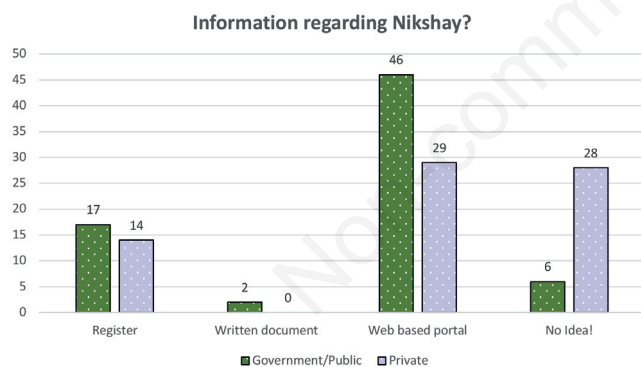


Figure 1. Information regarding 'What is Nikshay?'

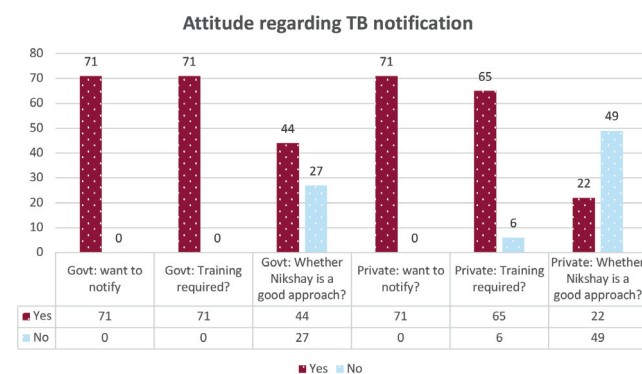


Figure 2. Attitude regarding tuberculosis notification among the doctors.

Table 2. Awareness regarding tuberculosis notification among the doctors.

Variable	Private sector, n (%)		Government sector, n (%)		p-value
	Yes	No	Yes	No	
Is tuberculosis a notifiable disease?	68 (95.8%)	03 (4.2%)	68 (95.8%)	03 (4.2%)	1.0
Is a tuberculosis notification mandatory?	68 (95.8%)	03 (4.2%)	68 (95.8%)	03 (4.2%)	1.0
Knowledge about provision of imprisonment if not notified	38 (53.5%)	33 (46.5%)	25 (35.2%)	46 (64.8%)	0.028*
Knowledge about Nikshay	43 (60.6%)	28 (39.4%)	65 (91.5%)	06 (8.5%)	<0.001*
Does Nikshay work on a unique code?	36 (50.7%)	35 (49.3%)	51 (71.8%)	20 (28.2%)	0.009*

* $p<0.05$.

improved Direct Benefit Transfer (DBT). Nikshay is available for private and public practitioners alike. This study was done to assess the awareness, attitude and practices of TB case notification among public and private sector doctors practicing modern system of medicine.

Of the 142 doctors who were finally enrolled for the study, majority (95.8%) knew that tuberculosis is a notifiable disease and its notification is mandatory. This is similar to the finding of a study done at Alappuzha district of Kerala by Philip *et al.* in the year 2015 [9], Thomas *et al.* done at Chennai in the year 2016 [10] and Surup *et al.* from Karnataka in 2019 [7].

The current study showed that doctors from public sector were more aware about Nikshay and its working based on unique code generated for the patient as opposed to private practitioners. This was in discordance with study done by Surup *et al.* [7] and Chadha *et al.* [11] where only 21.7% and 18% of private practitioners were aware of Nikshay respectively, this may be because our study was done in a metro city.

In comparison with public sector doctors, private practitioners (PP) were more knowledgeable about imprisonment, possibly because they face more medico-legal problems. Doctor in both the sector were strongly supporting the need of training programmes for better utilization of Nikshay similar to study done by Chadha *et al.* [11]. Twenty-three percentage of the doctors enrolled in the study felt that Nikshay is not good approach, among whom the majority were public sector doctors. Previous study by Surup *et al.* [7] and Bharaswadkar *et al.* [12] found that while the training programme did increase the knowledge, they were inadequate in increasing the utilization of Nikshay.

Common modes utilized for notification among private sector doctors were directly notifying the cases through hospital, or either via local DTO or NTEP medical officer, and *via* Nikshay portal while majority of public sector doctors notified only *via* hospital NTEP centre. In a study done by Sahasrabudhe *et al.* in Pune among PP, cases were notified either via paper, web portal, and a combination of web and mobile app, paper and mobile app, and paper and

web. In their study they also found that the convenient mode for TB notification were paper, followed by mobile app [13]. Public sector doctors were notifying the cases at diagnosis as all the cases were notified by the local NTEP programme officer, before initiation of treatment. Private sector doctors who notified either via Nikshay or local NTEP/DTO were either notifying at diagnosis or as per their convenient time, and those whose hospital was notifying the cases had no idea about the time of notification.

The common hindrance to notification of tuberculosis were lack of proper knowledge, high patient load and stigma associated with TB along with other reasons like lack of a simplified notification system and fear of losing patients. Study done by Surup *et al.* in Udipi among private practitioners identified TB being a challenge to treat, patient lost to follow-up or stigma, complicated notification system (Nikshay), lack of trust and acknowledgement from the government as barrier to TB notification [7]. Philip *et al.*, in their study done at Kerala, reported that obstacles to notification were provider misconception regarding notification, distrust in DOTS, concerns regarding patient confidentiality, discrimination and lack of coordination between private and public sectors [9]. Similarly, Thomas *et al.* in Chennai found time constraints, patient confidentiality, and fear of offending patients as factors limiting TB notification [10]. This was similar to the finding of the study by Chadha *et al.* done among private practitioners in Mysore [11]. The perceived barriers to TB notification as per Reema Arora *et al.* in their study in Delhi were lack of awareness about the portal and the notification programme, issues with the address, and complicated portal [14].

Recently, TB notifications fell by 21% in 2020 compared to 2019 due to COVID-19 pandemic all over the world. TB case notification plummeted to below 84,000 in April 2020 and 92,000 in March 2021 due to several lockdowns and restrictions throughout India [15]. Similarly, in a study by Rebecca *et al.* in Malawi found a drastic reduction in TB notifications by 35.9% during the pandemic [16]. In order to improve notifications, additional methods such as integrated TB and COVID-19 screening, testing algo-

Table 3. Practices regarding tuberculosis notification among the doctors.

Variable	Private sector, n (%)	Government sector, n (%)	p-value
How do they notify?			
1. Nikshay	20 (28.2%)	00	<0.001*
2. <i>Via</i> local DTO/NTEP	17 (24%)	61 (85.9%)	<0.001*
3. Concerned hospital notifies	34 (47.8%)	00	<0.001*
4. Don't notify	00	10 (14.1%)	0.001*
How soon do they notify?			
1. At diagnosis	33 (46.5%)	61 (85.9%)	<0.001*
2. Whenever they find time	04 (5.6%)	00	0.112
3. Do not know, the hospital notifies!	34 (47.9%)	00	<0.001*
Issues with notification			
1. Lack of proper knowledge	34 (47.9%)	27 (38%)	0.235
2. High patient load	02 (2.8%)	32 (45.1%)	<0.001*
3. Lack of simplified mechanism	06 (8.45%)	10 (14.1%)	0.288
4. Stigma	21 (29.6%)	01 (1.4%)	<0.001*
5. Fear of losing patients	07 (9.85%)	01 (1.4%)	0.063
6. Can not say	01 (1.4%)	00	1
How do they update themselves?			
1. Textbooks	03 (4.2%)	07 (9.9%)	0.189
2. Journals/study material	40 (56.3%)	27 (38%)	0.028*
3. Seminar	23 (32.4%)	37 (52.1%)	0.017*
4. Colleagues	05 (7%)	00	0.058

*p<0.05.

gorithms, or combined contact investigation strategies, improved digital notification system can be advocated.

Frequent activities regarding case notification are being taken up in private sectors like Joint Effort for Elimination of Tuberculosis (JEET) project. Government has also made non-notification of TB cases, a punishable offence which invites penalty up to the extent of imprisonment still a sizeable number of TB cases in India are not notified. The major reasons for non-notification are high patient burden on the doctors, poor knowledge about Nikshay and its working, technical difficulties in using Nikshay app, stigma associated with TB. Most seminars related to tuberculosis are commonly held in government institutions, thus more public sector doctors get benefit of that compared to private practitioners.

Our study has some limitations: This study was carried out only at South Delhi so cannot be replicated to India as a whole. Data collection was done during post-graduation period. Due to limited time available after clinical and academic responsibilities, the number of doctors approached were less. Doctors practicing only modern system of medicine were interviewed.

To conclude, TB notification has been made compulsory by the Government of India, this helps not only in the assessment of actual burden of this deadly and disabling disease but also in planning and resource allocation for better control of TB. In order to improve the notification, frequent activities like broadcasting in local media, public places, school, and patient support groups can help eliminate the stigma associated with TB among general population and improve health care utilization. Better outreach programmes, timely Continued Medical Education (CME) activities, user friendly notification portal, and prompt incentives on notification can improve the notification rates and in the long run, can help us reach the goal of TB elimination by 2025.

References

1. World Health Organization. Tuberculosis. Cited 2022 Jul 6. Available from: <https://www.who.int/news-room/fact-sheets/detail/tuberculosis>
2. Central TB Division, Ministry of Health & Family Welfare, Government of India. India TB Report 2022. Cited 2022 Jul 6. Available from: <https://tbcindia.gov.in/index1.php?lang=1&level=1&sublinkid=5613&lid=3658>
3. Tbfacts.org [Internet]. TB Statistics India. Cited 2022 Jul 6. Available from: <https://tbfacts.org/tb-statistics-india/>
4. Satyanarayana S, Nair SA, Chadha SS, 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:e24160.
5. Bhaumik S, Biswas T. India makes tuberculosis a notifiable disease. *CMAJ* 2012;184:E519.
6. Government of India, The Gazette of India. Mandatory TB Notification. 2018. Cited 2022 Jul 20. [in Hindi]. Available from: <https://tbcindia.gov.in/WriteReadData/1892s/2071378125Gazette%20on%20Mandatory%20TB%20Notification.pdf>
7. Dey S, Rao AP, Kumar A, Narayanan P. Awareness & utilization of NIKSHAY and perceived barriers for tuberculosis case notification among the private practitioners in Udipi district, Karnataka. *Indian J Tuberc* 2020;67:15–9.
8. Ni-kshay Reports [Internet]. Dashbard. Cited 2022 Jul 6. Available from: <https://reports.nikshay.in/Reports/TBNotification>
9. Philip S, Isaakidis P, Sagili KD, et al. “They know, they agree, but they don’t do”- The paradox of tuberculosis case notification by private practitioners in Alappuzha District, Kerala, India. *PLoS One* 2015;10:e0123286.
10. Thomas BE, Velayutham B, Thiruvengadam K, et al. Perceptions of private medical practitioners on tuberculosis notification: A Study from Chennai, South India. *PLoS One* 2016;11:e0147579.
11. Singh Chadha S, Burugina Nagaraja S, Trivedi A, et al. Mandatory TB notification in Mysore city, India: Have we heard the private practitioner’s plea? *BMC Health Serv Res* 2017;17:1.
12. Bharaswadkar S, Kanchar A, Thakur N, et al. Tuberculosis management practices of private practitioners in Pune municipal corporation, India. *PLoS One* 2014;9:e97993.
13. Sahasrabudhe T, Barthwal M, Sawant T, et al. Tuberculosis notification: An inquiry among private practitioners in Pimpri-Chinchwad municipal corporation area of Maharashtra, India. *Indian J Tuberc* 2022;69:73–8.
14. Arora R, Khanna A, Sharma N, et al. Early implementation challenges in electronic referral and feedback mechanism for patients with tuberculosis using Nikshay – A mixed-methods study from a medical college TB referral unit of Delhi, India. *J Family Med Prim Care* 2021;10:1678.
15. Aggarwal AN, Agarwal R, Dhooria S, et al. Impact of Covid-19 pandemic on tuberculosis notifications in India. *Lung India* 2022;39:89.
16. Soko RN, Burke RM, Feasey HRA, et al. Effects of coronavirus disease pandemic on tuberculosis notifications, Malawi. *Emerg Infect Dis* 2021;27:1831-9.