Competencies of Indian Medical Graduates in delivering Effective Tuberculosis care: A mixed method study among doctors at Chennai, India

Sree Tirukkovalluri Sucharitha¹, Aravind Manoharan², Ezhilarasan Suganya³, Sivaram Mahendran Balaji⁴

³Associate Professor, Department of Community Medicine, Sri Venkateshwara Medical College Hospital and Research Centre, Puducherry, India

⁴Assistant Professor, Department of Community Medicine, Thanjavur medical college, Thanjavur, Tamil Nadu, India **Correspondence :** Dr. Aravind Manoharan, E-mail: m_aravind86@yahoo.co.in

Abstract:

Introduction: In spite of the various advances in the Tuberculosis (TB) management system in our country, we are still struggling to achieve the End TB strategy. Addressing the health provider difficulties in TB care will definitely be potential tool to control TB. **Objective:** To assess the competency, challenges and solutions of Indian medical graduates to provide effective Tuberculosis care. Method: It is a mixed methodological study conducted among the Bachelor of Medicine and Bachelor of Surgery (MBBS) graduates practising in various parts of Chennai, Tamil Nadu, India. The competency of the Indian medical graduates in delivering TB care was assessed using a content validated e-survey questionnaire disseminated through social media affinity groups and free listing; pile sorting and in-depth interview was done in the qualitative part. **Results:**The proportion of participants having good, fair and poor competency in providing effective TB care was 35%,19% and 46%, respectively. Various challenges in attaining good competency were enlisted by the participants through free listing, a smaller number of TB patients in private medical college has attained the highest Smith S value followed by other eleven challenges. Based on the pile sorting and indepth interview various solutions have been suggested, with most of them emphasizing on compulsory TB chest clinic posting followed by others measures. **Conclusion:** The major reason identified in difficulties in delivering TB care was inadequate exposure in managing TB patients, incomplete knowledge on notification, referral and followup system. These lacunae can be overturned by compulsory posting in TB clinics during internship period, provision of required personal protective equipment (PPE) for doctors and patients in TB wards and outpatient department, mandatory teaching on updates of TB management.

Key Words: Competency, Medical graduates, Tuberculosis

Introduction

Global Tuberculosis Report (2018) places India among the lead contributors for Tuberculosis (TB).^[1]To achieve the strategy of End TB by 2025, the expansion of quality care services involving multiple sectors, strengthening of health systems in government settings, involving private sector in case notification and incentivizing the follow-up of TB clients and adopting innovating policies and

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Sucharitha T, Manoharan A, Suganya E, Balaji S Competencies of Indian Medical Graduates in delivering Effective Tuberculosis care: A mixed
	DOI : 10.51957/Healthline_459_2023	method study among doctors at Chennai, India. Healthline. 2023; 14(1): 23-31

¹Professor, Department of Community Medicine,Annaii Medical college and Hospital,Pennalur,Sriperumbudur, Tamil Nadu, India, ²Associate Professor, Department of Community Medicine, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education, Kelambakkam, Tamil Nadu, India,

interventions is deemed essential and reflected in the Revised National Tuberculosis Control Program (RNCTP) which is now renamed as National Tuberculosis Elimination Programme (NTEP).^[2] There is advancement even in diagnostic modality for sputum smear negative patients in the form of Cartridge based nucleic acid amplification test(CBNAAT) which can aid in early diagnosis and medication.^[3] In spite of these advances, challenges remain to achieve TB elimination.

Training curriculum of Indian medical graduates (IMG) as per National Medical Commission (NMC) envisages to equip the medical undergraduates with knowledge, attitudes, skill sets and competencies to adequately address the challenges in tackling with TB. Studies found that current teaching curriculum with class-room and bed-side clinical teaching based on a case study or real patient and performing acidfast bacilli staining in practical curriculum is inadequate to equip the medical graduates to perform the roles as expected in the NTEP program.^[4,5] Innovative curriculums such as Program-Based Teaching on TB control have been pilot tested and revealed the potential for such novel inclusions in the teaching curriculum for medical undergraduates.^[6] Addressing the Health provider difficulties in TB care will definitely be potential tool to control TB. Thus, with the above back ground the study was conducted with the objectives to assess the competency level of the medical graduates in delivering tuberculosis care, to identify the perceived challenges in delivering effective tuberculosis care and to derive perceived solutions to address the challenges enlisted in providing effective tuberculosis care.

Method:

This is a mixed methodology study where the quantitative method is observational cross-sectional study and qualitative method includes free listing, pile sorting and in-depth interview. The study population includes qualified MBBS graduated

doctors practising in government and private health sector, Chennai, Tamil Nadu, India. Doctors, who generally do not prescribe or provide TB treatment as they work under senior doctors, were excluded from the study. For quantitative methodology, the sample size was 200 which was obtained by using the formula $4pq/d^2$ where, prevalence (p)=85% (q)=15% (d)=6,minimum required sample was arrived at 142.^[5]Considering non-response rate of 20%, the sample size came as 160, however a higher sample size of 200 was considered. For qualitative methodology, face to face and telephonic in depth interviews were conducted. Sample size of 24 was found to be adequate as no new information was obtained after 17th sample information. Ethical approval was obtained from Institutional Ethics Committee before conducting the study.

Snow ball sampling method was used for quantitative method, in which the competency of the Indian medical graduates in delivering TB care was assessed using a content validated e-survey questionnaire disseminated through social media affinity groups like whatsapp, mails; purposive sampling technique among sub-group of the study population to identify the perceived challenges and solutions in providing effective tuberculosis care. The study was conducted for the period of three months from January to March 2020.

Content validated questionnaire, which in addition to socio-demographic variables contained questions and statements on i) Knowledge on National Tuberculosis Elimination Program (NTEP) guidelines for diagnosis and treatment of TB ii) Attitude of the participants towards TB care iii) Practices on TB management iv) Self-rated competencies in provision of comprehensive TB care at primary level such as epidemiology, transmission, pathogenesis, natural history, risk factors, symptoms, co infection with Human immunodeficiency virus (HIV), anti-tubercular drug (indication, contraindication and interactions), drug resistance and communication to patients family. The maximum score is calculated to be 40,the participants were classified based on their score obtained as good (>30), fair (20-30) and poor (<20). Data were entered in MS Excel and frequency and percentage were calculated. Chi square test was used to find the significance on association of competency level with undergraduate education sector. Free listing was done to list out perceived challenges in delivering effective TB care and salience was derived

using a salience score (Smith's *S*). Smith's S score is the importance or representativeness of items to individuals or to the group which is measured by word frequency across lists, word rank within lists or by combining both. ^[7] Pile sorting was done to group the challenges interlinked (Cluster analysis done). Indepth interview was conducted to derive solutions in which transcript; coding and inductive analysis was done.

Methodology used in finding competencies of Indian Medical Graduates in delivering effective TB care:



Results:

The study was conducted among 200 Indian medical graduates whose mean age was 30.5 ± 8 years and nearly two-third of them were males and most of them graduated and working in private health institutions. (Table 1)

Nearly half (46%) of the participants had poor competency in delivering TB care followed by 35% of them having good and 19% of them having average competency.(Figure 1)

The Indian medical graduates who have completed their under graduation (UG) in government medical college had better competency in delivering TB care than those from private medical college background and it is found to be statistically significant with the chi square value of 18.9 and p value <0.05 (Table 2)

The major perceived challenge to obtain good competency to provide effective TB care was having less number of TB patients in private medical colleges, having maximum salience value followed by the other enlisted challenges. The perceived challenges in delivering effective TB care are arranged in descending order of Smith's S value. (Table 3)(Figure 2)

Р	arameters	Frequency (%)		
Gender				
Ν	ſale	134 (67%)		
Female		66 (33%)		
Age in years (mean ±	SD) = 30.5 ± 8 years			
Agegroups				
<	25 years	10 (5%)		
2	6 – 30 years	84 (42%)		
3	1 – 35 years	69 (34.5%)		
3	6 – 40 years	24 (12%)		
>	40 years	13 (6.5%)		
Working in				
Р	rivate sector	112 (56%)		
G	overnment sector	88 (44%)		
Qualified Undergraduate from				
Р	rivate institute	120 (60%)		
G	overnment institute	80 (40%)		
Socio-economic class [*]				
C	lass I	153 (76.5%)		
C	lass II	47 (23.5%)		

Table 1 : Socio-demographic profile of study participants (n=200)

^{*} Modified BG Prasad classification





Indian Medical graduates completed their UG in	Competency in delivering TB care			Total (%)	p value* (Significance)
	Good (%)	Fair (%)	Poor (%)		
Private Institute	28 (23.33%)	16 (13.33%)	76 (63.34%)	120 (100%)	1.01
Government	44 (55%)	20 (25%)	16 (20%)	80 (100%)	
institute					

Table 2 : Association of Competency level with Undergraduate Education Sector (n=200)

*Chi square test

It was observed that perceived challenges such as less number of TB patients in private medical college, less exposure to TB patient due to less number of posting days in UG period and stigma creates a barrier to involve family members were piled in the same group indicating perceived relationships on these challenges for having competency in delivering effective TB care. In the same manner two other groups were piled. (Figure 2) The most commonly perceived solution to improve effective TB care was providing compulsory posting in TB clinics and wards, regular training on NTEP updates. With respect to the challenges related to treatment protocols the perceived solutions attributed were to attend sessions on newer updates and get certification. The pile groups and their respective perceived solutions are listed in Table 4.

Sr.	Perceived Challenges for having Good competency	Frequency	Average	Smith's S Value
No	to deliver effective Tuberculosis care		Rank	
1	Less number of TB patients in	100	3	0.594
	private medical college			
2	Nursing staff take care of referral procedure	75	2	0.563
	to government hence less idea on it			
3	Procedure of TB notification is unclear	50	1	0.5
4	Communication between Private	50	3	0.25
	and Government sector is low			
5	Less exposure to TB patient, due to less	50	4	0.267
	number of posting days in UG period			
6	Patient have low confidence of Government treatment	50	5.5	0.161
7	Cost of medicine in Private health setup is high	50	2	0.422
8	Thrice weekly to Fixed Dose Combination (FDC)	25	7	0.083
	regimen makes it difficult for doctors to follow			
9	Stigma creates a barrier to involve family members	25	9	0.028
10	Daily drug regimen makes patient depressive	25	8	0.056
	to take medicine daily			
11	No updates on changes in DOTS regimen	25	5	0.139
12	Fear on getting TB to the doctors during the	25	2	0.188
	management of patient			

Table 3 : Perceived Challenges in delivering effective Tuberculosis care (n=200)

Figure 2: Pile sorting on Perceived relationship on various challenges for having Good competency in delivering effective TB care (n=200)*



*The numbers mentioned in the figure corresponds to the Sr.No and respective list of challenges mentioned in the Table 3

Sr. No.	Pile group	Perceived Solutions
1	 Less number of TB patients in private medical college Less exposure to TB patient, due to less number of posting days in UG period Stigma creates a barrier to involve family members Fear on getting TB to the doctors during management of patient 	Compulsory TB posting, minimum of 2 weeks in Regional chest clinic or Government Hospitals during the Internship period Consistent awareness campaign on the fact that TB is a curable disease on effective treatment Provision of masks and other personal protective measures for the doctors
2	 Thrice weekly to FDC regimen makes it difficult for doctors to follow Daily drug regimen makes patient depressive to take medicine daily No updates on changes in DOTS regimen 	Doctors should regularly get equipped with the NTEP updates, webinar should be made available for free and it should be made mandatory for doctors to get certified every time there is a change in treatment guidelines Patient should be educated on the benefits of FDC in aspects of drug adherence and added health benefits
3	 Nursing staff take care of referral procedure to government hence less idea on it Procedure of TB notification is unclear Communication between Private and Government sector is low Patient have low confidence of Government treatment Cost of medicine in Private health setup is high 	Referral procedure should be made by the intern and follow up of the patient has to be submitted at the end of the clinical posting TB notification method has to be explained clearly by organizing a regional CME , especially targeting the Private doctors Cured TB patient should be involved in Community participation to speak about the effectiveness of Government medicine and the health facility

Table 4: Perceived Solutions in overcoming the Challenges in achieving good competency to deliver effective TB care (N=24)

Discussion

Tuberculosis remains a significant public health problem in India and a competent workforce including adequately trained medical care providers remain essential in delivering comprehensive care at primary level.

Current undergraduate MBBS curriculum for tuberculosis is based on NTEP as mandated by National Medical Commission (NMC), however multiple studies cited poor compliance of the guidelines by the physicians and poor awareness among undergraduates to the guidelines mentioned in NTEP which was evident in this study with poor competency in 46% of study participants.^[8-10]Lack of knowledge on the case definitions for tuberculosis and misconceptions about treatment regimens and protocols was reported in a study among medical undergraduates and interns of a government medical college in South India which was in line with the finding in this study where the study participants are medical graduates.^[8] It is observed from this study that there is a knowledge and practice gap with respect to treatment, notification and referral services among the study participants which is comparable to the results of the study among private practitioners in West Bengal.^[10]

Patient-centred model of care defined as "providing care that is respectful of and responsive to, individual patient preferences, needs and values, and ensuring that patient values guide all clinical decisions" is included as part of the End TB strategy.^[11] Provision of patient-centred care in the context of TB incorporates treatment adherence interventions such as patient education and communication in complementing the treatment prescription practices by medical professionals.^[12] This requires reorienting training methodologies to provide communication skills training for patient care for medical undergraduates.Attitude, Ethics and Communication (AETCOM) module implemented by MCI (2015) introduced objective training on those three components. It has to be strengthened and expanded to focus on high burden diseases such as TB.^[13]

Authors assessed the risk-perception of tuberculosis among the study participants which was found to be high among interns. It is well documented that health care providers in India are at an increased risk of TB diseases including drug resistant forms of TB (DR-TB) due to occupational exposure in care settings with poor hospital infection control practices.^[14-18] In a study from a public tertiary setting from India, Pardeshi et al reported that most medical residents perceive tuberculosis as occupational hazard and 51% are fearsome thus avoiding TB patients though feeling compassionate to care for them.^[19] It is to be observed that fear of getting TB during case management was one of the perceived challenge noted in this study which was comparable to the above mentioned studies. Standard operating procedure guidelines for clinical and diagnostic procedures related to clinical care in TB wards, designating intensive care units (ICU), TB laboratories as high risk areas and periodic, repeated trainings of care providers is highly recommended to enable overcome this fear.^[20] One of the important perceived challenge inferred in this study was that stigma creates a barrier to involve family members.

This has to be addressed since it was found reported by Neha Taneja et al that home-based care in MDR TB treatment good scope of improving treatment outcomes of patient.^[21]

Research has been identified as an avenue to improve training exposure on TB disease through qualitative inputs from the study participants. In his editorial, Mohan A highlighted the importance of Operational Research in assessing the NTEP program wherein the medical colleges served the significant role of a research agency in evaluating the strengths and gaps and leading to programmatic reforms related to patient treatment protocols, duration of treatment etc.^[22] Research potential of medical colleges can be enabled by building capacities of the faculties in research conduction with robust and ethics approved pre-registered protocols in timely manner to promote TB related research in medical colleges.^[23]

Conclusion:

The overall competency of the Indian medical graduates in providing effective TB care demands a definitive improvement. The competency level of the medical practitioners who were educated in private medical college was less compared to those trained at government medical college.On reasoning out the difficulties in delivering effective TB care, the major reason identified was inadequate exposure in managing TB patients, incomplete knowledge on notification,referral and followup system.Though the present medical curriculum has appreciable guidelines to equip the medical undergraduates, emphasis on compulsory posting of the medical interns in TB clinic will provide a comprehensive exposure.

Recommendations:

The major recommendation based on the present study findings are compulsory posting in TB clinics during internship period, provision of required personal protective equipment (PPE) for doctors and patients in TB wards and outpatient department, mandatory teaching on updates of TB management, maintenance of log book on TB patient follow-up care by each intern during their respective clinical postings. These measures can definitely contribute to achieve End TB strategy goals.

Limitation of the study:

The study is conducted among doctors in Chennai alone.Includi ng study participants from wide geographic distribution may add up some of valuable inputs to improvise the existing TB care.

Declaration:

Funding: Nil.

Conflicts of interest : Nil

References:

- 1. Global Tuberculosis Report. Available from: https://www.who.int/teams/global-tuberculosisprogramme/tb-reports[cited 24 August 2021].
- 2. Central TB Division. Government of India. Available from: http://www.tbcindia.gov.in/[cited 24 August 2021].
- Vijay DD, Meharaj SHS, Jayanthi S, et al. A Comparison Study of CBNAAT, Gene Xpert and Line Probe Assays in the Diagnosis of Tuberculosis in smear Negative Specimens. J Pure ApplMicrobiol. 2022;16(3):1953-1963. DOI: 10.22207/JPAM.16.3.42
- Purty AJ. Detect-treat-prevent-build: Strategy for TB elimination in India by 2025. Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine. 2018 Jan;43(1):1. DOI: <u>10.4103/ijcm.IJCM_321_17</u>
- Gupta R, Malhotra A, Malhotra P. Assessment of rational prescribing practice among interns: a questionnaire based observational study. Int J Res Med Sci. 2018 Aug;6:2808-12. DOI: <u>10.18203/2320-6012.ijrms20183274</u>
- Mangayarkarasi V, Kalaiselvi K, Kavitha D, Chitraleka V, Balaji R. Program-based teaching and learning to increase competency in undergraduate medical students using a model of the revised national tuberculosis control program. Journal of microbiology & biology education. 2019 Apr 26;20(1):50. DOI: https://doi.org/10.1128/jmbe.v20i1.1649
- Dongre Amol, Deshmukh Pradeep. "Practical Guide: Qualitative Methods in Health and Educational Research"Chennai, Tamil Nadu: Notion Press Media Pvt Ltd 2021. Notion Press Media Pvt Ltd. 2021. p. 70–75.
- Revathi R, Dharanisri R. Knowledge about tuberculosis among undergraduate medical students in a private college in Chennai. Int J Community Med Public Health 2018;5:644-6. DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20180243
- Chennaveerappa PK, Rajashekar HK, Nagaral J, Halesha BR, Raghavendra PK, Vinaykumar MV, Nareshkumar MN. A study on awareness of tuberculosis and RNTCP among undergraduate medical students and interns. Journal of Evolution of Medical and Dental Sciences. 2014 Jul 21;3(29):8115-22. DOI: 10.14260/jemds/2014/3021
- Manoharan A, Chellaiyan VG, Jasmine M, Liaquathali F. Impact of educational intervention on the tuberculosis knowledge among the medical students, Chennai. Int J Community Med Public Health 2019;6:5317-20. DOI: http:// dx.doi.org/ 10.18203/2394-6040.ijcmph20195491

- Uplekar M, Weil D, Lonnroth K, Jaramillo E, Lienhardt C, Dias HM, Falzon D, Floyd K, Gargioni G, Getahun H, Gilpin C. WHO's new end TB strategy. The Lancet. 2015 May 2;385(9979): 1799-801. DOI:<u>https://doi.org/10.1016/_S0140-6736(15)60570-0</u>
- 12. Tuberculosis (TB). World Health Organization. 2021 Available from: https://www.who.int/tb/en/[cited 5September 2020].
- 13. National Medical commission. nmc.org.in. Available from: https://www.nmc.org.in/wp-content/uploads/2020/01/UG-Curriculum-Vol-II.pdf[cited 1 February 2021].
- 14. Joshi R, Reingold AL, Menzies D, Pai M. Tuberculosis among health-care workers in low-and middle-income countries: a systematic review. PLoS medicine. 2006 Dec;3(12):e494. https://doi.org/10.1371/journal.pmed.0030494
- 15. Christopher D, Daley P, Armstrong L, James P, Gupta R, Premkumar B et al. Tuberculosis Infection among Young Nursing Trainees in South India. PLoS ONE. 2010;5(4):e10408.DOI: <u>https://doi.org/10.1371/journal.pone.0010408</u>
- Singla N, Singla R, Jain G, Habib L, Behera D. Tuberculosis among household contacts of multidrug-resistant tuberculosis patients in Delhi, India. The International journal of tuberculosis and lung disease. 2011 Oct 1;15(10):1326-30.DOI: <u>https://doi.org/10.5588/ijtld.10.0564</u>
- 17. Pai M, Gokhale K, Joshi R, Dogra S, Kalantri S, Mendiratta DKet al. Mycobacterium tuberculosis infection in health care workers in rural India: comparison of a whole-blood interferon γ assay with tuberculin skin testing. Jama. 2005 Jun 8;293(22):2746-55.DOI:10.1001/jama.293.22.2746
- 18. Pai M, Joshi R, Dogra S, Mendiratta DK, Narang P, Kalantri S et al. Serial testing of health care workers for tuberculosis using interferon-γ assay. American journal of respiratory and critical c a r e m e d i c i n e. 2006 A u g 1; 174(3): 349 -55.DOI:<u>https://doi.org/10.1164/rccm.200604-4720C</u>
- Pardeshi GS, Kadam D, Chandanwale A, Bollinger R, Deluca A. Resident doctors' attitudes toward tuberculosis patients. Indian Journal of Tuberculosis. 2017 Apr 1;64(2):89-92.DOI:<u>https://doi.org/10.1016/j.ijtb.2016.11.001</u>
- 20. Pardeshi GS, Kadam D, Chandanwale A, Deluca A, Khobragade P, Parande M, Suryavanshi N, Kinikar A, Basavaraj A, Girish S, Shelke S. TB risk perceptions among medical residents at a tertiary care center in India. Tuberculosis Research and T r e a t m e n t . 2 0 1 7 N o v 22;2017.DOI:<u>https://doi.org/10.1155/2017/7514817</u>
- 21. Taneja N, Chellaiyan VG, Daral S, Adhikary M, Das TK. Home based care as an approach to improve the efficiency of treatment for MDR tuberculosis: a quasi-experimental pilot study. Journal of Clinical and Diagnostic Research: JCDR. 2017 Aug;11(8):LC05. DOI: <u>10.7860/JCDR/2017/27594.10401</u>
- Mohan A. Encouraging operational research in tuberculosis at medical colleges: what is required. NTI Bulletin. 2013;49(1&4):1-4.
- 23. Sharath BN, Shilpashree MK, Menezes RG, Bansal AK. Tuberculosis research in Indian medical colleges: has it taken a back seat?. Public Health Action. 2015 Sep 21;5(3):202...DOI: https://doi.org/10.5588/pha.15.0023