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Performance Assessment Of Some Operational Aspects Of Revised National Tuberculosis Control Programme In Tuberculosis Unit, Nagpur, India

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Abstract

Background : DOTS is the current international strategy for tuberculosis control endorsed by the World Health Organization and the International Union against Tuberculosis and Lung Diseases. Maharashtra achieved full coverage under RNTCP in October 2003. The programme was launched in Nagpur in the last quarter of 2002. Three years after its launch, it is the ideal time to assess the performance of programme to identify the operational challenges.

Methods: This is a cross sectional study carried out in 'Sadar Tuberculosis Unit' of Nagpur Municipal Corporation with the objective to study performance of some aspects of RNTCP. Programme performance was explored through laboratory records review and non participant observations of all four designated microscopy centres. DOT centres were observed for accessibility, identifiability and the facilities provided to patients visiting for treatment. Performance of some operational aspects of RNTCP was assessed using standards, norms, procedures etc described in programme guidelines.

Results: It was observed that the TB unit was manned with RNTCP- trained supervisory team. Three of four microscopy centres were established in multispecialty health facilities. Adequate space for sputum microscopy was available at two centres. Laboratory technician was available at three centres. Separate tables for smearing and staining were available at three centres. Sink, staining racks, spirit lamp, binocular microscope and drugs in patient - wise boxes were available in all four centres. Laboratory registers were completely and correctly filled in all centres. No false positive or false negative error was found in rereading of AFB smears.

Conclusions: It is concluded that the performance of the programme at the unit is satisfactory. Still some aspects of the programme components need to be strengthened at microscopy centres for better performance of RNTCP.

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Introduction

Tuberculosis (TB) is a major public health problem with great socio-economic consequences. Globally 8.8 million new TB cases occur in a year, of which 3.9 million are infectious. Total deaths occurring due to TB are to the tune of 2 – 3 million1. Estimated prevalence at any given time is 16 to 20 million cases, of which 8 to 10 million are infectious. Ninety five percent cases occur in developing countries. In India 1.8 million new cases and 4 lakh deaths occur every year costing the nation Rs. 30 crore direct costs and Rs. 1200 crore indirect costs2. It commonly affects the most economically productive age group resulting in a loss of 100 million productive working days.

Directly Observed Treatment Shortcourse (DOTS) is the recommended strategy to ensure cure of TB, which is adopted by 180 countries till 2005.[1] DOTS is the current international strategy for TB control endorsed by the World Health Organisation (WHO) and the International Union against Tuberculosis and Lung Diseases. It addresses the main challenges of case detection and treatment compliance, which was the weakest component of National TB control programme. Maharashtra achieved full coverage under Revised National Tuberculosis Control Programme (RNTCP) in October 2003.[2] Sputum microscopy is the least expensive, sensitive and simple tool used to screen the chest symptomatic attending the health facilities. This highlights the importance of well functioning and equipped laboratory. In urban settings, health services in general and tuberculosis services in particular, are provided through specialized health institutions, since primary health infrastructure is not well developed as in rural areas. Urban influence on health providers shows behavioral and attitudinal differences from their rural counterparts.

RNTCP was launched in Nagpur Corporation area in the last quarter of 2002. Three years after its launch is the ideal time to assess the performance of programme to identify the operational challenges. Studying the performance of all aspects of the programme was beyond the scope of this study, therefore it was planned to study performance of some aspects of the programme at Tuberculosis unit, so that suitable recommendations could be suggested. The study can help us to have a TB FREE breath in future.

Methods

This was a cross sectional study conducted with the objective of studying the availability of logistics and functioning of microscopy centres under Sadar TB unit, Nagpur, India from June to December 2006. This unit was selected because it covers the urban field practice area of the department of Preventive and Social Medicine, Indira Gandhi Government Medical College, Nagpur. Permission was taken from the City TB Officer, Nagpur Corporation who is Incharge of RNTCP. Ethical committee of Indira Gandhi Government Medical College, Nagpur approved the study.

Programme performance was explored through laboratory records review and non participant observations of all four designated microscopy centres under Sadar TB unit. Availability of logistics, resources and functioning of the centre in respect of sputum collection, smearing and staining procedures, and procedure for disposal of the infective material was studied using predesigned checklist based on RNTCP guidelines.[3] Knowledge of the laboratory technicians about grading the stained AFB smears was assessed. Quality of sputum microscopy was assessed by unblinded re-reading of five or all if less than five available positive and negative slides from each centre. For this, the slides which were read by laboratory technician in the last month of the third quarter of the previous year and stored for review were randomly

selected from the laboratory register using systematic random sampling method according to RNTCP guidelines. [3] Laboratory registers of all four centres were reviewed for the third quarter of previous year for gathering the information about completeness, correctness of the register and the diagnostic activities carried out at the centres. Performance of the operational aspects of RNTCP was assessed using standards, norms and procedures described in programme guidelines. [3,4]

Results and Discussion

Sadar Tuberculosis unit (TU) of Nagpur Municipal Corporation covers a population of 556493. This TU is manned with supervisory team of RNTCP consisting of Medical Officer – Treatment centre (MO–TC), Senior treatment supervisor (STS) and Senior Tuberculosis Laboratory Supervisor (STLS). STS and STLS were appointed by the City Tuberculosis Society formed under RNTCP. They all were trained. The team is provided with vehicle from TB control society for supervision. MO-TC pays supervisory visits in the TU area along with STS and STLS in the first week of every month. STS and STLS routinely supervise the work throughout the month. This TU has four designated Microscopy centres, where chest symptomatic are screened through sputum microscopy for diagnosis of TB. Diagnosed TB patients were then registered and directly observed for treatment by DOT providers which were identified by RNTCP staff.

Designated Microscopy Centres Studied were as follows:

Indira Gandhi Government Medical College (IGGMC) Microscopy centre: It is functioning in the central laboratory of the institute, which is a teaching institute and tertiary referral hospital catering to the needs of large population of in and around Nagpur, and also from neighboring states.

Sadar Diagnostic Microscopy centre: It is functioning in the central laboratory of the multispecialty health facility of Nagpur Municipal Corporation catering mainly to the needs of residents of Nagpur on outpatient basis. It is also the headquarter of RNTCP supervisory team of Sadar TU. Office of the City TB Officer is situated in the same campus. Urban Health Training Centre of the Department of Preventive and Social Medicine of Indira Gandhi Government Medical College was also functioning in the same campus during the study.

Janta Maternity Home (J.M.H.) Microscopy Centre: It is functioning in the central laboratory of a private multi specialty health facility which is run by NGO.

Binaki Microscopy centre: It is functioning in the government health facility of Municipal Corporation delivering health care on outpatient basis.

The adequate availability of the resources and logistics at four microscopy centres which were assessed considering the norms given in RNTCP guidelines are shown in Table 1. Adequate space for sputum microscopy was available at two centres, while in JMH microscopy centre the space for microscopy was inadequate and at Binaki centre microscopy was carried out in registration room. Microscopy work at Binaki centre was carried out by part-time laboratory technician. Laboratory technician from IGGMC microscopy centre used to visit twice a week to Binaki microscopy centre for staining and examination of slides after doing her regular work. In Binaki microscopy centre there was no provision of running water supply and all microscopy procedures were carried out on the same table. Kaul S et al[5] observed adequate supplies at microscopy centres as per norms. Standard operating procedures (SOP) followed by the laboratory technicians

Table 1. Resources and Logistics at Microscopy centres (MC)

RESOURCES AND LOGISTICS	No. of MC with adequate	
RESOURCES	Number	Percent
Adequate space for microscopy	2	50
RNTCP trained M.O.	4	100
RNTCP trained lab tech (full time)	3	75
Alternate arrangement for sputum collection when technician on leave	4	100
Electric supply	4	100
Running water supply	3	75
Separate table for receipt, smearing & microscopy	3	75
Sink & staining rack	4	100
Functional binocular microscope	4	100
Spirit lamp	4	100
Slide storage box	3	75
REAGENTS		
Carbol fuschin (1%)	4	100
Methylene blue (0.1%)	3	75
Sulphuric acid (25%)	3	75
CONSUMABLE ARTICLES		
New slides	3	75
Sputum containers	3	75
Broom sticks	4	100
Cedar wood oil	4	100
Lens papers	3	75
Laboratory forms	4	100
Filter papers	3	75
Drugs in form of patient wise boxes	4	100

at microscopy centres is shown in table 2. In JMH microscopy centre slides were wrapped in a paper due to non availability of slide storage box. Table 3 shows diagnostic activities carried out in the third quarter of previous year at the four microscopy centres. In all centres laboratory registers were completely and correctly filled. Patients were given the serial laboratory number. Positive smears were being recorded in red with grade of the smear and abstract of microscopic activity was summarized at the end of every month in a standard format. Sputum positivity rate was as follows: IGGMC centre 12.21 %, Sadar M.C. 13.55%, JMH microscopy centre 4.54 % and Binaki microscopy centre 6.25%. RNTCP indicator states sputum positivity rate at M.C. should be 8 to 12 percent. Table 4 shows the frequency of agreement between the results of laboratory technicians and those of re-reading. It was observed that 29 out of 40 smears were labeled as 'negative' in re-reading. This shows 100% concordance in reading the negative smears. Remaining 11 smears labeled as 'positive' by technician were found to be 'positive' in re-reading. This also shows 100% concordance in reading positive smears. Thus there were no false positive or false negative errors, which are considered as 'major' error and affect the management of the patients. Quantification error was observed in grading two positive slides. It was observed that 2 positive smears read by technician as of '1+' grade were found of grade '3+'. This shows quantification error was present in two slides, which is a 'minor' type of error and does not affect management of the patient. It was found that 30 smears were read as 'negative' or 'scanty positive' by technician while in re-reading 31 smears were classified as 'negative' or 'scanty positive'. One scanty positive smear was read '1+' positive by technician. Thus the frequency of agreement for negative and scanty positive was in 29 of 30 observations (96.66%). Sarin R et al observed 100% concordance between microscopist and STLS and between STLS of two TUs. They observed false positivity rate varied from 2 to 7%, and false negativity rate varied from 0 to 52%. Bleumink B et al[6] observed concordance of 92.5% in positive and 97.2% in negative slides. Lan NTN et al[7] observed in unblinded reading, false negative error was 2.9% and no false positive error. Paramsivan CN[8] et al observed that the errors made by the umpire have to be accepted as inherent limitations of the referee reading under blind procedure.

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Table 2. Standard Procedures followed at Microscopy centres (MC)

Procedures*	No. of MC with adequate availability (n= 4)	
Sputum containers labeled	2	50
Laboratory technician demonstrates to the patients how to cough out sputum	1	25
Laboratory technician uses only new slides for smear	4	100
Smears allowed to air dry for 15 to 20 min	4	100
Laboratory technician uses standard staining procedure	4	100
Laboratory technician had adequate knowledge of grading smear	3	75
Examined slides are stored properly for review	3	75
Infective material is properly disposed	4	100

*Standard operating procedures laid down in RNTCP

Table 3. Diagnostic activities at Microscopy centres

Name of centre	No. of new patients examined for diagnosis	No. of patients in whom 3 samples	No. of patients diagnosed positive	No. of patients registered in TB register
IGGMC	625	573	70	35
SADAR	177	177	24	24
JMH	22	22	1	1
BINAKI	16	16	1	1
Total	840	788	96	61

Table 4. Re-reading of sputum smears

Result by lab	Result of re-reading				
Grading	-ve	scanty	1+	2+	3+
-ve	29		*	*	*
Scanty	**	1		#	#
1+	**	1	3	1	2#
2+	**	#			1
3+	**	#	#	1	1

*false negative **false positive # Quantification error

Agreement

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