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STUDY OF LABORATORY PRACTICES AT DESIGNATED MICROSCOPIC CENTERS LEVEL UNDER REVISED NATIONAL TUBERCULOSIS CONTROL PROGRAMME IN RAIPUR DISTRICT, CHHATTISGARH

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ABSTRACT

Background- Every year, approximately 18 lakh people develop TB disease and about 4 lakh die of it. India accounts for one-fifth of all new TB cases each year globally and tops the list of 22 high TB burden countries. Lab technician plays a pivotal role in the diagnosis of patients and thus in the success of the programme. There is need to assess the proper implementation of programme at operational level and the grass root level realities of DMC's. This study was planned to assess the laboratory practices by lab technicians at DMCs level under Revised National Tuberculosis Control Programme in Raipur district of Chhattisgarh state. **Method-** Study was conducted in all 33 Designated Microscopic Centers (DMC's) of Raipur district from November 2011 to October 2012. During the study, all (36) Lab technicians were included. **Result-** Majority of the lab technician were male. 94.4% were modular trained. IEC materials at DMC were available at 83.33% of centers. Laboratory stock like sputum containers, slides, staining reagents & disinfected materials were available for more than 1 month at 77.77%, 91.66%, 93.44% & 100% respectively. Correct method of display of contaminated material was observed in 36.11% of centers only. **Conclusion-** Supportive supervision should be carried out regularly to check for availability of sufficient stock and proper practices related to staining, examination and regarding of result.

Key words: Chhattisgarh, Lab technician, Practice, Raipur, RNTCP

INTRODUCTION

Tuberculosis (TB) is an infectious disease caused by the bacterium, Mycobacterium tuberculosis. TB germs usually spread through the air. Tuberculosis remains a major public health problem in the country. [1] Every year, approximately 18 lakh people develop TB disease and about 4 lakh die of it. India accounts for one-fifth of all new TB cases each year globally and tops the list of 22 high TB burden countries. [2]

Detection of acid fast bacilli in the sputum is the only reliable method for confirming pulmonary tuberculosis. Therefore, the lab technician plays a pivotal role in the diagnosis of patients and thus in the success of the programme. They carry out sputum collection, sputum processing and examination, recording and reporting, maintain the laboratory register properly, keep the laboratory clean, safely dispose of all contaminated materials including sputum cups, keep the microscope in good working condition, maintain records of the lab consumables and reagents and order supplies well in advance to avoid shortages, wash hands every time after handle contaminated material.[3] Non adherence to guidelines & improper practice by LT affects case defection, case follow up & compliance. [4] Missed cases and improper disinfection & disposal of contaminated material can increase the communicability of disease in the population.

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There is need to assess the proper implementation of programme at operational level and the grass root level realities of DMC's. This is important to uncover the concealed gaps. There is a lot of scope to assess the situation at operational level. With this background, this study was planned to assess the laboratory practices by lab technicians at DMCs level under Revised National Tuberculosis Control Programme in Raipur district of Chhattisgarh state.

MATERIAL AND METHODS

Cross sectional observational study was conducted in old Raipur district which currently has been divided into three districts.(Gariyabandh, Baloda Bazar & Raipur itself) from November 2011 to October 2012. As per National guideline of RNTCP list of 7 tuberculosis units (TUs) and 33 designated microscope centers (DMCs) was obtained from District Tuberculosis center, Raipur (C.G.) Ethical considerations were met through institutional ethical committee.

Map of study area (Raipur District) showing TUs & DMCs was prepared. The list of Lab Technician was also obtained. All the lab technician from each DMC were selected for study. Predestined and pretested was used for the survey.

The TUs & DMCs were visited. After reaching there, met with lab technician to explain him about the ongoing survey and got verbal consent. He /She was assured of confidentiality. After gathering general information, practice was assessed by observation and stock verification. Under observation, available and utilization of IEC material, availability and working status of microscope, maintenance, serial arrangement of slides and disinfection and discarding of contaminated material were noticed. Stocks were verified with updatation. [1,3]

Thus total 36 Lab technicians were interviewed. Collection data was checked for its completeness and correctness. Practice was assessed by availability and utilization of IEC material, Microscope and maintenance, Sock availability and there record verification, lab register maintenance, Slide preparation, Examination and storage practices, Disposal method and lab safety precaution.Data was compiled in MS excel & analyzed with the help of medical online statistical calculator.

RESULTS

Majority of the lab technician were male and 50% were aged between 21-30 years. 55.6% of the lab technician were graduate while 30.6% had their education up to higher secondary level 94.4% were modular trained while the rest didn't get it 58.35 of lab technician had received refresher training.

Table 1:Demographic Profile

Characteristics	Lab teaching	
	Number	**Percentage**
Age in Years.		
21-30	18	50.0
31-40	12	33.4
41-50	3	8.3
51-60	3	8.3
Sex		
Male	27	75.0
Female	9	25.0
Education		
Higher Secondary	11	30.6
Graduate	20	55.6
Post graduate	5	13.8
Modular training		
Received	34	94.4
Not received	2	5.6
Refresher Training		
Received	21	(58.3%)
Not received	15	(41.7%)

IEC materials at DMC were available at 83.33% of centers. Properly working microscope was available at all the centers while its alternative arrangement was available at only 19.44% of centers.

Laboratory stock like sputum containers, slides, staining reagents & disinfected materials were available for more than 1 month at 77.77%, 91.66%, 93.44% & 100% respectively, while these were verified by register at 5.55%, 2.77%, 5.55% & 0% of those centers. Laboratory register was start from 1st January 2013 at 25% of centers.

Display of standing procedure & slide examination in laboratory were available at 75% & 91.66% while it was practiced properly in 19.44% & 13.88% of centers. Correct method of display of contaminated material was observed in 36.11% of centers only. A laboratory safety precaution was followed appropriately by only 5.55% of lab technicians.

Table 2:Laboratory practices by Lab Technician in DMC's

S. No.	Laboratory practices		Followed	%
1.	Information, Education & Communication (IEC) material	Availability	30	83.33
2.	Microscope	Availability	36	100
		Alternative arrangement	7	19.44
3.	Lab maintenance	Cleanliness	33	91.66
4.	Sputum containers at Designated microscope center	Availability	28	77.77
		Stock verification	2	5.55
5.	Slides at Designated microscope center	Availability	33	91.66
		Stock verification	1	2.77
6.	Staining Reagents at Designated Microscopic center	Availability	34	93.44
		Stock verification	2	5.55
7.	Disinfectant materials at Designated Microscope center	Availability	36	100
		Stock verification	0	0%
8.	Availability and Updating of Lab register	Availability	36	100
		Start from 1st January	9	25
		All column complete	35	97.23
		Summary at the end of register of last month(2 last month record)	36	100
		Positive result write in red ink & Negative in Black/Blue	36	100
		Mark of supervisory visit	36	100
9.	Adaptation of Current Staining procedure (As per programme guideline) **[1,3]**	Display of slide examination procedure	27	75
		Observe Practice	7	19.44
10.	Adaptation of current slide Examination procedure (As per programme guideline) **[1,3]**	Display of slide examination procedure	33	91.66
		Observe Practice	5	13.88
11.	Slide storage(Serially arrange)	Observe Practice	36	100
12.	Adaption of current method of disposal of contaminated material**[1,3]**	Observe Practice	13	36.11
13.	Laboratory Safety Precaution **[1,3]**	Observe Practice	2	5.55

DISCUSSION

Modular training was received by 94.4% of Lab technicians and 58.3% received Refresher training in this study. Similar finding was observed by Uganda, 45.8% (of LT) had never been to any kind of refresher course. [5] Laboratories were found clean at 91.66% of DMC's in the present study.

Availability of IEC material was observed in 83.33% of DMC's. As per guideline, new register from January 1st was maintained in 25% of DMC's. Which is higher compared to 70.8% completion as per study from Uganda. [5]

Microscope was available in all DMC's, while alternative arrangement was available in 19.44% DMC's. All the microscopy contras had binocular microscope in working condition as revealed by Bhagat VM, Gattani PL. [6] According to study from Uganda microscopes were either defective or had been stolen in 25% of laboratories. [5]

In the current study, stock was deficient for sputum container, slides and staining reagent in 22.23%, 8.34% 6.54% DMC's. While in a study from Uganda, a sputum container was deficient in 16.7% Laboratories. [5] Bhagat VM, Gattani PL observed that inadequate stock of methylene blue and carbol fuchsine were found in 25% and 50% microscopy center respectively. [6]

As per RNTCP guideline, [1,3] display of staining procedure was seen in 75% of DMC's, while all the steps according to guideline was practiced appropriately by 19.44% of LT. The duration given for drying, fixing & staining was not appropriate. In a similar study by Uganda, majority of technicians heated the stain correctly, no standardized protocol was followed. Most common finding was, not air drying of smear (60.4%). [6]

Display of slide examination procedure was seen in 91.66% DMC's. While it was carried out as per guideline [1,3] in 13.88% of LTs. Number of fields examined fewer than fields to be examined according to RNTP protocol, irrespective of positivity. Similar finding was observed in a study from Uganda; where in 85.45% of LTs were reading fewer than 100 fields in negative slider. Reading fewer fields might affect grading of smear and even misreading of positive cases. [6]

A study from Uganda 60.4% Laboratories did not decontaminate used sputum cups before disposal [6] where as in the present study, 63.89% of DMC's did not either decontaminate before disposal or dispose properly as per RNTCP guidelines. Inappropriate disinfection & disposal of infected Lab material is dangerous to staff and community. A study from Maharashtra by Bhagat VM, Gattani PL showed that only 50% Lab technicians found to follow appropriate procedure for disinfection of slider & sputum containers. [6] While adoption of appropriate method of disposal of contaminated was found 36.11% in the current study.

Various aspects of the RNTCP, such as infrastructure facilities, adequacy of supplier and waste management procedure in microscopy center at Gulab Bagh (Delhi), Jaipur (Rajasthan), and Mahesana (Gujarat) was observed by Kaul and these were found to be according to the norm. [7]

A study in Thailand done by Lertkanokkun s. *et al*., [8] showed that some healthcare providers were not following the National Tuberculosis Programme guidelines. Another study by Hong, Kwon et al [9] reported that certain providers misunderstood the RNTCP guidelines and were not practicing as per the recommendations. It is expected that all healthcare providers should follow the RNTCP guidelines for treatment effectiveness. [4] For effective management of TB it is necessary that all health care providers should follow the RNTCP guideline.

Non compliance with the guideline and stock outs are the causes of development of MDR TB as mentioned in new guidelines of DOT plus. Stock out or insufficient stock of essential stain will cause non compliance with guideline and it ultimately lead to failure of diagnostic efficiency and indicate lack of supervision. [4] DOT plus is more complex than the basic DOTS strategy. For DOT plus to be successful, special attention is needed for the quality assured laboratory capacity, recording and reporting system.

CONCLUSION

Supportive supervision should be carried out regularly to check for availability of sufficient stock and proper practices related to staining, examination and regarding of result. Lab technician should be motivated for strict adherence to staining and examination procedure as per RNTCP guideline. Disinfection of contaminated material should be strictly enforced to prevent accidental transmission of tuberculosis from laboratory.

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