



# Assessment of knowledge and practices of tuberculosis health care providers under revised national tuberculosis control program in Kashmir valley of Jammu and Kashmir, India

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## ABSTRACT

### Background

Although Tuberculosis (TB) is both preventable and curable; but it still remains a leading infectious cause of morbidity and mortality worldwide. Low case detection rate is still a problem in few states of India which to some extent could be attributed to provider's lack of knowledge, inadequate skills, callous practices and not following RNTCP guidelines.

### Objectives

To assess the knowledge level and practices of health personnel providing TB care.

### Methods

This Cross sectional study was conducted in Kashmir Valley .50% DMC's from each RNTCP operated district were selected. Public health personnel (Doctors, Laboratory technicians and DOT providers) working under the program and private practitioners providing TB care in these districts were assessed for their knowledge and practices.

### Results

215 health providers of different cadres were studied. 38.6% of public health doctors, 29.0 % of DOT providers and 50% of Laboratory technicians were contractual workers. 52.0% private practitioners and more than 3/4th public health personnel were trained under RNTCP and working for 1-3 years for the program. Knowledge of public health medical officers regarding operational component of program e.g. for TB diagnosis(100.0%), TB defaulter (100.0%), number of sputum samples required for case detection (91.0%) a TB suspect (80.0%) and on other components was better than those of private practitioners. Lab technicians and DOT providers were also well versed with operational component of program. Good practices were reportedly observed in all types of health workers regarding tuberculosis.

### Conclusions

Despite having good knowledge and practices of TB among health personnel case detection rate is low in the valley which needs to be introspected as less number of patients are sent from PHI's and general OPD's for sputum examination to DMC's thus stressing the need for modular training or CME for all health personnel.

**Keywords:** Tuberculosis, Health Providers, Public Health Doctors, Private Practitioners, Laboratory Technicians, DOT Providers

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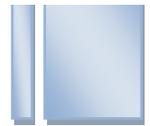
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## INTRODUCTION

Tuberculosis (TB) is both preventable and curable; but it still remains a leading infectious cause of morbidity and mortality worldwide. Though India is the second-most populous country in the world one fourth of the global incident TB cases occur in India annually.<sup>1</sup> As per WHO global TB Report, 2015, out of the estimated global annual incidence of 9.6 million TB cases, 2.2 million were estimated to have occurred in India. As per current WHO estimates, India's TB control program is on track as far as reduction in disease burden is concerned.<sup>2</sup>

Tuberculosis prevalence in absolute numbers, has reduced from 4 million in year 1990 to 2.5 million in 2013 annually and mortality has reduced from 0.33 million to 0.22 million annually. National coverage of DOTS (Directly observed treatment short course) strategy was achieved in the year 2006 and RNTCP (Revised National Tuberculosis Control Programme) is currently the world's largest DOT program.<sup>1</sup> Proper implementation of RNTCP program at operational level and successful treatment of TB patients mainly depends upon the updated knowledge level of the health worker and use of the same in field practices.<sup>3</sup> One study showed that provider's lack of knowledge led to incorrect advice being given to patients.<sup>4</sup> Providers inadequate skills, and not following RNTCP guidelines, also affected quality of service under RNTCP.<sup>5</sup> Providers' positive attitudes towards patients and to service provision contributed to completion of treatment.<sup>6</sup>

Despite the fact RNTCP was launched in 2005 in the state of J&K, the case detection rate during these years remains low in the state. One fundamental element needed for tuberculosis control programmes to succeed is that health staff should adequately manage persons with both suspected and confirmed tuberculosis. Lack of knowledge, a negative attitude or practice might be a contributor in low case detection. With this background, the study was planned with following objectives:

- 1) To assess the updated knowledge level and practices of public health personnel working under RNTCP in the valley.
- 2) To assess the updated knowledge level and practices of private providers in the valley.

Such type of study has not been conducted in the Kashmir valley before.

## METHODOLOGY

This Cross-sectional study was conducted in Kashmir valley for a period of one year. RNTCP was started in September 2005 in the state of J&K. All the six RNTCP operated districts were included in the study. Kashmir valley has 91 DMC's in 25 TU's (Tuberculosis unit). All the DMC's (Designated microscopy centres) have been created as per RNTCP guidelines except for Gurez & Tangdar (Being hard to reach border district, the two DMC's have different population norm viz 1 DMC for 3200 & 5000 respectively).<sup>7</sup>

### Sample Size and Procedure

A multistage sampling procedure was followed to select the DMC's. 50 % of DMC's from each district were selected by Simple Random Sampling. DMC's of Gurez & Tangdar were also included. A total of 45 DMC'S were selected for the study.

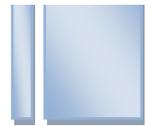
### Study Groups and Participants

In the selected DMC's manpower posted at these places were studied to fulfill the aims and objectives of the study. PP's (Private practitioners) practicing in the vicinity of these DMC's and who consented to be part of the study were also studied.

### Study Procedure

Trained data collectors facilitated the self-administered data collection by using a pre-tested structured questionnaire. The investigators supervised data collection in the selected health institutions to ensure data quality and implemented a daily check of the collected data in order to keep consistency.

Permission of concerned quarters was taken to allow the workers to have access to selected TU's and DMC's. Informed consent of all participants was taken to make them part of the study. Selected DMC's were visited on working days. Medical officer's (MO) in-charge of the RNTCP and PP's were handed over the questionnaire and requested to fill it in presence of data collectors. Laboratory Technicians (LT's) and DOT Providers were interviewed by the



workers. Mostly MO in-charge RNTCP was interviewed but in case of his/her absence substitute in charge MO's were interviewed. PP's had to be interviewed after 5 pm or on Sundays as most of these clinics were functioning during these timings only.

### Ethical Clearance

Ethical clearance was obtained from the institute ethical clearance committee. For the areas of Gurez and Tangdhar permission of deputy commissioner was sought to access these hilly border areas.

### Statistical Analysis

Data was analyzed using SPSS version 17.0. Percentages were taken out and differences in proportions between the various groups were tested by using chi-square test.

## RESULTS

### General Characteristics of Treatment Providers

Table-1 depicts out of 215 health providers studied 44 were medical officers, 46 Laboratory Technicians, 25 Private practitioners and 100 were DOT providers.

**Table 1 Distribution of Studied Health Personnel by Designation (District Wise)**

District	Government run institutions				Private facilities			
	Medical officer		Lab Technician		DOT provider		Private Practitioner	
	No	%	No	%	No	%	No	%
Srinagar	8	18.2	9	19.6	17	17.0	4	16.0
Budgam	6	13.6	6	13.0	11	11.0	5	20.0
Baramulla	6	13.6	7	15.2	19	19.0	4	16.0
Kupwara	7	15.9	7	15.2	11	11.0	3	12.0
Anantnag	8	18.2	8	17.4	20	20.0	6	24.0
Pulwama	9	20.5	9	19.6	22	22.0	3	12.0
<b>Total</b>	<b>44</b>	<b>100.0</b>	<b>46</b>	<b>100.0</b>	<b>100</b>	<b>100.0</b>	<b>25</b>	<b>100.0</b>

Table-2 shows that 86.4% MO's were graduates (MBBS) and 11.4% had postgraduate degree rest were BUMS doctors. 25 private practitioners interviewed were mostly MBBS graduates (76.0%), 24.0% were postgraduates either in medicine, ENT, general surgery or chest medicine. All the LT's had undergone one or other type of course in lab technology. 32.0% of the DOT providers were graduates 2% were post graduates, remaining 64% had variable literacy status ranging from 7<sup>th</sup> standard to 12<sup>th</sup> standard. 54.4% of the MO's were regular employees of health department, 38.6% were contractual and 6.8% were ad-hoc employees. 61.0% of DOT providers were regular, 29.0 % contractual, 4.0% ad-hoc and 6% were voluntary workers. Half the number of LT's (50.0%) were contractual workers, 43.5 % were regular, remaining were ad-hoc

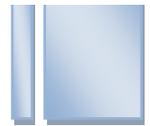
employees. 77.3% of the MO's and 78.3% of DOT providers were involved for more than 3 years with the RNTCP program. 71.0% of LT's were involved for 1-2 yrs. 79.0 % MO's, 52.0% of PP's, 76.0% of DOT providers, and 91.3% of LT's were trained under RNTCP.

92.1% of DOT providers, 100.0% of LT's, 52.0% of PP's and 79.5 % of MO's were satisfied with the type of training they had received under RNTCP. 43.2% of MO's recommended changes in the type of training like 25.0% had recommended it to be for more duration 29.5% were of the opinion that every doctor should be trained likewise 36.0% of PP's recommended training for every doctor. 6.6 % of DOT providers suggested an increase in duration of training.



Table 2 Characteristics of Studied Health Care Providers

Characteristic	Medical officer/l/c DMC		Private provider		DOT Provider/TBHV		Lab. Technician	
	No	%	No	%	No	%	No	%
<b>Qualification:</b>								
Graduates	38	86.4	19	76.0	32	32	46	100
Post Graduates	5	11.4	6	24	2	2	-	
Others	1	2.3	-		64	64	-	
<b>Status Of Employment:</b>		0.0	NA				-	
Contractual	17	38.6	-		29	29.0	23	50.0
Ad-Hoc	3	6.8	-		4	4.0	3	6.5
Regular	24	54.5	-		61	61.0	20	43.5
Voluntary		0.0	-		6	6.0	-	
<b>Duration Of Posting At DMC:</b>		0.0	NA		-		-	
<1 Yr	3	6.8	-		29	29.0	4	8.7
1-2 Yrs	7	15.9	-		71	71	6	13.0
2-3 Yrs and More	34	77.3	-		-		36	78.3
<b>Trained In RNTCP:</b>								
Yes	35	79.5	13	52.0	76	76.0	42	91.3
No	9	20.5	12	48.0	24	24.0	4	8.7
<b>Duration Of Training:</b>		0.0						
<6 Days					76	76.0		
6 Days	41	93.2	13	52	0	.0		
15-30 Days	3	6.8	-		-		42	91.3
<b>Place Of Training:</b>			-		-		-	
LRS	3	6.8	-		-		-	
STDC Srinagar	10	22.7	7	28.0	-		-	
At DTC'S	31	70.5	6	24.0	76	100	42	91.3
Refresher Training Received.	17	38.6	nil	nil	10	13.2	22	47.8
Training Satisfaction	35	79.5	13	52	70	92.1	42	100.0
<b>Changes Recommended In Training:</b>								
For more Duration	19	43.2	9	36	10	13.2	nil	
Field Exposure in training	11	25.0	-		5	6.6	-	
Every Doctor to be Trained	6	13.6	7	28	5	6.6	-	
Total Respondents	13	29.5	9	100	-		-	
	44	100.0	25	100	100	100	46	100



### Knowledge and Awareness of Health Care Providers

Table- 3 All the MO's of public health facilities had correct knowledge about TB diagnosis under the program (100%), TB Defaulter (100.0%), number of sputum samples required for case detection (91.0%) and who is a TB suspect (80.0%), however lesser number of MO's knew about the number of sputum examinations required during DOTS (38.6%), how to

categorize TB case (52.3%) and how to deal with a sputum negative case (68.2%). The percentage of PP's having similar knowledge on some operational components of TB control were lesser than those from government institutions e.g. number of sputum samples to be tested was 56%, who is a TB suspect was 60% and 88% correctly knew how to diagnose TB.

**Table 3 Knowledge among Health Care Providers about Operational Components of TB Control (RNTCP)**

	Medical officer of health facility		Private practitioners		Lab. Technicians		DOT providers		p-value
	n	%	n	%	n	%	n	%	
Correct Knowledge about Chest symptomatic TB suspect	14	31.8	8	32	10	21.7	8	8.1	***p=0.008
Number of sputum samples to be tested	35	79.5	15	60	42	91.3	89	90.8	
Diagnosis of TB	40	90.9	14	56	43	93.4	88	89.7	*p=0.001
Sputum negative case	44	100.0	22	88	45	97.8	92	93.8	*p=0.043
TB treatment Categorization	30	68.2	22	88	25	54.3	66	67.3	
Number of sputum exam. during DOTS	23	52.3	13	52	23	50.0	60	61.2	
Defaulters	17	38.6	10	40	44	95.6	93	94.8	**p=0.001 ***p=0.001
Dealing with Contacts of sputum +ves	44	100.0	24	96	41	89.1	92	93.8	
Total studied	33	75.0	20	80	37	80.4	89	90.8	***p=0.024
	44	100.0	25	100	46	100	98	100	

\*Medical officers vs Private practitioners \*\*Medical officers vs Lab. Technicians \*\*\* Medical officers vs DOT providers

Among LT's majority knew about TB suspect (91.3%), TB diagnosis (97.8%), Number of sputum samples required (93.4%), number of sputum exam during DOTS (95.6%), TB defaulter (89.1%) but the knowledge about percentage of chest symptomatic's in OPD (21.7%), TB case categorization (50.0%), or how to deal with a Sputum negative case (54.3%) was low.

Knowledge of only 98 DOT providers out of 100 was recorded on questioner 89.7% of whom had correct knowledge about sputum samples, 90.8% about a TB suspect, 93.8% about diagnosis, 67.3% about sputum negative case, 61.2% about categorization, 94.8% about sputum examination while on DOTS, 93.8% about defaulters and 90.8% about contacts of sputum positives. Considering total knowledge of

health providers 67.1%, 55.8%, 77% and 94.4% of health providers knew how to deal with a sputum negative case, about categorization, about number of sputum examinations while on DOTS and defaulter's respectively. 84.0% had a correct knowledge of dealing with the contacts of sputum positives. Difference in knowledge between different cadres of health personnel was statistically significant at places shown in the table.

Figure -1 depicts knowledge of MO's about number of weeks of cough in a patient to be evaluated for TB. 80% knew that cough of two weeks is to be evaluated for TB. Table-4 depicts that 24.0% and 8.0% were aware of DOTS or DMC facility and 72% of both in the vicinity of their clinics respectively. 88% reported that DOT's is a viable method to tackle menace of TB in the society.

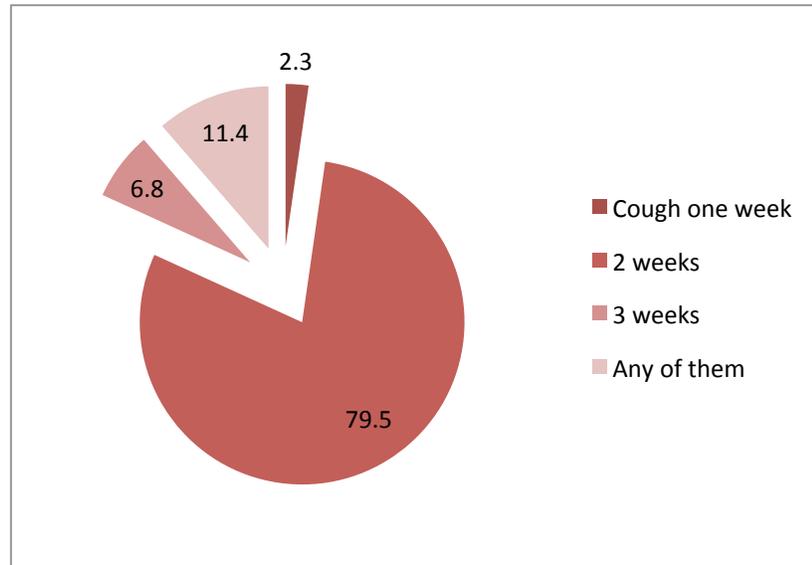


Fig 1 Knowledge of Doctors about Duration of Cough for a TB Suspect

Table 4 Other Knowledge Parameters of private Practitioners Regarding RNTCP

Awareness regarding infrastructure of RNTCP:-	N	%
Aware of DOT'S facility in vicinity of clinic	6	24
Aware of DMC facility in vicinity of clinic	2	8
Aware of both in vicinity of clinic	18	72
Think DOTS as a viable method to tackle menace of TB		
Yes	22	88.0
No	3	12.0

### Practice of Health Care Providers

Table-5 shows 80% of the PP's reported that they send their patients to DMC's for sputum examination. (80%) reported sending a positive case to DOT's facility. 76% reported they follow their patients after being put on DOT'S. 60% reported they were contacted by RNTCP team for cooperation and utilizing DMC or DOTS centre for a TB suspect or a TB case. Out of those not trained 80% wanted to undergo RNTCP modular training.

Table- 6 shows 86.4% of MO's in-charge RNTCP reported that other doctors posted at such health facilities were cooperative and send patients for sputum examination to the DMC. Reason of non cooperation on their part was attributed to being not aware of RNTCP guidelines (6.8%), sending TB patients to private laboratories (2.3%) and 4.5% deemed it unnecessary to send patient to DMC. 63.6% of MO's reported that they make personal

requests to other doctors, 36.4% reported sitting in general OPD with them to increase case detection. 93.2 % reported that other staff of health facility was cooperative in detecting a case of tuberculosis. 84.1% said that patients were referred from PHI's (peripheral health institutions) for case detection. The reason given for others not doing so was attributed to staff at PHI not well versed with RNTCP (6.8%) referred directly to higher centers or all symptomatic patients did not report to PHI's 4.5% each. 95.5% reported that Lab staff informed them if there was a sputum positive case.

76.1% of LT's reported that they do examine cases without the advice of in-charge doctors but then report the case to the in-charge if any of the cases turns out to be a positive case. 48.6% reported the reason for doing so as patient being known to the lab technician. 98.0% of DOT providers admitted that LT informs about a positive case and 96% of these cases



report for DOTS. 93.2% of MO's said they supervise the work of their subordinates and reason given by

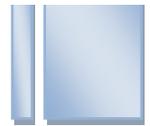
rest for not doing so was attributed to shortage of time.

**Table 5 Practices of Private Practitioners regarding RNTCP**

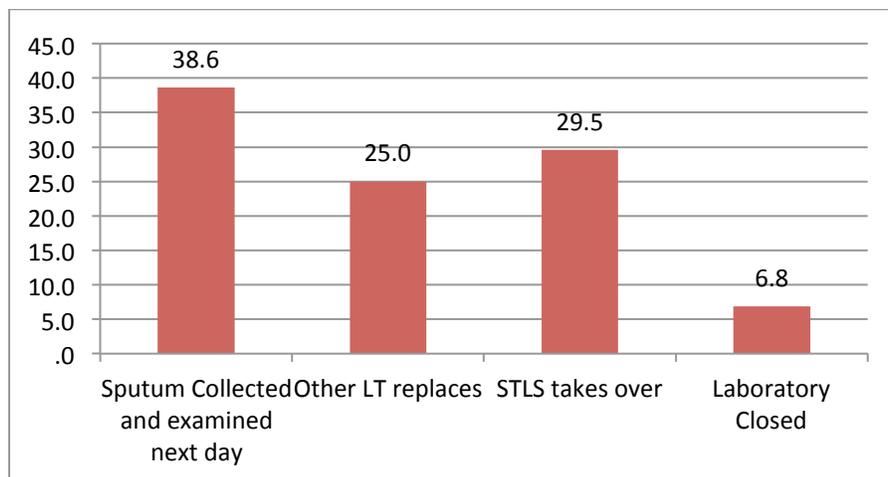
Send chest symptomatic 's for sputum examination	Number	%
Own Facility	2	8
DMC	20	80
Tertiary care hospital	1	4
Any other place	2	8
<b>Course of action followed in case of +ve Patient:-</b>		
Put patient on ATT	1	4.0
Refer to Tertiary Care Hospital	4	16.0
Refer to DOTS facility	20	80.0
Yes	19	76.0
No	6	24.0
<b>Follow pts after being put on DOTS:-</b>		
Yes	19	76.0
No	6	24.0
<b>Contacted by RNTCP managers to either send patients for sputum microscopy or for treatment to DOT's facilities</b>		
Yes	15	60.0
No	10	40.0
<b>Would you like to get trained in RNTCP</b>		
Yes	8	80.0
No	2	20.0

**Table 6 Practices of Public Health Personnel under RNTCP**

	Yes		No		P<0.001
	No	%	No	%	
<b>Coordination/cooperation by doctors:-</b>					
Are other doctors in the health facility cooperative	38	86.4	6	13.6	P<0.001
<b>Reasons of non-cooperation</b>					
Not aware of RNTCP guide lines			3	6.8	
Send patients to private Laboratories			1	2.3	
Deem it unnecessary			2	4.5	
<b>Efforts made to increase cooperation:-</b>					
Request personally	28	63.6			
Sit in general OPD	16	36.4			
Display IEC material in OPD	8	18.2			
Involve BMO	8	18.2			
Others	5	11.4			P<0.001
Is other staff cooperative	41	93.2	3	6.8	
Are patients referred from PHI's	37	84.1	7	15.9	
<b>Reasons of non referral from there:-</b>					
All symptomatic's do not report to PHI's			2	4.5	
Staff at PHI not well versed with RNTCP			3	6.8	



Referred directly to higher centres	2	4.5		
<b>Average number referred from PHI's/ wk</b>				
1-2	17	38.6		
2 to 4	22	50.0		
More than 4	5	11.4		
<b>Coordination /cooperation of lab staff</b>				
Lab staff conducts sputum examination without MO orders	13	29.5	31	70.5 p <.007
Does lab. staff inform in case of +ve case	42	95.5	2	4.5 P<0.001
<b>Coordination by Lab staff:</b>				
<b>Do you examine sputum without advice of MO's</b>	35	76.1	11	23.9
Reasons for sputum exam without MO advice :				
MO absent	1	2.9		
Patient known to lab worker	17	48.6		
Patient refuses to see MO	2	5.7		
Others	15	42.9		
<b>Coordination reported by DOT provider:</b>				
People from DMC inform about +ve cases	98	98.0	2	2.0
All +ve cases of DMC report to DOTS centre for treatment?	96	96.0	4	4.0
<b>Supervision</b>				
MO Reviews work of RNTCP workers at the facility	41	93.2	3	6.8
MO Conducts meeting with PHI workers	19	43.2		
MO Visits Lab for supervision	44	100		
Visits made to DMC for Quality assurance	44	95.7		
Supervisory visits made by MO to DOTs centre	98	98	2	2



**Fig 2 Course of Action Followed in Absence of Lab. Technician**

All MO's admitted to visiting the DMC frequently for supervision.43.2% admitted conducting meetings with workers at PHI's.95.7% of LT's reported that

concerned authorities come for quality assurance. 98% of the DOT providers reported being supervised by higher ups.

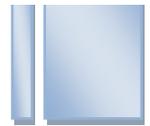
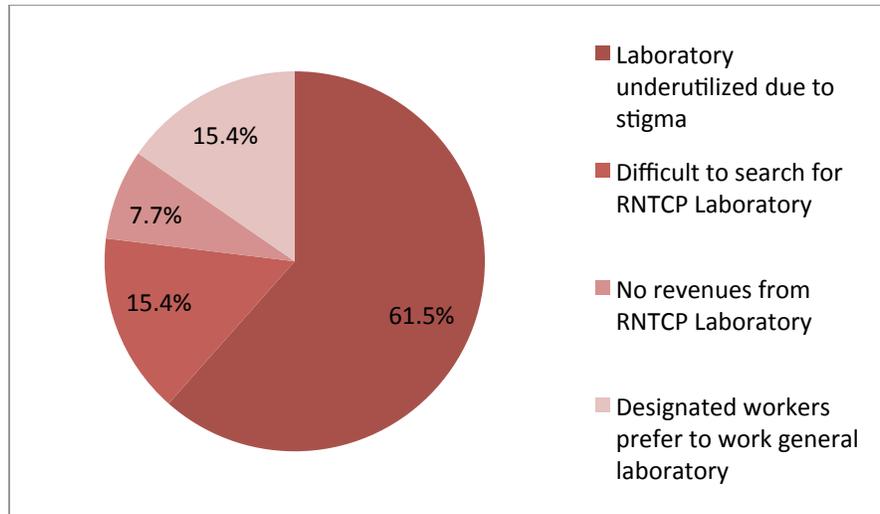


Figure -2 shows course of action taken by supervisors if LT was absent. 39% providers reported that sputum is collected and examined next day, 25% reported that other LT takes over the work. 29.5% reported STLS takes over and 7% reported that Laboratory remains closed.

Figure -3 shows difficulties faced by various LT's due to separate DMC, 61.5% felt that DMC is underutilized due to stigma.



**Fig 3 Difficulties faced due to Separate DMC**

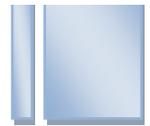
## DISCUSSION

More than 3/4th of MO's and PP's were MBBS graduates others had post graduate degrees from different specialties. Baseline KAP study under RNTCP project shows More than half of the doctors contacted in each state were MBBS qualified quite a good number were BUMS.<sup>8</sup> Likewise in a study in Pakistan by M Ahmed *et al.* all the participating PPs were qualified doctors with MBBS degree. Two of them had post-graduation in medicine.<sup>9</sup> A study by N Vandan *et al.* shows that 71% doctors had specialized medical education for treating TB.<sup>10</sup>

All LT's had requisite laboratory training. Of the DOT providers 32.0% were graduates rest had a variable literacy status some having as low as 7<sup>th</sup> standard. B Dhiraj *et al.* in their study report 54.4% TBHV and HW had their education up to higher secondary while 28% and 13.6% were graduate and post graduate respectively.<sup>3</sup> Study by DS Hashim *et al.* shows majority of healthcare workers (87.8%) had a diploma qualification.<sup>11</sup> Study done by M Mesfin *et al.* found that out of the total community of HW, 33.3% had primary education, 16.4% had secondary schooling, 18.6% can read and write and 31.5% were illiterate.<sup>12</sup>

Only half of the MO's, 2/3<sup>rd</sup> LT's and 43.5 % DOT Providers /TBHV were regular employees of health department showing program is equally run by contractual or ad-hoc workers in all the three cadres. More than 3/4<sup>th</sup> of health personnel were working for 2-3 years with the program. This is a good sign as more they work for the program more well versed will they be with its guide lines and functioning. DS Hashim *et al.* report good knowledge was significantly associated with age and duration of work. More experience and a longer duration of work subjects the health care workers to more intensive training courses.<sup>11</sup>

79.0 % of DMC doctors, 52.0% of private providers, 76.0% of DOT providers, and 91.3% of LT's had received modular training under RNTCP. TB knowledge and awareness was varied among health providers, doctors had better knowledge of TB but outside the purview of RNTCP compared to which LT's, DOT providers mostly had program related concepts. Only 1/3rd of both types of doctors could correctly answer the percentage of chest symptomatic's among OPD attendees, this knowledge was comparatively very less in other cadres. Although attitude of more than 3/4th PP's



was found positive but lack of knowledge on various aspects of RNTCP is evident. N Vandan *et al.* also report that public sector doctors demonstrated better knowledge of drug regimens for sputum smear-positive and sputum smear-negative TB than private sector doctors. Statistical analysis indicated that doctors in the public sector had 2.1 times better knowledge than private sector doctors (odds ratio 2.1;  $P=0.05$ ).<sup>10</sup> Temesgen *et al.* report only 18.8% of the respondents were found trained on TBIC, 74.4% scored "good" knowledge in TBIC.<sup>13</sup> Studies from Iraq (95.5%),<sup>11</sup> Saudi Arabia (81.8%), and Bangkok (85%) report healthcare workers with "good" knowledge.<sup>14, 15</sup> We found no significant differences in knowledge by category of healthcare workers, whereas in a study of Russian health workers physicians scored significantly higher than nurses and laboratory workers and overall TB knowledge scores were low.<sup>16</sup>

Diraj *et al.* reported modular training was received by all TBHV and 46.2% of HW and their knowledge level were comparable to our study.<sup>3</sup> M Minnery *et al.* report a mean knowledge score of 10.1 (+/- 1.7) out of 15 or 67.3% correct in frontline TB personnel. Demographics shown to have an effect on knowledge score were age and level of education. Major knowledge gaps were noted primarily in themes relating to treatment and diagnostics.<sup>17</sup> A study in Vietnam shows that 47% respondents mean knowledge score was 15.59 +/- 3.78 (range 5-23). The mean practice score was 2.03 +/- 1.28 (range 0-5). Health staff knowledge of theoretical aspects was better than knowledge related to patient management. Even staff members who had attended TB training courses had inadequate TB knowledge, particularly in the area of TB control. District hospital staff reported surprisingly lower knowledge scores than community health care staff. Practice competency related to the management of tuberculosis patients during treatment course was low.<sup>18</sup> Slightly more than half (57.6%) of nurses have above average knowledge score. It was found that most of the nurses in this study had positive attitudes towards existing TB control strategy.<sup>19</sup>

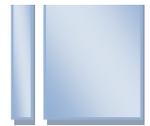
L Sumanee *et al.* found that 56.13% had a good level of TB knowledge; the remainder had a fair level.

More than half of the providers had a positive attitude towards TB and TB care. However, most had a negative attitude towards TB patients. Many providers were not delivering care in accordance with the National Tuberculosis Program (NTP) guidelines. Providers' knowledge levels were significantly linked to attendance at TB training, as well as their profession. Duration of work, TB training attendance, and age were all found to be related to providers' practices in the delivery of TB care.<sup>20</sup>

Our study depicts good practice and attitude of both public health and private practitioners. More than 3/4th PP's had answered that they diagnose and treat patients according to RNTCP guidelines and were aware of the presence of DMC and DOTS centers of their area and followed their patients once they were put on DOTS. Of those not trained in Modular training wanted to do so. Contrary to this study by Mubashir *et al.* report gross lack of PPs knowledge, attitude and right practice regarding TB diagnosis and management through DOTS.<sup>9</sup> Two surveys surrounding the diagnosis and treatment of TB in urban areas of Kenya showed that doctors were often not aware of the correct diagnosis and treatment procedures for dealing with TB patients.<sup>21,22</sup>

Coordination and supervision among public health personnel though seems good in our study but not without loop holes like not being aware of RNTCP guidelines (6.8%) sending patients to private laboratories for sputum examination (2.3%), referring patients directly to referral hospitals (6.8%) and conducting sputum examination without the knowledge of doctors. Dhiraj *et al.* study depicts that majority of the health workers were not following the RNTCP guidelines.<sup>3</sup> Another study by Hong *et al.* reported that certain providers misunderstood the RNTCP guidelines and were not practicing as per the recommendations.<sup>18</sup> A study in Thailand done by L Sumanee *et al.* showed that some healthcare providers were not following the National Tuberculosis Program guidelines.<sup>20</sup>

Good supervision and quality assurance was reported in our study but not without lacunas like not conducting monthly meetings etc.



## DISCUSSION

Over all knowledge on various aspects of TB was different in different cadres of health care providers. Although half of the private practitioners were trained under RNTCP but knowledge was comparatively less in them regarding the programme. Good coordination and supervision was reported by programme workers but some lacunae with respect to follow up and program implementation were observed.

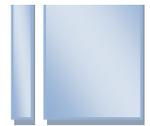
Despite having good knowledge of TB among RNTCP workers case detection rate is low in the valley which needs to be introspected as less number of patients are sent from PHI's and general OPD's for sputum examination to DMC's thus stressing the need for modular training or CME under the program for all doctors in each district. Likewise all private practitioners need to be trained under RNTCP. Despite good coordination and supervision reported by program workers, some lacunae with respect to follow up and program implementation were observed which needs to be redressed.

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