



## Original Research Article

## SWOT analysis of the Directly Observed Treatment Short-course (DOTS) strategy under the revised national tuberculosis control program at a large center in west Delhi

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## ABSTRACT

**Background:** Tuberculosis is a public health problem. In the present scenario, the disease burden lies in the low-income countries where a majority of the total population of the world lives. However, the disease is also reported from the developed world. In the present paper, authors aimed at analyzing the Directly Observed Treatment Short-course (DOTS) strategy under the Revised National Tuberculosis Control Program at one of the largest district of the national capital Delhi, by determining the strengths, weakness, opportunities, and threats to the program. Also, the paper gives insights into the various issues associated with it and suggests probable solutions for these issues.

**Methodology:** A qualitative analytical study using structured questionnaires designed specifically for service recipients and service providers was done at the Chest Clinic, Moti Nagar, New Delhi, and its DOT centers and DMC's. The data collection involved one to one interviews of study subjects and analysis of quarterly reports available at the CCMN and on the internet. The study was conducted from 19th January 2016 to 1 April 2016.

**Results:** A total of 65 subjects were randomly selected and interviewed. Service providers-35, service recipients- 30 (patients taking Category-I treatment under the DOTS of the RNTCP).

**Conclusions:** The study highlights various issues at a large center related directly or indirectly into DOTS and suggest possible solutions for the same. The data could be used to study in detail various other districts of India and other high TB burden countries.

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## 1. Introduction

Tuberculosis (TB) is a malady of incredible importance and is a significant public health issue in developing nations like India.<sup>1</sup> TB is an infectious disease brought about by Mycobacterium tuberculosis that influences the lungs and other body parts.<sup>2,3</sup> It is usually transmitted by aerosols and the TB of the lung is known as pulmonary TB and the TB involving other body parts is known as extrapulmonary TB.<sup>2</sup> A major leap towards success has been achieved in TB control, yet it remains one of the most serious, alarming public health problems in low-income countries with poor

health expenditure and meager annual government health budget.<sup>2</sup> Consistently, a huge number of individuals get the tubercular infection and in this manner, it remains a second leading cause of deaths due to the infectious diseases worldwide.<sup>3</sup> It is assessed that 33% of the population on the planet has a tubercular infection; nonetheless, the observed cases represent only the tip of the iceberg.<sup>4</sup> Also, India has the highest burden of TB in the world, accounting for approximately one-fifth of the global incidence.<sup>4</sup> India alone accounts for more than 25% of the world's incident cases with about four lakh deaths per year.<sup>5</sup>

The recommended treatment of new-onset pulmonary tuberculosis, as of 2016, was six months of a combination of antibiotics containing Rifampicin, Isoniazid, Pyrazinamide,

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and Ethambutol for the first two months, and only Rifampicin and Isoniazid for the last four months.<sup>6</sup>

To control TB the Government of India is running the Revised National Tuberculosis Control Program (RNTCP) under the umbrella of National Health Mission.<sup>6</sup> The present study is an analysis of the key component of the RNTCP i.e., Directly Observed Treatment Short-course (DOTS) strategy in Category I pulmonary cases at the Chest Clinic, Moti Nagar (CCMN) which is a very large District Tuberculosis Center (DTC) in West Delhi, covering a population of more than 13 lakhs. The present study is aimed at:-

### 1.1. General

1. Education, counselling, and motivation of the patients suffering from tuberculosis and taking treatment from the CCMN, New Delhi through the RNTCP's DOTS strategy.
2. Emphasis on the proper follow-up of the TB patients for timely sputum examination and treatment adherence.
3. To strengthen the TB control through increasing the awareness about the disease.

### 1.2. Specific

1. To improve the attitude, behavior, skill, and knowledge of the medical and paramedical staff working under the aegis of CCMN, New Delhi.
2. To improve the quality of services like case detection rate, cure rate, default retrieval, and sputum conversion.
3. To improve the quality of the supervisory and monitoring activities for the proper functioning of the DOTS program under RNTCP by May 2016.
4. To solve the issues related to the service providers and service recipients.

#### 1.2.1. Organizational analysis-

DOTS strategy is an internationally recognized strategy for delivering the basics of TB case-finding and cure. It is not simply a clinical approach to patients, but rather a management strategy for public health systems, including political commitment, case-detection through quality-assured bacteriology, short-course chemotherapy, ensuring patient adherence to treatment, adequate drug supply, and sound reporting and recording systems.<sup>6,7</sup> In India DOTS is implemented through the National Rural Health Mission under the Ministry of Health and Family welfare.<sup>6</sup> The national capital Delhi's DOTS Program under the RNTCP has 25 Chest Clinics/district tuberculosis centers spread over Delhi.<sup>4</sup> The Chest Clinic, Moti Nagar (CCMN), a District Tuberculosis Centre (DTC), is the focal point for all TB control activities in West Delhi.<sup>4</sup> It falls under the North Delhi Municipal Corporation (NDMC),

which is an autonomous body and itself is one of the part of the Municipal Corporation of Delhi (MCD) after its trifurcation.<sup>4</sup> It also has four NGO's and two night shelters working under its supervision for TB Control.

The Administrative structure in NDMC is as follows:-

Commissioner -> Director Health Administration -> Addl. DHA(Med & TB) -> CMO I/c.

The District TB Officer (DTO) who is a CMO I/c at the DTC has the general obligation of the management of RNTCP at the regional level as described in the program guidelines.<sup>4</sup> The CCMN is one of the oldest and largest TB centers of Delhi which covers a population of about 13 lakhs.<sup>4</sup> It comes under the Karol Bagh Zone.<sup>4</sup> It has two Tuberculosis Units with 24 DOT centers (18 DOT Centers and 6 sub-centers) and 13 Designated Microscopy Centers (DMC's), under its supervision.<sup>4</sup> It covers an area of around 35 km under its supervision. The CCMN covers a population that is a mix of various socio-economic groups. At one end the CCMN covers some of the lavish societies and on the other hand are certain areas with extreme poverty. Some of these areas also harbor a large population of gypsies who came to Delhi in search of jobs and have settled in illegal encroachments where the living conditions are pathetic.

## 2. Materials and Methods

A qualitative analytical study using structured questionnaires designed specifically for service recipients and service providers was done at the Chest Clinic, Moti Nagar, New Delhi, India, and its DOT centers and DMC's. The data collection involved one to one interviews of study subjects and analysis of quarterly reports available at the CCMN and on the internet. The study was conducted from 19th January 2016 to 1 April 2016.

The primary data collection was done by using structured questionnaires designed specifically for the particular class of the staff like concerned Health Officers, senior treatment supervisors, senior treatment lab supervisors, DOT providers/TB health visitors, nurses, pharmacist and the service recipients i.e., the patients who were already on Category I TB treatment. The data also include the salient findings by the researcher.

A total of 65 subjects selected through random sampling were interviewed. Service providers-35, service recipients-30 (patients taking Category-I treatment under the DOTS of the RNTCP).

### 2.1. Inclusion criteria

Only Category-I pulmonary patients taking treatment for the first time for the TB were included. Patients from all age groups were included in the study. In pediatric cases, the parents/guardians were asked to provide the data required in the questionnaire.

## 2.2. Exclusion criteria

The Category-I extrapulmonary cases were not included in the study. Besides, all those patients who were already treated earlier, i.e. Category-II and the drug resistant TB cases, falling under Category-IV and Category-V were excluded. Also, the patients on Non-DOTS regimen were excluded from the study.

The secondary data collection was done using the quarterly reports and the medical records available at the CCMN, WHO 2015 Global TB Report], and the observations by the authors.

## 2.3. Programs running

Several national programs like DOTS for the Category-I and Category-II and DOTS-Plus for the drug-resistant TB like MDR-TB and XDR-TB are running at the CCMN. Besides, Non-DOTS was given after permission from DTO to those patients who were advised the same by the expert physicians/surgeons due to some conditions like adverse drug reactions.

## 2.4. Resources of the CCMN

The CCMN receives its funding from both RNTCP and NDMC for the smooth running of the program.<sup>8,9</sup> The CCMN has two sets of employees one is permanent and the second are contractual. The permanent staff is paid by the funding from NDMC while the contractual staff receives their salaries from the RNTCP fund through the Integrated District Health Society (IDHS), New Delhi. IDHS, a registered society with the Registrar of Societies, Delhi and is involved in delivering health-related services under NRHM to the people in the district.<sup>9</sup> The logistics are provided by the NDMC and also by the State Program Officer, New Delhi through the RNTCP funds. Besides, as stated in the WHO 2015 Global report on TB the domestic funding accounts for most of (90%) of TB control activities in India.<sup>10</sup> Besides the budget for the payment of salaries of permanent staff was from the NDMC through Karol Bagh Zone.

## 2.5. Situational analysis

### 2.5.1. Health status situation

The current situation of new pulmonary TB cases as per the quarterly reports available at the CCMN shows a steady increase in the number of cases. The increase could well be attributed to better diagnostic techniques, increased awareness activities, free cure of TB, and an increase in the number of TB notifications from the private sector, etc. The most alarming thing is the gradual rise in the number of cases in an urban population. The WHO Global TB report of 2015 on TB states India to have a 23% share of the total world TB cases thereby being a high burden

country.<sup>10</sup> Globally in 2014, there were an estimated 9.6 million incident cases of TB: 5.4 million among men, 3.2 million among women and 1.0 million among children.<sup>10</sup>

The TB treatment success rate of India in 2014 as per the WHO Global TB report in new cases was 88%.<sup>10</sup>

### 2.5.2. Health facilities

Many health facilities were running in the area. These include:<sup>8</sup>

1. Ayurvedic dispensaries
2. Unani dispensaries
3. Homeopathic dispensaries
4. Maternity & child care services
5. Primary health care services
6. School health services
7. Tertiary care hospitals

### 2.5.3. Service program

The DOTS strategy under RNTCP is a huge program covering about 13 lakh population of West Delhi. Besides, being largest in the area the CCMN also caters to the needs of the huge number of extrapulmonary TB, MDR and XDR-TB cases. The center also has night shelters running under its area wherein the DOTS to the patients can be provided.<sup>4</sup> The CCMN usually is among the top three performers of the Delhi in terms of case detection, sputum conversion rate and has a low default rate.

### 2.5.4. SWOT analysis of the organization

The various strengths, weaknesses, opportunities, and threats to the organization will be discussed in detail in the present study.

### 2.5.5. Strengths

2.5.5.1. Cooperative staff. The CCMN has several strengths. The highly cooperative and patient-friendly staff is the biggest strength of the CCMN. The staff has always been active and inclined towards TB awareness activities, as evidenced by the timely patient-provider meetings and other community awareness activities like puppet shows, nukkad nataks, awareness campaigns at the metro stations, painting competitions, etc.<sup>4,11</sup>

2.5.5.2. Awareness campaigns. Of all the above-mentioned strengths the awareness activity conducted by the CCMN at the metro station of Delhi Metro Rail Corporation at the Metro Station is worth mentioning.<sup>4,11</sup> The awareness activity is a novel attempt and was done for the first time in India on two consecutive years i.e., 2015 and 2016. In this activity a stall was placed at one of the busiest metro rail station, i.e., at the Moti Nagar, wherein a DOT provider and a physician was involved in creating the awareness for the masses.<sup>4,11</sup> The awareness activity was unique and has never been done anywhere in the world for

**Table 1:** DOT Centers under CCMN

<b>Tuberculosis Unit I (TU-I)</b>	
1	Chest Clinic Moti Nagar, Moti Nagar, New Delhi
2	Sardar Vallabh Bhai Patel Hospital - Patel Nagar, Delhi
3	Delhi Govt. Dispensary - Prem Nagar, Delhi
4	Delhi Govt. Dispensary - Baljeet Nagar, Delhi
5	ESI Dispensary (NIA) - Near Moti Nagar Police Station, Moti Nagar, New Delhi
6	ESI Dispensary - I Block, Karampura, New Delhi
7	C-1C, Raja Garden, Delhi
8	Sudarshan park, (Operation ASHA)
9	Amar Park, Zakhira (Operation ASHA)
10	Delhi Govt. Dispensary, Ranjeet Nagar, New Delhi
11	Basti Vikas Kendra - Lakkarmandi, Jawahar Camp, Kirti Nagar, New Delhi.
12	Kalakar Trust, Pandav Nagar, New Delhi
<b>Tuberculosis Unit II (TU-II)</b>	
1	Delhi Govt. Dispensary, Nangloi, Delhi
2	Khushali Society - E-Block, Nangloi, Delhi (running with DGD Nangloi)
3	Delhi Govt. Dispensary, Tikri Kalan - Tikri Kalan Village, Delhi
4	Delhi Govt. Dispensary, Madipur - F Block, Madipur JJ Colony, New Delhi
5	Delhi Govt. Dispensary, Paschim Vihar - A Block, Paschim Vihar, New Delhi
6	Delhi Govt. Dispensary, Jwala Puri, - Camp no.4, Jwala Puri, New Delhi
7	Delhi Govt. Dispensary, Tilangpur Kotla - Tilangpur Kotla village
8	Delhi Govt. Dispensary, Nihal Vihar, Delhi
9	ESI Dispensary- Pocket 3, Paschimpuri, Madipur, New Delhi
10	ESI Dispensary- Camp No.4, Jwalapuri, New Delhi
11	CGHS Dispensary, Sunder Vihar, behind Sunder Vihar bus Stand
12	CGHS Dispensary- Green Appt., Near Jwalaheri Market, Paschim Vihar
<b>List of DMC's under CCMN</b>	
<b>TU-I</b>	
1	Chest Clinic, Moti Nagar, New Delhi
2	Sardar Vallabh Bhai Patel Hospital, Patel Nagar, Delhi
3	Basti Vikas Kendra, Lakkarmandi, Jawahar Camp, Kirti Nagar, New Delhi
4	ESI Hospital, Basai Darapur, Raja Garden, New Delhi
5	Delhi Govt. Dispensary, Ranjeet Nagar, Delhi
6	Delhi Govt. Dispensary, Prem Nagar, Delhi Govt. Dispensary, Prem Nagar, Delhi
<b>TU-II</b>	
1	Delhi Govt. Dispensary, Nangloi, C-Block, Nangloi, New Delhi
2	Delhi Govt. Dispensary, Madipur, F Block, Madipur J J Colony, New Delhi
3	Delhi Govt. Dispensary, Paschim Vihar, New Delhi
4	Delhi Govt. Dispensary, Jwala Puri, New Delhi
5	Delhi Govt. Dispensary, Delhi Govt. Dispensary, Tikri Kalan
6	Delhi Govt. Dispensary, Delhi Govt. Dispensary, Tilangpur Kotla, Delhi
7	Khushali Society - E-Block, Nangloi, Delhi (running with DMC at DGD Nangloi)

TB control in the past. The details of the activity are also reported elsewhere in two international publications.<sup>4,11</sup>

2.5.5.3. Efficient counseling of the patients. At the CCMN prime importance is given to the counseling of the patients to encourage them to complete their full course of treatment. The role of DOT providers, Senior Treatment supervisors (STS), MO-TB, and the DTO are commendable. The prompt retrieval of the defaulter/loss to follow-up cases is done at the CCMN.<sup>12</sup>

## 2.5.6. Weakness

2.5.6.1. Distance issues. The weakness worth mentioning is the distance of the DTC from the sub-centers. The DTC covers an area of about 30 kilometers and thus at times it is really difficult for the patients to travel to the DTC for prompt treatment. With the high-burden of cases, the distance plays a major role. The already weak and poor patients are sometimes devoid of prompt treatment of adverse effects due to the distance constraints. The issue has been raised multiple times with the higher authorities, but the same is still unheeded.

2.5.6.2. Shortage of staff. The second issue is the lack of staff. There is a shortage of staff at the CCMN. There are vacant posts of Medical Officers that are adversely affecting the monitoring and supervision of the programme. There is also a requirement of DOT providers, Senior Treatment Lab Supervisor (STLS) and STS.

**Table 2:** Staffing pattern

Name of position	Sanctioned	Positioned	Vacant
MO-TB	3	1	2
Pharmacist	2	1	1
X-ray technician	2	1	1
LDC	2	0	2
Lab assistant	2	0	2
Peon	2	1	1
Safai karamchari/Cleaners	3	2	1

2.5.6.3. Drug store not as per the guidelines. The district also lacks the standard drug store with all the mandatory requirements like an air conditioner, proper spacing between drugs, moisture/humidity control, pest control and twenty-four hour power back-up.<sup>6</sup> Besides, the RNTCP guidelines state that a buffer stock of three months should be maintained at the CCMN however, the same is lacking.<sup>6</sup>

2.5.6.4. Travel issues of patients under enhanced case finding. A major issue related to the patients is that in cases with extrapulmonary involvement like any abscess or lymphadenitis there is no provision of sample collection which should be sent to the National Reference Laboratories (NRL) like AIIMS, NDTB, Safdarjung Hospital for culture like LPA/CBNAAT. The poor patients have to travel first to the higher centers like the RBIPMT and there the samples are collected only on two weekdays and then these patients have to submit these samples to the NRL's. This leads to the unnecessary burdens on the patients and often result in poor patient compliance, thereby adversely affecting the enhanced case finding for the drug-resistant TB cases like those of MDR and XDR-TB.

2.5.6.5. Job dissatisfaction. Another weakness is related to job satisfaction. Although the DOTS is running smoothly at the CCMN, but there is a great difference between the salaries of the permanent and contractual employees. The permanent employees are paid higher salaries with annual increments and other perks and allowances, but the contractual employees are devoid of all such entitlements and thus there are issues related to the job satisfaction which needs to be addressed.

2.5.6.6. Lack of research. The district is an important part of New Delhi and covers a huge population. But the studies to determine the cause for such a large TB patient load in the district are lacking. Although, CCMN has published a

few very rare case reports, but these are sparse.<sup>2,3</sup> In-depth studies, like operational research was lacking at the CCMN.

### 2.5.7. Opportunities

2.5.7.1. Condition ideal for operational research. The high burden of TB cases serves as an excellent source for a number of clinical and research studies. The district covers a very large population and thus can be a great platform for the studies to determine the higher rate of TB incidences and prevalence in the urban population. A number of qualitative and quantitative research can be done at the CCMN. The results obtained from these studies can be beneficial for the formulation of new or modification of already existing guidelines.

2.5.7.2. Good platform for innovative awareness campaigns. The success of the innovative awareness activities at the Metro Station at Moti Nagar can also be really useful for the enlightenment of the lay public about TB its free cure and thus, in the long run, will help in reducing the overall TB cases in the urban population.<sup>4,11</sup>

2.5.7.3. Treatment for patients in night shelters. The CCMN also has two night shelters under its district and the guidance and training by the STS to the caretakers at these night shelters will help with prompt diagnosis and treatment of the presumptive TB cases. The novel activity will serve as an important step in the reduction of the new TB cases and also in the alleviation of the problems in those who are already suffering.

2.5.7.4. Opening of tertiary care health facilities for patient benefit in the vicinity. The CCMN also covers the area of Basaidarapur where a medical college is about to be started at the ESIC Basaidarapur.<sup>13</sup> Thus the presence of a medical college in the vicinity will boost the prompt referral and expert care of the TB patients.

### 2.5.8. Threats

2.5.8.1. Increase in default/loss to follow-up rate. The long distances as described earlier are sometimes the reason for the default/loss to follow-up of the patients from the DOTS. The poor patients cannot afford the daily travel to the DOT centers and the charges to travel to the CCMN in cases of common adverse effects of the drugs. This will adversely affect the treatment outcomes and also the overall health of the population of the district.

2.5.8.2. Issue related to the premises. As evident by the data obtained from the patients and the service provider's majority of both the categories are not happy with the premises. The patients had distance issues related to CCMN. Also, the building is in poor shape and has been declared 'dangerous' by the MCD's civil engineers. Still, the poor patients have to risk their life to visit the dangerous building

of the CCMN. With Delhi situated at the hot spot of the earthquake belt, such dilapidated buildings can collapse anytime which may result in a huge loss of life and property.

The staff is risking their lives to work in an already declared 'dangerous' building. The complaints of plaster/bricks falling on the staff are common. Such a grave situation can lead to any major loss of life or disability anytime.

#### 2.5.9. Selected health care program

The main objective of DOTS at the RNTCP is to detect a maximum number of cases and to start DOTS to these patients promptly.<sup>6</sup> The issues related to non-compliance of patients, the stigma associated with the disease, etc. are addressed professionally and the patients are encouraged to adhere to the treatment and also they are counseled continuously throughout the treatment. The active role of DTO and MO-TB to solve any issues related to the patient of the service staff is also important for the success of the program.<sup>6</sup> The main purpose of choosing this study was to determine the grey areas which need improvement so that the DOTS can be fostered to achieve more than 95% success rate and negligible default rate. The current treatment success rate of India as per the WHO Global report 2015 is 88%.<sup>10</sup> The annual performance of the CCMN is detailed Table 3.

#### 2.5.10. Reasons for low performance

1. The distance of the DOT centers far from the patient's home.
2. The distance of the CCMN far from DOT centers.
3. The low pay scale of contractual staff.
4. Dangerous premises of CCMN.
5. Lack of supervision due to the shortage of staff.

### 3. Results

The authors studied the quarterly reports available at the WHO website, at the website of [tbcindia.nic.in](http://tbcindia.nic.in) and from the reports available at the CCMN.<sup>6</sup> The data obtained by adding the Category I pulmonary TB cases in four quarters were as under.

Table 4 shows that there is a steady increase in New Sputum Positive (NSP), cases in the last six years. The increase in different types of TB cases is alarming as the RNTCP was in full swing and still the results are showing a steady rise. The rise in the number of cases could be attributed to a number of factors like the new and improved diagnostic facilities, increasing awareness about TB in the population; the role of Accredited Social Health Activist's (ASHA's) and NGO's to encourage the patients to take treatment for TB; advice from a cured patient in the community who encourage others to resort to DOTS after detailed clinical examination at the CCMN; advertisements about the disease in the print and media by

the Government of India; audio and video commercials; regular community and district level meetings held at the various DOT centers and also at the schools, fire station, police station, metro station, etc.<sup>4,11</sup> It has been observed that the role of awareness campaigns is an integral part of TB control. Studies conducted in Serbia showed that most of the general public was not having satisfactory knowledge about TB and the same is also true for the Indian population.<sup>4</sup> The majority of the population was not aware of the basic presentations of the disease like cough with or without expectoration, fever, loss of appetite, weight loss, etc.<sup>4</sup> A number of misconceptions about TB still prevail in society. In a huge country like India, it is imperative to involve every segment of the community for effective prevention and control of TB.

The data obtained from questionnaires were as follows:-

The data analysis and interpretation were done in detail using tables and percentages. The data were compared with the published literature and also with the standard data available at the CCMN and also at the national level. All the study participants were happy with the smooth functioning of the RNTCP DOTS program.

The data analysis also revealed that the most important factor related to service providers was the issue of the dangerous building. The premises were so dangerous that it could collapse anytime. This great demotivating factor was affecting the work of the staff, as they were scared of working in such a building. The issue also looms large in the patient's mind when they step into an already dangerous building with 24 (80%) patients not happy with the dilapidated building. However, there is a certain section of subjects that were happy with the premises and these were the study participants who were either working or taking DOTS from various DOT centers of the CCMN in the vicinity.

The lack/shortage of staff was also an important finding from the study. There were a number of posts including those of Medical Officers, STS, STLS, DOT providers, pharmacist, lab assistants, etc., lying vacant. In such a crunch situation it was very difficult to timely supervise the DOT centers. Besides, the lab works and the administrative works were also suffering due to such a shortage.

The next point noted was the staff was cooperative and was well guided by the DTO and MO-TB. This could well be the major contributor to the success of the RNTCP DOTS at the CCMN.

Almost all lab technicians and 68.75% of DOT providers were not happy with the salaries. The staff was underpaid and was contractual in the majority of these study participants. The 31.25% DOT provider who are happy with their salaries were the permanent staff and were paid about twice the amount of salary along with the regular perks and other allowances.

**Table 3:** The annual performance of the CCMN in last three years

Name of health program	Annual performance	Target set	Achievement in percent (Coding B)
DOTS under RNTCP for Category I TB patients	2013- 85%	2013-90%	94%
	2014-86%	2014-90%	95%
	2015-87%	2015-95%	91.57%

**Table 4:** Trends of Category I-(NSP) in the last six years

Types of cases	Year					
Category I	2010	2011	2012	2013	2014	2015
NSP	454	492	479	622	778	868

Majority 80% of the patients responded affirmatively when asked about the DOT provider's behavior and only six cases answered negatively. The reason could well be attributed to a high workload and less pay leading to job dissatisfaction in these DOT providers.

Of the 30 service recipients, six were not happy with the DOTS strategy. The majority of the patients were happy with the program. Six patients were not happy with the strict alternate-day regimen and the distance of the DOT centers from their residence. The same reason holds for the patients who were unhappy with the anti-TB medicines due to the adverse effects of the drugs.

All the patients responded that there were no charges for the anti-TB medications and also that the DTO and MO-TB promptly solve any issues related to patients or service providers.

Sixteen patients were having issues related to the distance of the CCMN or their DOT center from their residence. The issue has been detailed earlier in this paper in the section of SWOT analysis.

The questions related to sputum follow-ups, community meetings, and initial home visits were answered affirmatively by all the TB patients. Thus, giving an impression that the RNTCP was in full swing as per the set guidelines at the CCMN and its DOT centers.

### 3.1. Identifying the managerial problems

The emphasis was laid on finding the managerial issues associated with the proper implementation of the program. It was noticed that there were vacant positions of the MO-TB, STS, and STLS and thus the supervision is affected many a time. The RNTCP requires frequent and timely supervisions and in the absence of such supervisory visits, the smooth running of RNTCP could be affected. The problem of such shortage of staff should be addressed as a priority and then only the efficient and effective monitoring could be done in such a large district of Western Delhi.

The second major issue was related to the casual approach of the contractual staff. The efforts should be made to solve their issues.

The third issue related to the patients was that of the distance which at some centers was about 35kms from the CCMN. The distance results in failure to promptly consult the doctors at the CCMN in cases of the adverse drug reactions and thus may result in increasing the default rate.

Another issue was related to the dangerous premise of the CCMN. Such buildings should be immediately shifted to safe places in the vicinity.

### 3.2. Suggested interventions

1. The CCMN should be shifted to safer premises.
2. The distance between the CCMN and DOT centers should not be a factor for a patient to be deprived of the expert's care and also to become a defaulter from the program in the absence of such care. Such patients should be referred to the nearest higher health care facility.
3. The research activities should be encouraged.
4. The motivational sessions for the staff and the patients can be organized periodically to distress the participants.
5. The issues of contractual staff should be given due attention as per the guidelines.
6. Periodic training of DOT providers and other staff for the betterment of the DOTS practice.

### 3.3. Action plan

After analyzing the data it was found that the shortage of staff was the main factor contributing to the lack of timely supervision. The authorities responsible for the filling of such vacant posts should be informed and requested to fill such posts.

Moreover, the issue of the distance of the CCMN and its DOT centers can also be solved by referring to the Category I patients of TB to the nearest tertiary level facilities. The same will help the poor patients who are not able to pay for the commutation to the CCMN in case of any adverse drug reactions or for any other consultations with the DTO or MO-TB.

Besides, the contractual staff should be motivated time and again for the smooth running of the DOTS at the CCMN. The efforts should be made to make this section of workers permanent as per the guidelines. If the same is difficult then there should be some incentives like Best DOT provider of the month or Best Lab Technician of the month, etc. which will help in creating an atmosphere conducive to effectively and efficiently implementing the DOTS at the various centers under the CCMN.

Motivating sessions both for the staff and patients can be organized frequently and thus will help in solving the issues of the lack of interest or job dissatisfaction.

The dilapidated building of CCMN should be shifted to any safe location in the vicinity and this will solve the problem of fear among the service providers and service recipients.

Awareness campaigns like the one conducted at the metro stations will boost awareness among the general public and will help in active case finding. The commuters are receptive and responsive to special health education messages and are more inclined to assimilate the information and relay it to other household members and friends. This will encourage people to actively visit the CCMN for the check-up.

Operational research should be encouraged at the CCMN. As it will be a boon for the research fraternity and results will help in new policy-making or for modifications in the existing guidelines. Periodic training of all the staff is imperative.

The operational problems as stated above should be addressed promptly to run the DOTS strategy of RNTCP efficiently and effectively. Thereby, increasing the case detection and the cure rate and reducing the default rate which is of prime importance in the national program. The researcher believes that after the completion of this project, with the recommendations made in this study there will be an improved DOTS practice under the RNTCP in Western Delhi.

#### 4. Conclusions

To conclude we had conducted a study to find the various issues related to the patients and the providers at the CCMN which are important in determining the success of the DOTS at the CCMN. The study suggested few actions to be taken to further improve the DOTS practice under RNTCP at the CCMN. The present study will serve as an example for

the nationwide analysis of the DTC's and will, in turn, provide valuable data and issues which may directly or indirectly impact the efforts towards achieving the goal of TB elimination from a very high TB burden country.

#### 5. Source of Funding

None.

#### 6. Conflicts of Interest

None.

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