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Original Research Article

A study of compliance to DOTS among tuberculosis patients attending a district hospital, Uttar Pradesh

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ABSTRACT

Background: Tuberculosis is an old disease and has deep social impact on the society. It is a re-emergent killer disease with rise in MDR and XDR strains. DOTS strategy under RNTCP has had a substantial impact over the past two decades. Treatment compliance is one of the key factors determining success of TB control program. The objective of this study was to find out the compliance rate with DOTS and factors responsible for non-compliance in the district.
Methods: A cross-sectional study was carried out using structured questionnaire in a tuberculosis unit of Chandauli district, Uttar Pradesh. 100 tuberculosis patients aged ≥15 years registered for TB treatment were enrolled in the study.
Results: Out of the 100 patients interviewed, majority of patients (95%) complied. The main reasons for non-compliance were improvement in symptoms after initial doses leading to discontinuation of therapy, and side effects of drugs. One of the defaulter migrated, so he could not be traced. Among factors influencing compliance to DOTS most important was strong monitoring.
Conclusions: Health education and easy accessibility of healthcare services are required to further improve the compliance of TB treatment. Internet tools and social security schemes can play essential role in increasing awareness and strengthening the monitoring program.

Keywords: DOTS, Compliance, Tuberculosis, Noncompliance, Default

INTRODUCTION

Tuberculosis (TB) is among the top 10 causes of death worldwide. In 1993, WHO (World Health Organization) declared TB a global health emergency.[1]

In 2017, 10 million people were ill with TB, and 1.6 million died including 0.3 million people with HIV (Human Immunodeficiency Virus). In the same year an estimated 1 million children became ill with TB and caused death of 2,30,000 children. TB is a leading killer of people who are HIV-positive. Multidrug-resistant TB (MDR-TB) is a public health crisis and also a health security threat. WHO estimates that there were 5,58,000 new cases of TB with resistance to rifampicin (first-line drug), of which 82% had MDR-TB. Globally, the fall in TB incidence is about 2% per year. There is a need to accelerate this annual decline to 4–5% to reach the 2020 milestones of the End TB Strategy. Between 2000 and 2017, an estimated 54 million lives were saved through TB diagnosis and treatment. Sustainable development goals include ending the TB epidemic by 2030 among the health targets.[2]

Various studies have noted that compliance with treatment is the approach that reduces the need of further healthcare assistance, especially when it comes to tuberculosis, which is directly associated to social structure. The incompatible social structure undermines the huge effort that is put in by the Government and healthcare workers to treat and eradicate the disease. Social inequalities make individuals vulnerable to diseases. One of the main issues making the disease even more complex is the abandonment of treatment having serious repercussions in the epidemiological scenario. However, compliance with treatment is related to how the patients conceive the disease, their social status and awareness of the disease, as well as the standard of healthcare services available in that geographical region. In 1993, the WHO recommended the implementation of DOTS (directly observed treatment short course) for treatment of tuberculosis, aiming to achieve better treatment compliance.[3]

DOTS under Revised National Tuberculosis Control Program (RNTCP) is a proven, cost-effective TB treatment strategy. It is a combination of technical and managerial components which quickly makes the infectious cases non-infectious and breaks the cycle of transmission. DOTS also prevents the development of drug-resistant strains of TB that are often fatal and more expensive to cure.[4]

RNTCP, a centrally sponsored scheme, is being implemented under national health mission. This program was initiated from 1997, and had covered the entire country in 2006. The program, since then, has achieved global benchmark of case detection and treatment success and achieved millennium development goals in 2015 of halting and reversing the incidence of TB.[5] However, MDR-TB, which has emerged primarily as a result of inadequate treatment, continues to pose problems.

Poor adherence to treatment is one of the factors under patient centric causes responsible for emergence of multi-drug-resistant and extensive-drug-resistant bacilli.[6,7] Hence, ensuring compliance is of utmost importance to control TB and halt the MDR & XDR (extensive drug resistance) TB epidemic at an early stage. There is a need to sustain and further intensify the actions being undertaken to reduce default.[7] It is important to know the reasons of default and timely retrieval of these patients who interrupt treatment. This study was conducted to know the compliance rate among tuberculosis patients and the major reasons behind noncompliance.

METHODS

Study area and population

This is a cross sectional study that has been carried out in Chandauli district of Uttarpradesh, India. The district has been divided in three Tuberculosis Units (TUs), covering a population of 2 lakh named Chakia, Rampur and Shikarganj. For the study Chakia TU was selected. All the patients registered in the DOTS centers of the selected TU from October 2018 onward were included in the study until the desired sample size was complete. During this study, it was decided to interview all patients at the DOTS centers. Verbal consent was obtained from patients and the pretested questionnaire was administered by investigator. Treatment cards of these patients were obtained from the selected TU and all the required information was collected on predesigned pretested schedules. For criteria of non-compliance, the RNTCP definition of defaulter has been accepted here.[6] Patients who defaulted on treatment were interviewed regarding reasons of default and other associated factors.

Sample size and duration of study

All tuberculosis patients aged ≥15 years who registered between October 2018 to January 2019 in the DOTS center of the district were enrolled in the study. Out of 127 registered TB patients, 100 TB patients were interviewed. All the patients were on treatment under Community Based DOTS strategy.

Definition of default

"A patient who, at any time after registration, has not taken anti-TB drugs for two months or more consecutively."[6]

Statistical analysis

The analysis included profiling of patients on different socio-demographic pattern. Statistical association between the compliance and the patients' socio-demographic characteristics were derived. Descriptive statistics was analyzed with SPSS version 17.0 software. $P<0.05$ was considered statistically significant.

RESULTS

The study was conducted among patients of Chakia TU, who were treated for tuberculosis using the standard treatment regimen of DOTS. Out of the total 127 registered patients 100 patients could be interviewed.

Of the 100 patients interviewed 57% were males and 43% females. The association of compliance with sex was statistically not significant ($p=0.93$). Maximum number of patients were in age group 15-34years (41%) followed by 35-54years (33%). The association of compliance with age is statistically significant ($p=0.0389$). The compliance was maximum in 15-34 years age group. With respect to occupation 35% of patients were in unemployed category which included housewives, followed by farmers and laborers (Table 1).

Married people were more compliant to treatment. Higher rate of compliance was observed in people with college level education (100%) while it was low in illiterates

(90.6%) (p=0.223). Regarding relation of socioeconomic class (as per modified Kuppuswamy scale)[8] to compliance, no significant difference was observed (p=0.29).

Table 1: The socio-demographic profile of the study population.

Socio-demographic factors	Compliant	Non-compliant	Total
Age groups (years)			
15-34	41	0	41
35-54	31	2	33
>55	23	3	26
Gender			
Male	54	3	57
Female	41	2	43
Marital status			
Married	70	2	72
Single	25	3	28
Occupation			
Service	14	0	14
Farmer	22	2	23
Unemployed	32	1	35
Laborer	17	2	18
Other	10	0	10
Education			
College	11	0	11
Secondary level	26	0	26
Primary level	30	1	31
Illiterate	28	4	32
Socioeconomic class			
Class I	3	0	3
Class II	10	0	10
Class III	23	1	24
Class IV	24	1	26
Class V	35	3	37

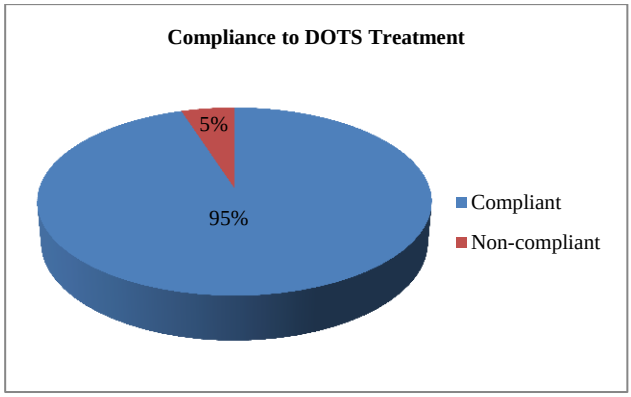

Figure 1: The rate of compliance to DOTS treatment.

Of the 100 interviewed patients, majority of patients (95%) complied, while 5% patients did not comply with treatment.

In the present study, 4 defaulted and 1 died. Overall compliance rate in our study was found to be 95% (Figure 1).

On analyzing the reasons of default, 2 stopped the treatment because they felt better and didn't continue the treatment, 1 left because of side effects following medication. One of the defaulter migrated, so he could not be traced (Table 2).

Table 2: The reasons of non-compliance to DOTS among tuberculosis patients.

S. no.	Reason of discontinuation	Number
1	Feeling better	2
2	Side effects of drugs	1
3	Migration	1
4	Death	1
	Total	5

Table 3: The factors influencing compliance to DOTS among tuberculosis patients.

S. no.	Reasons of compliance	Percentage (%)
1	Strong monitoring	19
2	Monetary support	17
3	Accessibility (mobile van)	14
4	IEC (radio/T.V.)	12
5	Self motivation	12
6	Attitude of healthcare staff	9
7	Good diagnostic facility	7
8	Active case finding	5
9	Family support	3
10	Economical factor	2
	Total	100

Highest percentage (19%) among factors that influence compliance to DOTS was strong monitoring and the least important factor was (2%) economical factor (Table 3).

Strong monitoring, monetary support, accessibility of medical services, Information Education and Communication (IEC) through television, radio etc. and self motivation are the top five reasons of good compliance to DOTS in this study.

DISCUSSION

In the study out of 100, 95 complied with the treatment while 5 defaulted, which is in accordance with what is expected under RNTCP.[9] Jain et al observed similar default rate of 4.6% and Bhadke et al reported default rate of 7.7%.[10,11] While Rai et al reported a non-compliance rate of 18.9%, Jain et al reported 12.5% and Mittal et al reported 15.1% default rate.[7,9,12] This may be either due to difference in working definitions of noncompliance or actual difference of compliance rate in the community

because of the varying socio-demographic variables or healthcare associated factors.

Patients in age group of 15-34 years were mostly compliant while older patients (>50years) were less compliant. Similar findings were reported by Mittal et al that default was more in older patients.[7] But Rai et al and Bhadke et al found that default was highest in middle age group.[10,12] The reason behind higher non-compliance in older patients is mainly the self-neglect and neglect by family members, while co-morbidities and restricted mobility were also important reasons. Further higher default in the middle age group may be due to the reason that they are economically productive members of the family. They cannot get frequent leaves to reach the DOTS center and comply with the treatment regimen which led them to abandon the treatment in between.

In the present study compliance was more among females than males similar to Rai et al while Kumar et al reported higher percentage of noncompliance among females.[7,12,13]

It is evident in our study that compliance rate was higher among educated patients as compared to illiterate. The reason for non-compliance of illiterate patients, was lack of understanding of the consequences of interrupted treatment. So to improve compliance among these patients, they should be educated about various aspects of disease, DOTS and importance of completion of treatment. Gopi et al. in their study (South India) reported that non-adherence to DOTS was higher among illiterate (39%).[12,14]

Non-compliance was found to be higher among laborers (11%) and farmers (8.7%). This may be because laborers were not willing to visit DOTS center frequently due to the fear of losing daily wage and poor knowledge regarding the significance of completing treatment. Similar reasons were true for farmers. Other authors in their study have reported higher non-compliance among employed than unemployed.[12,15]

Noncompliance was highest among patients belonging to socioeconomic class-V (8.1%), but significant association between compliance and socioeconomic group was not found. Other studies have found similar association.[12, 16] This is probably due to the fact that most of the patients of lower socioeconomic class were daily wager and illiterates.

In the present study main reasons of non-compliance were false perception of having their disease cured as they felt better after initial treatment (2/5), adverse effects of drugs (1/5) and migration of the patient (1/5). One of the patients, died due to co-morbidities. Kaona et al and Bhadke et al also found that most common reason of failure to comply with DOTS was symptomatic relief after initial therapy.[10,17] Similarly, Juvekar et al reported that reason of default to DOTS were felt better 27%, health services related problem 17%, side effects of drugs 10%.[18] Jaggarajamma et al found that intolerance to drugs 42%, migration 29%, symptoms free 20%, work related problems 15%, treatment elsewhere 13% and domestic problems 8% were major reasons for non-compliance to treatment in their study.[19] A study done in the states of Bihar and West Bengal reported that improvement in symptoms (40% and 56%), intolerance to drugs (20% and 9%), and other illnesses were major causes of non-compliance.[20] Mittal et al reported side effects following medication, improvement in symptoms, lack of time, no relief following medication, and lack of awareness as the reasons of non-compliance to DOTS.[7]

Since in the present study compliance was found to be 95%, which is very close to the expected rate, reasons for good compliance were also analyzed. The important reasons behind compliance were strong monitoring strategy under the RNTCP program, monetary support including travel allowance and diet support, accessibility to healthcare services which have been enhanced by introducing the mobile van. The mobile van has the basic facilities of diagnosing TB through microscopy, providing medicines and information regarding DOTS.

Information, education and communication by various means like Television, Radio etc. has led to increased awareness about TB and the DOTS treatment strategy. These promotional measures motivate the patients to approach healthcare centers and seek treatment. Knowledge about the disease, its treatment options and information about the adverse effects of the drugs and treatment interruption can have a positive psychological impact on the patient. The communication between the healthcare provider and patients with their family members goes a long way in ensuring adherence to treatment. Self motivation is one factor which alone can be the driving force for a patient to complete his/her treatment. If the patient is self motivated, he/she will not only comply with the treatment but also take care of their diet, which is an essential element in cure of the patient. The good attitude of the healthcare staff, maintenance of constant supply of medicines and prompt actions against adverse effects of drugs drives patients' to healthcare centers.

Government of India (GoI) is taking a lot of effort to maintain good diagnostic facilities and actively find new cases not only to eradicate TB but also to prevent the development of MDR TB. Family support and cost factors are other factors influencing compliance to TB treatment. The support of the family is essential factor because this helps patients to get over the social stigma of the disease and a concerned family can encourage the patient to complete the treatment. Cost factor becomes less important as the treatment is free of cost, also travel and diet allowances are provided by the GoI.

This study has certain limitations. Firstly, it is a single center study which is restricted to one tuberculosis unit of a district. Secondly to generalize the findings, a larger

study needs to be carried out. Thirdly, we did not measure the time of default or non-adherence when interviewed. Lastly, recall bias cannot be ruled out.

CONCLUSION

Compliance with DOTS is directly associated to how the patient understands the disease. Therefore, it is necessary to transcend the understanding of the strategy, so that it goes beyond medication intake and considers individuals' needs. All TB patients should have access to free, affordable and quality assured diagnostic and treatment services. Treatment and support should be provided at locations and timings so as to minimize workday disruption.

Counseling of the patients as well as the family members should be done by the healthcare provider at the initiation of the treatment explaining the treatment plan, adverse effects of the anti-tubercular drugs and the importance of proper nutrition during the treatment. Apart from one to one counseling, multidisciplinary support groups and self help groups can prove to be effective intervention to promote treatment adherence. The problem arising due to migration during treatment can be tackled through efficient referral and transfer system. There is already a strong IEC campaign in our country for TB. The same can be used to curb the social stigma behind the disease. Internet tools and social media can be used as an effective platform for increasing awareness and strengthening monitoring program.

Social security schemes such as RSBY (Rashtriya Swasthya Bima Yojana), TB pension scheme and CSR (Corporate Social Responsibility) etc. may be linked to mitigate out of pocket expenses. Extra nutritional support for TB patients can be provided through schemes like PDS (Public Distribution System) and Food security act. All these efforts go a long way in ensuring compliance to tuberculosis treatment.

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