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Various Factors Associated With Non-Compliance To Dots

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Abstract
BACKGROUND : *Tuberculosis (TB) is a communicable disease requiring prolonged treatment. Poor adherence to a prescribed treatment increases the risk of morbidity, mortality, and spread of disease in the community Further poor adherence to treatment leads to emergence of multi-drug-resistant bacilli, so ensuring compliance is of utmost importance to control TB and halt the MDR TB epidemic at its beginning. So there is continuing need to sustain and further intensify the actions being undertaken to reduce default.*
AIMS AND OBJECTIVES: *To study various factors associated with non compliance to DOTS.*
MATERIAL AND METHODS : *This cross sectional type of study was conducted on 900 patients registered to DOTS centers of Agra city using simple random sampling. Treatment card of patients were obtained from their respective DMCs and all the required information was collected. Defaulters were further traced in community along with an equal number of no defaulters.*
RESULTS : *default was significantly associated with older age (22.5% of non compliant patients were of >45 years), male sex and business man and labourer. Education was found to have significant effect on patient compliance. It was also observed in table 2 that the patients who did not comply to the treatment had more side effects (62.2%). Less than half (48.6%) of patients of non compliance group were aware that tuberculosis is an infectious disease of lungs, 37.8% patients of non compliance group and 42.3% patients of compliance group were aware about correct mode of transmission of tuberculosis while 30.6% of defaulters and 43.2% of non defaulters were aware that TB is curable. Higher proportion of non defaulter patients (40.5%) was aware about what the DOTS is, as compared to defaulters (28.8%).*
CONCLUSION: *Non compliance was found to be due to lack of knowledge about various aspects of tuberculosis and its treatment along with side effects of medicines. So health education along with some modification in drugs dosages is the need today.*

Keywords: *DOTS, tuberculosis, non-compliance, compliance, defaulter.*

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I. Introduction

Tuberculosis (TB) is a communicable disease requiring prolonged treatment. Poor adherence to a prescribed treatment increases the risk of morbidity, mortality, and spread of disease in the community.[1] The World Health Organization (WHO) declared TB a global public health emergency in 1993 and since then intensified its efforts to control the disease worldwide.[2] Tuberculosis control has been accorded a high priority within the health sector as it is a major public health problem.[3]

Revised National TB Control Programme (RNTCP) is an on-going Centrally Sponsored Scheme, being implemented under the umbrella of National Health Mission. The programme was initiated from 1997, covered entire country in 2006. The programme, 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. In 2013, total population of India covered under Revised National Tuberculosis Control Program (RNTCP) were 1247 million; 81,21,514 TB suspects were examined; 9,28,190 smear-positive TB patients were diagnosed; 7,98,414 smear-positive cases were notified; and 14,10,880 patients were registered for treatment. The treatment success rate has been more than 85% since the year 2001; default rates have decreased from 9% in 1999 to 6% in 2012 among NSP cases. High default rates among smear-positive retreatment cases (more than 15%) have been an area of concern.[4]

Further poor adherence to treatment leads to emergence of multi-drug-resistant bacilli, so ensuring compliance is of utmost importance to control TB and halt the MDR TB epidemic at its beginning. So there is continuing need to sustain and further intensify the actions being undertaken to reduce default. The focus must remain on dealing with important reasons of default and timely retrieval of patients who interrupt treatment. This paper identifies reasons for noncompliance to treatment among defaulters, elicited during home visits.[5]

II. Aims And Objectives

1. To study various factors associated with non compliance to DOTS.
2. To find out measures to decrease treatment interruption among tuberculosis patients put on DOTS.

III. Methodology

This cross sectional type of study was conducted on patients registered to DOTS centers of Agra city. For calculating suitable sample size overall failure and defaulter rate was taken as 10.2%.[6] The minimum sample size comes out to be 880. Keeping the dropouts and non respondents in consideration, the sample size is increased and rounded off to 900 patients. Sampling technique used was simple random sampling. The sampling was done using the following steps –The list of Tuberculosis units along with their Designated Microscopic Centers and DOTS centers was obtained from District Tuberculosis Center. There are three TU in Agra city, named as Agra central, Agra south and Agra north. All the three TUs were selected for study. In the second stage, two DMCs from each TU were selected randomly. All the DOTS centers under these selected microscopic centers were taken for study. All the patients put on treatment on selected DOTS centers during the study period were taken till the desired sample size was achieved. Treatment card of patients were obtained from their respective DMCs and all the required information was collected on predesigned pretested schedule. Patients who defaulted on treatment were further traced in community and interviewed thoroughly regarding reasons of default. Along with defaulters an equal number of no defaulters were also studied. The information thus collected was computerized in specific programme developed on Microsoft office excel and was analyzed with the help of SPSS statistical software.

IV. Observation and Results

In present study total 900 patients were taken. Among these maximum patients belonged to the productive age group, i.e. age group of 16-30 years, (40.8%), followed by 31-45 years age group (26.6%), 19% belonged to <15 years age group, 13.7% of patients belonged to >45 years age group. 61.3% of total selected patients were male. Regarding the treatment outcome of patients it was found that 71.6% of patients had favorable outcome at end of treatment (45.4% treatment completed and 26.2% cured). While 15.1% defaulted.

Among 900 patients, a total of 136 defaulters were found. When these non compliant patients were traced in community, only 111 patients could be contacted and interviewed to find out various factors associated with treatment default. A comparison group of 111 patients from the same area from where defaulters were studied was also studied to analyze the factors behind treatment default.

Table 1 shows effect of different bio-social factors on compliance of patients. On analyzing the effect of age on compliance of patients it was observed that default was significantly associated with older age (22.5% of non compliant patients were of >45 years while only 9.9% patient were >45 years age in compliance group. Compliance to treatment showed significant difference among male and female. Among defaulters three fourth patients (74.8%) were male. Hindus were significantly more (85.6%) as compare to non defaulters (80.1% Hindu).

On analyzing the effect of occupation, it was observed that laborers and businessman were more among non compliance group (57.6% and 9.0% respectively) as compare to compliant one (47.7% laborers and 3.6% businessman). Proportion of unemployed and retired persons was also more among defaulters (6.3%), Education was found to have significant effect on patient compliance to treatment as 34.2% patients were illiterate among non compliance group, while it was almost one forth patients in compliance group.

As proved by previous studies, side effects following medication is an important factor of treatment interruption, it is also observed in table 2 that the patients who did not comply to the treatment had more side effects (62.2%), while almost half of patients in compliance group had side effects and this difference was found to be statistically significant. Among various side effects nausea and vomiting was equally present among both the groups (18.0% & 17.1% among defaulters and non defaulters respectively) but side effects like fatigue, gastro intestinal problems and loss of appetite were found to be more among defaulters (62.2%, 33.3% & 27.0% respectively). But this difference in various side effects was not found to be statistically significant.

Table 3 shows the knowledge of patients about various aspects of tuberculosis, such as tuberculosis is which type of disease and how it is transmitted, whether it is curable or not. On analyzing all the responses less than half (48.6%) of patients of non compliance group were aware that tuberculosis is an infectious disease of lungs, rest were either having incorrect knowledge or were not aware about tuberculosis, 61.2% patients of

compliance group were aware but this difference in awareness was not found to be significant. 37.8% patients of non compliance group and 42.3% patients of compliance group were aware about correct mode of transmission of tuberculosis while 30.6% of defaulters and 43.2% of non defaulters were aware that TB is curable. The statistical test on difference in knowledge of patients of two groups did not show any significant relation ($p>0.05$).

Table 4 shows awareness of patients about various aspects of DOTS. It was observed that higher proportion of non defaulter patients (40.5%) were aware about what the DOTS is, as compared to defaulters (28.8%). Awareness about the duration of DOTS treatment was found to be significantly more among non defaulters (30.6%) as compared to defaulters (14.4%).

V. Discussion

Overall non compliance rate in our study was found to be 15.1% that almost one fourth (22.5%) of non compliant patients were of >45 years while it was only 9.9% in compliance group indicating that patients from older age group defaulted more and default was very less in pediatric age group patients. Verma S.K. et al observed the somewhat different pattern that patients falling in 35-44 years age group are more non-compliant (25.4%) to the treatment followed by the patients aged above 45 years (18.1%) and the patients in age group 15-24 years were least (3.5%) non-compliant,[7] while Menzis D et al also found that older subjects were less compliant.[8] The reason behind more default in older patient is mainly the self neglect and neglect by family, while development of more side effects was supposed to be another important reason. Further comparatively more default in 31-45, followed by 16-30 years age group is mainly due their being economically productive member of the family, which led them to leave the treatment rather than to leave their earning of the day. Chanderasekaran V. et al also observed that default was highly associated with age > 45 years.[9]

Compliance to treatment showed significant difference among male and female. Among defaulters three fourth patients (74.8%) were male, Male defaulted more because of being earning member of family as they could not have afford to get leave on job that frequently and DOTS centers are present in most of the localities so women manages to get some time and visit the DOTS center on their own. Verma S.K. et al observed that non-compliance to treatment was equally prevalent among male (10.4%) and female (11.0%) patients,[7] while some observed non-compliance to be more prevalent among female patients, due to non-availability of any person to accompany them while visiting the DOTS clinics and they are stigmatized if found to have tuberculosis.[10]

Among defaulters Hindus were significantly more (85.6%) as compare to non defaulters (80.1% Hindu). while in other study no significant difference in persons of two religion was observed.[7]

On analyzing the effect of occupation, it was observed that laborers and businessman were more among non compliance patients (57.6% and 9.0% respectively). Proportion of unemployed and retired persons was also more among defaulters (6.3%). Pandit N.et al observed that maximum non compliance was among unemployed, followed by government servant and laborers,[11] while other did not found any significant association of occupation with default.[9]

Education was found to have significant effect on patient compliance to treatment as 34.2% patients were illiterate among non compliance group, while it was almost one forth patients of compliance group. Similar findings were observed in other studies also.[7,9,11,12]

Side effects following medication were an important factor leading the patient to interrupt the treatment. It is also observed in our study that the patients who did not comply with the treatment had more side effects (62.2%), while almost half of patients in compliance group had side effects. Fatigue was the most common side effect in both the groups (62.2 & 46.8% among defaulters & non defaulters). Abdominal pain, burning & loss of appetite were present in almost one third of defaulters and less than one fourth of non defaulters. Sukumaran P. et al observed that 63% of patients developed fatigue, followed by abdominal pain, vomiting and loss of appetite in 21%, 15% & 10% 0f patients respectively.[13]

On analyzing the knowledge of patients about various aspects of tuberculosis it was found that less than half (48.6%) of patients of non compliance group were aware that tuberculosis is an infectious disease of lungs, while 61.2% patients of compliance group were aware. 37.8% patients of non compliance group and 42.3% patients of compliance group were aware about correct mode of transmission of tuberculosis while 30.6% of defaulters and 43.2% of non defaulters were aware that TB is curable. N. Pandit et al also revealed that the compliance of DOTS was significantly high among those who have good knowledge about various aspects of disease.[11] The adequate knowledge about disease was found to be protective factor for defaulting to therapy in other studies.[14]

When awareness of patients about various aspects of DOTS was analyzed, 40.5% of non defaulters & 28.8% of defaulters were aware about what is DOTS. Awareness about the duration of DOTS treatment was found to be significantly more among non defaulters (30.6%) as compare to defaulters (14.4%). Altogether awareness of DOTS was poor among all patients. Sukumaran P. et al observed that no patient was aware about

DOTS,[13] while other observed that provision of free availability of anti TB drug was known to 78% 0f respondents before reaching DOTS centers[15].

VI. Figures and Tables

Table 1: Socio demographic features of non-compliance and compliance group

Factors	Non-compliance		Compliance		Test of significance
	No.(111)	% (100)	No.(111)	%(100)	
Age groups (in years)					
<15	5	4.5	23	20.7	χ^2 = 17.176, df = 3, p<0.001
16-30	52	46.8	48	43.3	
31-45	29	26.1	29	26.1	
>45	25	22.5	11	9.9	
Sex					
Male	83	74.8	69	62.2	χ^2 = 4.09, df=1,p<0.05
Female	28	25.2	42	37.8	
Religion					
Hindu	95	85.6	89	80.1	χ^2 = 1.144, df = 1, p<0.05
Muslim	16	14.4	22	19.9	
Occupation					
Service	5	4.5	5	4.5	χ^2 = 16.353, df = 6, p<0.05
Business	10	9.0	4	3.6	
Laborer	64	57.6	53	47.7	
House-wife	18	16.2	27	24.3	
Unemployed/ retired	7	6.3	3	2.7	
Student	7	6.3	14	12.6	
Not defined ;(Under 5 child)	0	0.0	5	4.5	
Educational status*					
Illiterate	38	34.2	26	23.4	χ^2= 6.924**, df = 2, p<0.05
Primary	36	32.4	29	26.1	
Middle	20	18.0	24	21.6	
High-school	16	14.4	27	24.3	
Intermediate & above	1	0.9	5	4.5	

*educational status of patients grouped in to three-illiterate, up to middle and high school and above.

Table 2: Side effects of medication among non-compliance and compliance group

Side effects*		Non-compliance		Compliance		Test of significance
		No. (111)	%	No.(111)	%	
present	Fatigue	69	62.2	52	46.8	χ^2 = 0.43, df=3, p>0.05
	Nausea & vomiting	20	18.0	19	17.1	
	Abdominal pain & burning	37	33.3	28	25.2	
	Loss of appetite	30	27.0	23	20.7	
	Total	69	62.2	55	49.5	χ^2 = 2.58, df=1, p<0.05
Absent		42	37.8	56	50.5	

*multiple response

Table 3: Knowledge of tuberculosis among non-compliance and compliance group

Various aspects of TB	knowledge	Non-compliance		Compliance	
		No. (111)	%	No. (111)	%
Type of disease	Correct	54	48.6	68	61.2
	Incorrect	12	10.8	12	10.8
	Absent	45	40.6	31	27.9
χ^2 = 4.186, df=2, p>0.05					
Modes of transmission	Correct	42	37.8	47	42.3
	Incorrect	24	21.6	21	18.9
	Absent	45	40.6	43	38.7
χ^2 = 0.5264, df=2, p>0.05					
Curability of disease	Correct	34	30.6	48	43.2
	Incorrect	0	0.0	0	0.0
	Absent	77	69.4	63	56.8
χ^2 = 3.790, df=1, p>0.05					

Table 4: Awareness of patients about DOTS

Various aspects of DOTS	Awareness	Non-compliance		compliance	
		No. (111)	%	No. (111)	%
What is DOTS	Yes	32	28.8	45	40.5
	No	79	71.2	66	59.5
$\chi^2 = 3.360$, df = 1, p>0.05					
Duration of treatment	Yes	16	14.4	34	30.6
	No	95	85.6	67	69.4
$\chi^2 = 10.872$, df = 1, p=0.001					

VII. Conclusion

Non compliance was found to be due to lack of knowledge about various aspects of tuberculosis and its treatment along with side effects of medicines. So health education along with some modification in drugs dosages is the need today.

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