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Effectiveness of DOTS regime in terms of cure, failure, default and relapse in the treatment of TB patients

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ABSTRACT

Background: DOTS has given very good results in terms of cure and satisfaction among tuberculosis patients. But still some failure and relapse cases occur. Hence studies on effectiveness of DOTS are required. The objectives of research were to study the effectiveness of DOTS regime in terms of cure, failure, default and relapse in the treatment of TB patients

Methods: A hospital based prospective follow up observational study was undertaken in the department of general medicine at a tertiary care medical college and hospital. The present study was conducted among the 60 eligible subjects as per the inclusion and exclusion criteria laid down for the present study.

Results: 41 were pulmonary cases and 19 were extra pulmonary patients. At the end of intensive phase only 7 cases were sputum positive out of 37 which reduced to three at the end of extended intensive phase of treatment which further reduced to two at the end of two months of continuation phase. But by the end of completion of continuation phase, one case again became sputum positive i.e. failure case making a final tally to three. It was seen that there was significant weight gain over the period of time in both pulmonary and extra pulmonary cases. The cure rate was 78%. One patient died. Two defaulted and three were failure cases.

Conclusions: The DOTS was found to be 78% effective in terms of cure rate. Still there is a huge gap of 22% found in the present scenario which needs to be addressed seriously and by all to prevent multi drug resistant tuberculosis.

Keywords: Continuation phase, Effectiveness, Intensive phase

INTRODUCTION

RNTCP is successful in achieving its goals. That cure rate of 85% and case finding rate of 70%. But this is not enough. As more and more multi drug resistant tuberculosis cases are found and registered. There is no policy under RNTCP to follow the cases once it is declared cured as per RNTCP treatment guidelines. There are many reasons including compliance issues which lead to treatment failure and relapse of the cases of tuberculosis. There is a need to find out these reasons to

prevent further disease transmission, for success of the program and control of the disease.¹

DOTS have given very good results in terms of cure and satisfaction among tuberculosis patients. But still some failure and relapse cases occur. Some patients land into multi drug resistance. Hence effectiveness of DOTS as 100% cure is doubtful. But ethical issues come while planning the randomized controlled trials for DOTS effectiveness studies. Patients in the control group are also tuberculosis patients and they cannot be denied the

right therapy as they are also exposed to the risk of developing the multi drug resistant tuberculosis and or complications associated with tuberculosis. So, it is important to adopt some other approach to study the effectiveness of DOTS therapy for the success of treatment of tuberculosis. Systematic review is one such way.² India carries the highest number of cases of tuberculosis compared to any country in the world. It shares almost 20% of the cases globally. The morbidity and mortality related to tuberculosis in India is also very high.³

Inspite of achieving the good success rates under DOTS, incidence of tuberculosis continues on an increasing trend. It is not coming down. World Health Organization reported that the success rate of DOTS globally was 84% as per its 2004 report. But due to unexplored reasons or reasons unknown, tuberculosis continues to be the global public health problem. With arrival of HIV it has really been very difficult to control the tuberculosis.⁴

As per DOTS program, two success outcomes are used. They are treatment completed and the second one is cured. If the sputum of the patient is negative for the tubercle bacilli at the end of the intensive phase of the treatment and also if the sputum of the patient is negative for the tubercle bacilli at the end of the six months or at the end of the treatment completed, then that patient is declared as cured. The bacilli are of two types. One is slow growers and one are of fast growers. Slow growing tubercle bacilli are the important reason for multi drug resistant tuberculosis. DOTS ensure to take care of these both the types of tubercle bacilli but in some cases, it may fail.5 With this background present study was carried out to study the effectiveness of DOTS regime in terms of cure, failure, default and relapse in the treatment of TB patients.

METHODS

A hospital based prospective follow up observational study was undertaken in the department of general medicine at a tertiary care medical college and hospital. The present study was conducted among the 60 eligible subjects as per the inclusion and exclusion criteria laid down for the present study.

The present study was conducted for a period of two years. Informed consent was obtained from every participating individual after explaining them the nature of the study. Almost all consented for the present study to participate as there was no intervention. It was only observation of the regular DOTS and the outcome.

Inclusion criteria

- All registered cases of DOTS during the study period,
- All those who are ready to participate in the present study.

Exclusion criteria

- All those who are not ready to participate in the present study,
- All those who are found to be seriously ill or having complications of tuberculosis.

Once the patient came to the DOTS centre and was found to be having tuberculosis, either pulmonary tuberculosis or having extra pulmonary tuberculosis was asked for his consent to participate in the present study. Once the patient consented to participate in the present study, detailed history was taken in the proforma which was designed before the start of the study.

Patient was classified as sputum positive or sputum negative in the present study. As per the DOTS protocol, sputum was again tested at the end of intensive phase. If it is negative, the patient was started with the continuation phase. If the sputum at the end of the intensive phase of two months was found to be positive, then the intensive phase was extended for one more month.

At the end of this extended intensive phase, the sputum was again tested, and the result was recorded. The sputum was again tested at the end of two months of continuation phase and again at the end of completion of the continuation phase. All these results were carefully recorded in the proforma of the present study.

Weight was recorded in the beginning of the treatment phase. Weight was recorded again at the end of intensive phase. At the end of this extended intensive phase, the weight was again tested, and the result was recorded. The weight was again recorded at the end of two months of continuation phase and again at the end of completion of the continuation phase. All these results were carefully recorded in the proforma of the present study.

The outcome was recorded at the end of completion of the continuation phase. The outcome was classified as cured, failure, defaulted, relapses or died. Thus, all patients were followed till the treatment completion phase in the present study. All data was entered and analyzed using proportions.

RESULTS

Table 1 shows 37 out of 41 pulmonary cases were found to be positive by sputum AFB at presentation. Four cases were not sputum positive. 19 were extra pulmonary tuberculosis patients.

Before the start of the treatment, 37 patients were sputum positive and four were sputum negative among the pulmonary cases. At the end of intensive phase of treatment, only 7 cases were sputum positive which reduced to three at the end of extended intensive phase of treatment which further reduced to two at the end of two

months of continuation phase. But by the end of completion of continuation phase, one case again became

sputum positive i.e. failure case making a final tally to three as shown in Table 2.

Table 1: Distribution of study subjects as per sputum positivity.

Pre-treatment sputum AFB	Pulmonary TB	Extra-pulmonary TB	Total
Sputum negative	4 (9.8%)	19 (100%)	23
Sputum positive	37 (90.2%)	00	37
Total	41	19	60

Table 2: Sputum conversion during treatment among pulmonary cases.

Pulmonary cases	Pre- treatment	At the end of intensive phase	At the end of extended intensive phase	2 months of continuation phase	At the end of completion of continuation phase
Sputum positive	37 (90.24%)	7 (18.91%)	3 (8.8%)	2 (5.4%)	3 (8.8%)
Sputum negative	4 (9.86%)	30 (81.09%)	34 (91.2%)	35 (94.6%)	34 (91.2%)

Table 3: Weight gain during treatment among pulmonary cases (n = 41).

Weight	Mean <u>+</u> SD
Pre treatment	43.42 <u>+</u> 9.2
At the end of intensive phase	45.07 <u>+</u> 9.2
2 months of continuation phase	46.31 <u>+</u> 9.2
At the end of completion of continuation phase	47.42 <u>+</u> 9.1

Table 3 shows the w eight gain during treatment among pulmonary cases (n=38). It was seen that there was significant weight gain over the period of time. The weight increased from 43.42+9.2 (pre treatment phase) to 47.42+9.1. It increased to 45~kg at the end of the intensive phase and then it became 46~kg at the end of the 2 months of continuation phase.

Table 4: Weight gain during treatment among extra pulmonary cases (n = 19).

Weight	Mean <u>+</u> SD
Pre treatment	49.47 <u>+</u> 9.2
At the end of intensive phase	51.26 <u>+</u> 9.4
2 months of continuation phase	51.68 <u>+</u> 10.1
At the end of completion of continuation phase	52.94 <u>+</u> 11.1

P < 0.032

Table 4 shows weight gain during treatment among extra pulmonary cases (n = 19). In extra pulmonary cases also, the there was significant weight gain over the period of time. The weight increased from 49.47+9.2 (pre treatment phase) to 52.94+11.1. It increased to 51 kg at the end of the intensive phase and then it became 52 kg at the end of the 2 months of continuation phase.

Table 5: Outcome of DOTS therapy among pulmonary cases.

Outcome	Number	Percentage
Cured	32	78
Failure	3	7.3
Defaulted	2	4.9
Died	1	2.4
Total	38	100

X2 = 86.68, p = 0.000

Table 5 shows outcome of DOTS therapy among pulmonary cases. The cure rate was 78%. One patient died. Two defaulted and three were failure cases.

DISCUSSION

41 were pulmonary cases and 19 were extra pulmonary patients. At the end of intensive phase only 7 cases were sputum positive out of 37 which reduced to three at the end of extended intensive phase of treatment which further reduced to two at the end of two months of continuation phase. But by the end of completion of continuation phase, one case again became sputum positive i.e. failure case making a final tally to three. It was seen that there was significant weight gain over the period of time in both pulmonary and extra pulmonary cases. The cure rate was 78%. One patient died. Two defaulted and three were failure cases.

Verver S et al followed the patients for more than five years. The relapse rate was 18%.⁵ Among them 14% were declared cured, 28% were defaulters. Thus, the authors concluded that defaulters were at more risk of relapse than the patients who took regular treatment. Dobler CC et al conducted a study in Australia.⁶ They found that there were only three cases of repeated culture positive

cases. Two of these three patients had visited their country of origin which was having high incidence of tuberculosis. Third patient had reactivation of infection with same strain and was a case of secondary failure. This patient was found to have low compliance rate.

du Plessis DG et al in their study used "Multilesional strain genotyping". They did this in HIV negative patients who had secondary tuberculosis. They observed that the secondary infection was caused by the same strain whether it is pulmonary tuberculosis or extra pulmonary tuberculosis.

Shamputa IC et al from their study concluded that failure of the treatment and the relapse were mainly not caused by the re-infection by tubercle bacilli. They carried out the matching of the "DNA fingerprinting patterns" before the start of the treatment and again at recurrence. In five cases it did not match. This indicated that there was reinfection. In remaining cases there was reactivation.

Garcia de Viedma D et al observed that the strains involved in the primary and secondary infection of tuberculosis, were different in most of the cases. The author studied the difference between the reactivation and reinfection groups. They found that it was statistically not significant. They thus concluded that in recurrent tuberculosis the reinfection has an important role.

Kliiman K et al observed that the treatment success rate was 81.5%. ¹⁰ This is slightly more but comparable with the findings of the present study. The default rate in their study was 9.4% which is double than that observed in the present study. The author noted that the alcoholics were 3.2 times more likely to default than non-alcoholics. They also observed that unemployed were 3 times more likely to default than employed. They also found that those with multi drug resistant tuberculosis were 2 times more likely to default than those without multi drug resistant tuberculosis. They also noted that those from urban areas are 1.8 times multi drug resistant tuberculosis than those from rural areas.

Blondal K et al observed that the treatment success rate was 61% which is lower than that observed in the present study. He but their study was among MDR and XDR tuberculosis patients. Our study was conducted among non MDR and non-XDR tuberculosis patients. In their study 22.3% of the patients defaulted which is very high compared to the findings of the present study. The authors concluded that the DOTS category IV regime was very effective and cured almost 75% of the patients. The risk factors for recurrence of MDR and XDR TB were previous treatment, and resistance development.

Holtz TH et al found a sputum conversion rate of 77% which is similar to the findings of the present study. 12 The authors observed that 23% did not convert. The risk factors for delayed conversion or no conversion as studied by them were history of past treatment for MDR

TB, increased culture colony count and on X ray presence of cavities on both the sides of the lung.

CONCLUSION

The DOTS was found to be 78% effective in terms of cure rate. Still there is a huge gap of 22% found in the present scenario which needs to be addressed seriously and by all to prevent multi drug resistant tuberculosis.

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institutional ethics committee

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