

Trend of Tuberculosis Cases under DOTS Strategy in Dakshina Kannada District Of Karnataka, India: Issues and Challenges

*S Ganesh Kumar¹, HN Harsha Kumar¹, Rao Ramakrishna², S Jayarama¹, MS Kotian¹

¹Dept. of Community Medicine, KMC Mangalore, Manipal University, India

²District Tuberculosis Officer, Dakshina Kannada District, Karnatak, India

(Received 17 Apr 2009, accepted 4 Aug 2009)

Abstract

Background: Tuberculosis remains a worldwide public health problem and India accounts for highest TB burden in the world. The aim of the study was to evaluate the trend and treatment outcome of tuberculosis (TB) cases treated under DOTS strategy at a district level in Karnataka, India.

Methods: This was a Retrospective record based study conducted in Dakshina Kannada district of Karnataka, during January 2007 to April 2007. Patients registered for treatment in the entire district since its inception in 2003 to 2006 were considered for analysis.

Results: Totally, 7620 patients were treated under DOTS strategy. Of these, 3308 cases (43%) were found to be new sputum smear positive for acid-fast bacilli (AFB). The case notification rate has increased from 55% in 2003 to 85% in 2005. The incidence of new sputum positive TB cases were maximum among productive age group (15-44 years) and was significant ($\chi^2= 150.08$, $P< 0.001$). Males constituted 70% of the total new sputum positive TB cases and the difference seen in males and females was also statistically significant ($\chi^2= 551.254$, $P< 0.001$). Defaulter cases have been increasing among new smear positive cases and this was statistically significant ($\chi^2=4.9$, $P= 0.03$).

Conclusion: The cure rate is declining along with the increasing default rate among new smear positive cases over a period.

Keywords: DOTS strategy, Trend of tuberculosis cases, Treatment outcome, Default rate

Introduction

Tuberculosis (TB) remains one of the leading killer diseases of the developing world. In India, after inception of Revised National Tuberculosis Control Programme, the total TB cases was decreased from 5 millions during 1997 to 3.3 million during 2005 and deaths decreased from 0.42 million during 1997 to 0.32 million during 2005. The incidence of cases was raised marginally from 1.71 million during 2000 to 1.85 million during 2005 (1). Piloted in 1993 and expanded nationally in 1997, directly observed treatment short-course (DOTS) during 2003 covered over 1 billion people, almost entire country (2). It covered the entire population of the country on the eve of 24th March 2006 (3). Similar to the WHO endorsed DOTS strategy throughout the world, the RNTCP aims at achieving 70% case detection rate through quality sputum microscopy and 85% cure rate amongst

those who have been put on treatment. While many claims have been made about the success of DOTS expansion in terms of numbers covered (4-7), there are only a few reports providing details about actual treatment success rates and the problems associated with them (8, 9).

Here we report the trend (for four years i.e. 2003-2006) and treatment outcome of TB cases after implementing DOTS strategy in Dakshina Kannada district of Karnataka state, India.

Materials and Methods

The DOTS programme was started and implemented across Dakshina Kannada district, Karnataka over a period of time (January 2003- December 2004) covering the entire population of 18, 97, 730 (2001 census). We carried out a retrospective analysis of the data for the entire district during a period of 4 months from January 2007 to

April 2007. Patients registered for treatment in the entire district since its inception in 2003 to 2006 were considered for analysis. Study population included prison population as well. Patients were referred to the DOTS centers from various out-patient departments of medical colleges, other public and private health care providers in the area.

Classification of cases

All diagnosed TB patients were divided in three categories for therapeutic purposes adopted under RNTCP. Category 1 includes new sputum smear positive cases, seriously ill sputum smear negative cases and seriously ill extra pulmonary cases. Category 2 includes sputum positive relapse, sputum positive failure and treatment positive treatment after default cases. Category 3 includes sputum negative and extra pulmonary not seriously ill cases. The definitions followed under RNTCP are as per the guidelines of WHO. Initially smear positive patient who completed treatment and had negative smear result on at least two occasions, one at treatment completion was classified as cured. A patient is defined as a defaulter if they miss at least two months of treatment regardless of whether they return to treatment or not. A patient who returns smear positive after having left treatment for a period of at least 2 months was classified as return after default and they were put on category 2 regimen of RNTCP. A patient who was initially smear positive, who began treatment and who remained or became smear positive again at five months or later during the course of the treatment was classified as failures. A patient who was initially smear negative patient who received full course of treatment, or smear positive who completed treatment, with negative smear at the end of initial phase, but no or only one negative smear during continuation phase and none at treatment end was classified as treatment completed.

As per the estimated annual risk of infection of 1%, there will be 50 new smear positive cases, 50 new smear negative cases, 25 retreatment cases and 10 extrapulmonary cases giving a total of 135 cases for one lakh population. This gives an ex-

pected 2565 cases for the whole population of the district. This forms the denominator for calculating the case detection rate. Case notification rate was calculated for each year by the formula- Total number of cases treated under DOTS/Population in ten lakhs of the district gives the case notification rate per ten lakhs population. Percentage of estimated cases detected was also found out. Case detection rate, as defined by the World Health Organization (WHO) is the number of new smear positive case notifications divided by the estimated incidence of smears positive TB.

The data was edited and corrected for discrepancy and missing information. The data was then entered in SPSS Version 11 and analyzed. The results were expressed in proportion in appropriate tables. The Chi-square test was used to test difference between proportions. $P < 0.05$ was considered as significant.

Results

The total number of TB cases reported and case detection rate during 2003 to 2006 has been increasing. A total of 7620 patients were treated under DOTS strategy. Of these 3308 cases (43%) were found to be new sputum smear positive for acid-fast bacilli (AFB). The case notification rate has increased from 55% in 2003 to 85% in 2005 (Table 1). The incidence of new sputum positive TB cases were maximum among productive age group (15-44 yr) and it was found to be significant ($\chi^2 = 150.08$, $P < 0.001$). Males constituted 70% of the total new sputum positive TB cases and the difference seen in males and females was also statistically significant ($\chi^2 = 551.254$, $P < 0.001$) (Table 2). Cases were classified according to the treatment regimen given (Table 3). The cure rate has been decreasing over a period of time, but this was not found to be statistically significant ($\chi^2 = 0.94$, $P = 0.33$). During 2005 it was below the expected RNTCP goal (79%). Defaulter cases have been increasing among new smear positive cases and this was found to be statistically significant ($\chi^2 = 4.9$, $P = 0.03$) (Table 4). As majority of the patients treated are cured among new

smear positive cases, very few patients were left smear positive at the end of the treatment and cure rate can not be ascertained in case of smear negative and extra pulmonary cases. Totally 784 pa-

tients treated for extra pulmonary cases and 1142 patients treated for sputum smear negative cases (Table 5 and 6).

Table 1: Case load of Tuberculosis 2003-2006

Year	Total number of TB cases put on DOTS	Number of new sputum positive patients (%)	Case notification rate per ten lakh population (% of expected cases)	Case detection rate (%)
2003	1407	702 (50)	740 (54.9)	73.9
2004	1831	785 (43)	967 (71.4)	82.6
2005	2196	912 (42)	1156 (85.6)	96
2006	2186	909(42)	1150 (85.2)	95.6

Table 2: Age and sex distribution of new sputum smear positive cases

Age group	2003		2004		2005		2006	
	Male	Female	Male	Female	Male	Female	Male	Female
0-14	1	3	0	3	2	4	1	3
15-44	283	157	281	186	335	205	353	182
45-64	178	42	221	45	259	49	254	63
65 and above	35	3	39	10	46	12	40	13
Total	497	205	541	244	642	270	648	261

For age- $\chi^2=150.08, P<0.001$

For sex- $\chi^2=551.254, P<0.001$

Table 3: Categorization of patients based on treatment regimen given

Year	Category 1		Category 2			Category 3		Total	
	New sputum smear +ve cases	Seriously ill sputum smear negative/Extrapulmonary	Relapses	Failures	Return after default	Others	Sputum negative not seriously ill		Extrapulmonary cases not seriously ill
2003	702	107	56	24	106	80	192	139	1407
2004	785	228	100	34	115	99	301	169	1831
2005	912	334	148	32	165	158	231	210	2196
2006	909	408	158	54	151	175	165	166	2186
Total	3308	1077	462	144	537	512	889	684	7620
(%)	(43.4)	(14.1)	(6)	(1.8)	(7)	(6.7)	(11.7)	(9)	

Table 4: Treatment outcome of new smear positive cases

Year	Patients registered	Patients who have been cured	Cure rate	Treatment completed but not cured	Died (%)	Failures (%)	Defaulters from treatment (%)
2003	702	597	85%	3	32(4.6)	20(2.8)	48(6.8)
2004	785	636	81%	4	49(6.2)	17(2.2)	76(9.7)
2005	912	721	79%	12	43(4.7)	33(3.6)	95(10.4)

Linear trend for cure rate- $\chi^2=0.94, p=0.33$

Linear trend for defaulters from treatment- $\chi^2=4.9, P=0.03$

Table 5: Treatment outcome of extra pulmonary cases

Year	Patients registered	Treatment completed	Died (%)	Failures (%)	Defaulters from treatment (%)
2003	172	155	6 (3.5)	0 (0)	10 (5.8)
2004	235	217	9 (3.8)	0 (0)	8 (3.4)
2005	377	326	22 (5.8)	5 (1.3)	21 (5.6)

Table 6: Treatment outcome of new smear negative cases

Year	Patients registered	Treatment completed	Died (%)	Failures (%)	Defaulters from treatment (%)
2003	265	225	18 (6.8)	2 (0.7)	18 (6.8)
2004	463	385	41 (8.9)	3 (0.6)	33 (7.1)
2005	414	341	32 (7.7)	10 (2.4)	29 (7)

Discussion

The performance in the district was generally low in the year 2003 when the programme was introduced. Since this was in the initial stage of implementation, case notification rate was found to be low similar to other parts of the country (10). As the network got expanded, it led to better detection of existing cases leading to increase in the number of cases over a period of time. According to recent report on status of RNTCP, case detection rate during 2006 was 69% to 71% and cure rate was 83% (3, 11). Defaulter cases have been increasing among new smear positive cases. During 2005 it was 10.4%. The initial default rate at the national level during 2006 was 8% (11). Because of increasing number of patients who default intermittently, the number of relapse cases increased. Cure rate is also declining over a period of time which could be attributed to increase in default rate. This is the major concern for TB control since they may continue to spread the disease and calls for attempts to retrieve these patients and put them on treatment. This requires the need for more intense and continuing motivation efforts to retain the cases under treatment. The proportion of failures and deaths were well within the expected limits of RNTCP performance indicators. Studies should be done to find out the reasons for bacteriological positivity in patients who were on regular treatment. The possibility of these patients having been infected with the primary drug resistant bacteria cannot be ruled out.

There could be other factors that would have contributed to low performance of the programme which are not clear from the existing data.

Studies are required to find out reasons for those who did not turn up for regular follow up and treatment and evolve methods to ensure their return to treatment. Studies are also needed on the working and efficiency of the DOT agents who play a vital role in retaining the patients on treatment. It is a challenge to motivate and to keep up the efficiency of the DOTS agents and the field staff who play a vital role in achieving the targets under RNTCP.

Acknowledgements

The authors acknowledged the help received from the district health authorities in conducting the study. This was not a funded study. The study was conceived and conducted by the authors themselves. The authors declare that they have no conflicts of interest.

References

1. Global data on Tuberculosis, World Health Organization. Available from the following URL (Cited on 10-1-2007); http://www.who.int/tb/publications/global_report/2007/pdf/ind.pdf.5.
2. Chauhan LS (2004). Status report on DOTS expansion and implementation during the 4th quarter 2003. *J Indian Med Assoc*, 102: 256-7, 281.

3. Chauhan LS (2006). Status report on RNTCP-2nd quarter 2006. *Indian Journal of Tuberculosis*, 53: 217-19.
4. Khatri GR, Frieden TR (2002). Rapid DOTS expansion in India. *Bull World Health Organ*, 80: 457-63.
5. Granich R, Chauhan LS (2003). Status report of the Revised National Tuberculosis Control Programme: January 2003. *J Indian Med Assoc*, 101: 150-1, 156.
6. Chauhan LS (2004). Status report on DOTS expansion and implementation during the 2nd quarter 2004 (April-June 2004). *J Indian Med Assoc*, 102: 627-8.
7. Frieden TR (2005). Tuberculosis control: critical lessons learnt. *Indian J Med Res*, 121: 140-42.
8. Sharma SK, Lawaniya S, Lal H, Singh UB, Sinha PK (2004). DOTS centre at a tertiary care teaching hospital: lessons learned and future directions. *Indian J Chest Dis Allied Sci*, 46: 251-56.
9. Sophia V, Balasangameswara VH, Jagannatha PS, Saroja VN, Kumar P (2004). Treatment outcome and two & half years follow-up status of new smear positive patients treated under RNTCP. *Indian J Tuberc*, 51: 199-208.
10. Gopi PG, Subramani R, Santha T, Radhakrishnan S, Chandrasekaran V, Rajeswari R et al. (2006). Performance of a DOTS programme: Administrative and technical challenges-A field report from a district in South India. *Indian J Tuberculosis*, 53: 123-134.
11. Chauhan LS (2007). Status report on RNTCP-3rd quarter 2006. *Indian Journal of Tuberculosis*, 54: 49-51.