DOTS Reaches Socially Marginalized Population in the Community : A Study from a Rural Area of South India

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ABSTRACT

We report here that the Directly Observed Treatment, Short course (DOTS) is reaching all tuberculosis patients in the community irrespective of social classification based on the analysis from the tuberculosis prevalence survey and programme performance during 1999-2003 from a rural area in Tamilnadu, South India. New smear- positive cases treated under a DOTS programme were classified in two groups namely; scheduled caste living in colony and other population. The prevalence of smear- positive cases among the scheduled caste population was 1.9 times higher than the other population and this was reflected in the notification also. The successful treatment outcome was also similar in these two groups (75% and 78% respectively; overall 77%). From these findings it is concluded that people living in colony have equal access to DOTS as those in the village.

Key words : Tuberculosis, DOTS, scheduled caste, accessibility.

INTRODUCTION

Tuberculosis (TB) is one of the major health problems and it affects the poor and the disadvantaged social section of the community disproportionately. The great challenge of TB control programme is to identify the vulnerable groups who face barriers to accessing TB services that provide diagnosis and treatment and, thus, strengthen the TB control. The relation between tuberculosis and poverty has been well documented.[1,2] Government of India initiated Revised National TB Control Programme (RNTCP) based on the globally recommended DOTS strategy to make DOTS available through out the country. DOTS strategy was implemented in the study area of Tiruvallur district in 1999 and TB Research Centre (TRC), Chennai has monitored the programme. Epidemiological surveys of disease and infection are also being undertaken in this area to measure the epidemiologic impact of the DOTS strategy.

The millennium development goals (MDGs) of halving the TB prevalence, incidence and mortality by 2015 are possible

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only if DOTS is made accessible to all patients irrespective of gender, economic and social difference. A study[3] conducted in this area focusing on whether the TB programme is outreaching the poor segment of the community has shown that two-third of the TB patients who had access to the TB programme were poor and the programme meets the health need of this vulnerable segment of the population. Another study[4] from the same area had shown that despite facing social stigma, women were more likely to access to the health services, benefited under DOTS and adhered to treatment. This paper compares the prevalence of TB, notification rates and the treatment outcome in the marginalized population (schedule caste) and the other population as well to find out whether the DOTS programme is reaching out to the socially marginalized population in the community.

MATERIALS AND METHODS

The study area is a semi-urban area with a population of 580,000 consisted of 209 villages and nine urban units. In a random sample of these villages and urban units consisting of one fifth population, a series of community surveys have been undertaken by TRC to estimate the trend of TB prevalence and incidence of TB among adults aged $\geq$15 years and thereby measure the impact of DOTS. To assess whether DOTS is accessible for the whole population, the survey area was divided into villages and colonies according to the caste; scheduled caste living in "colony" having separate facilities for water, places of worship and other amenities and others in "village".

All persons in the selected villages/units were screened for symptoms of TB and chest radiography. Two sputum specimens (one spot and early morning) were collected from those who had chest symptoms and/or had abnormal shadows suggestive of TB in chest radiograph. These specimens were examined for smear and culture. Those who were found to be bacteriologically positive (active cases) were referred to the nearest health facility (HF) and treated under DOTS if they satisfied the RNTCP criteria.[5] The third survey was conducted during the period from January, 2004 to June, 2006. Data on socioeconomic status were also collected to estimate the standard of living index (SLI) in both village and colony for comparison.

In the survey area, apart from those cases detected in the survey (active cases), there were symptomatic patients voluntarily reporting to the health centres and got diagnosed for TB (passive case). All the patients were categorized as per RNTCP guidelines and given directly observed treatment.[6] Information on the date of start of treatment, name, sex, age, address, category, sputum smear results initially, during the treatment and at the end of treatment and treatment outcome were recorded in TB register maintained by the TU. The RNTCP definition for different terms such as cure, treatment completed, expired, default and failure is used for treatment outcome of the patients.[6] The study was approved by the institutional ethics and scientific committee.

Data Collection

Experienced social workers/field investigators visited all the patients at their residence and interviewed patients to obtain information about education, employment, income, previous history of treatment, smoking and drinking habits, health seeking behaviour and their perception about TB treatment. Another survey team visited each and every households (HHs) of the study population and interviewed the head of the

family using a semi-structured interview schedule and collected the information on type of house, toilet facility, electricity in the house, fuel for cooking, source of water supply, other facilities in the house like grinder, mixer, fan, refrigerator, television, washing machine, furniture and vehicles. A scoring system was used to classify the households in to various SLI as per the NFHS definition.[3] For this, a score was assigned to each of these items in the household and these scores were added up to get a total score. Each HH was then classified into low SLI for a score 0-14, medium for 15-25 or high for more than 25.

All new sputum positive cases (active and passive) registered under DOTS from 1999 to 2003 from the survey area formed the study population for treatment outcomes collected from the TB Register.

Data analysis

Prevalence of smear positive pulmonary TB based on the survey conducted between 2004 and 2006 and notification rates were estimated for the villages and colonies separately and the ratio obtained. Socio-economic parameters and the treatment outcome among the two groups for patients were compared between the two groups using chi-square test. The level of statistical significance was set at p<0.05.

RESULTS

Of 89338 persons screened in the survey, 26260 (30%) belonged to the colony. The overall prevalence of smear-positive cases from the third survey was estimated to be 178/100,000 (Table 1). The prevalence was higher (268/100,000) in the colony than that in the village {(140/100,000) p<0.001}, ratio of prevalence being 1.9:1. This showed that the prevalence was nearly two times higher in colony compared to village. The notification

Table 1 : Prevalence of TB in colony and village population in Tiruvallur district, south India.

	Colony	Village	Total
Eligible population (≥15 years)	26260	63078	89338
Screened	24089	56717	80806
Sputum eligible	3310	6944	10254
Examined for sputum	3133	6567	9700
No. of smear positives	61 (268)	75 (140)	136 (178)

Note: Figures in parenthesis indicate prevalence (adjusted for coverage) per 100,000

rate (number of patients registering at the HFs for treatment) per 100,000 population per year in the colony and village was estimated to be 206 and 120 respectively; the ratio being 1.7:1 (data not tabulated) similar to the prevalence ratio (1.9:1)

The distribution of 34567 HHs according to the SLI and classification of population is set out in Table 2. If could be seen that 19% (1882/10200) had a high SLI among residents in the colony compared to 41% (10127/24547) in the village and the difference was statistically significant (p<0.001).

Of the 584 new smear-positive cases put on treatment under DOTS, 244 were from

Table 2 : Standard of Living Index (SLI) in marginalized and privileged population in Tiruvallur district, south India.

SLI	Classification of Houses	
	Colony No. (%)	Village No. (%)
Low	3966 (40)	6796 (28)
Middle	4172 (42)	7624 (31)
High	1882 (19)	10127 (41)
Total	10020 (100)	24547 (100)

colony and the remaining from village. The treatment outcome of patients from colony and village is given in Table 3. The successful treatment outcome (declared cured or successfully completed treatment) of the patients in the colony (75.4%) was not statistically different from that in the village (78.2%).

The distribution of 584 cases by different socio-economic factors and the proportion in the colony is given in Table 4. It could be seen that the literacy and income was significantly lower in the colony and significantly more patients lived in thatched houses with no rooms. Intake of alcohol was significantly higher among residents in the colony.

DISCUSSION

The study findings have clearly shown that the services of the TB control were equally available to scheduled caste and other population in the community. The prevalence of TB was found to be nearly two times higher in the colony population. Also, the number of cases reporting to the governmental HFs was higher and proportional to the burden of TB in this population. This indicated that the

Table 3: Treatment outcome among new smear-positive cases registered in a DOTS programme from 1999-2003 in Tiruvallur district, south India

Treatment Outcome	Number of patients	
	Colony	Village
Successful	184 (75.4)	266 (78.2)
Defaulted	44	42
Expired	7	15
Failed	9	17
Total	244	340

Figures in parenthesis indicate proportion of patients with successful treatment outcome

accessibility to the HFs was similar in these two populations. A higher notification of cases has also been reported among the socially marginalized in a study conducted by Indian Institute of Health Management Research.[7] For cases notified to the HFs for treatment under DOTS, treatment outcome was found to be similar in the two groups, suggesting that treatment facility was equally accessible to the both colony and village populations.

Economically poor and vulnerable groups are at higher risk of developing tuberculosis compared with the general population because of over crowded and poor substandard living or working conditions.[8] Reduction of TB prevalence among the marginalized has been identified as a contributor to accelerating health progress in poor and the marginalized.[8] The present study showed that DOTS is addressing the specific needs of all segment of the population in the community for treatment of TB. Earlier studies reported from the same area had shown that there is equal access to TB services irrespective of the economic status[3] and gender.[4]

We have demonstrated a substantial annual decline in the prevalence of TB after the introduction of DOTS strategy.[9] The proportion of prevalence among scheduled caste and other population remained similar during the three surveys conducted, suggesting similar reduction in both groups. This showed that we are in the right direction of achieving millennium development goals (MDGs) of halving the TB prevalence, incidence and mortality by 2015 by making DOTS accessible to all patients irrespective of caste, socio-economic status. Our findings of equal accessibility were from a random population in the TU and hence could be

Table 4 : Factors for patients among marginalized population registered for treatment
in a DOTS programme in 1999-2003 in Tiruvallur district, south India

Factors	Total (584)	Colony (244) (%)	χ^2 value	Significant or not
Sex				
Male	458	184 (40)	2.25	NS*
Female	126	60 (48)		
Age				
< 45 yrs	286	114 (40)	0.85	NS
≥ 45 yrs	298	130 (44)		
Literacy				
Illiterate	274	134 (49)	11.76	S†
Literate	286	99 (35)		
Income				
< 1500	258	120 (46)	4.56	S@
≥ 1500	146	52 (36)		
Type of house				
Not pucca	480	215 (45)	14.54	S†
Pucca	81	18 (22)		
No. of rooms				
No	313	150 (48)	12.25	S†
≥ 1	244	81 (33)		
Patient delay				
≥ 4 weeks	466	195 (42)	0.19	NS
> 4 weeks	84	33 (39)		
First action				
Private	319	127 (40)	0.93	NS
Government	251	110 (44)		
DOTS convenient				
No	54	25 (46)	0.51	NS
Yes	432	178 (41)		
Smoking				
No	266	108 (41)	0.18	NS
Yes	295	125 (42)		
Drinking				
No	330	122 (37)	6.87	S+
Yes	231	111 (48)		

* Not significant; S+ - P<0.01; S@ - P<0.05; S† - P<0.001

Note : for variables 'literacy, income, type of house, number of rooms, patient delay, first action, etc', the number of patients is less than 584 due to the non availability of all patients at the time of interview with in a week after treatment started. For 'DOTS convenient', the number is still lower when interviewed at the end of second month after treatment started.

applicable to the entire area in the TU of the district. However, more studies are required from other parts of the country to validate the findings to be extrapolated to the entire country.

Limitations of the study

All sputum positive cases were taken for analysis from the survey area and not from the entire area. The findings are from a TB unit of south India may not be generalizable due to various extraneous factors.

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REFERENCES

1. Tuberculosis and Poverty. Division of publication information and ICMR, New Delhi; Vol 32, No 3: March 2003.

2. Spence DPS., Hotchkiss J., Williams CSD., Davies PDO. Tuberculosis and Poverty. *BMJ* 1993; **307**; 759-61.

3. Muniyandi M., Rajeswari R., Balasubramanian R. Tuberculosis control programme – Is it pro poor. *SAARC J TB L DIS & HIV*; 2004; **1**(1) 14-19.

4. Balasubramanian R, Garg R, Santha T, Gopi PG, Subramani R,Chandrasekaran V, et al. Gender disparities in tuberculosis: report from a rural DOTS programme in South India. *Int J Tuberc Lung Dis.* 2004; **8**(3):323-332.

5. Khatri GR, Frieden TR. The status and prospectus of tuberculosis control in India. *Int J Tuberc Lung Dis.* 2000; **4**:193-200.

6. Revised National Tuberculosis Control Programme. Technical guidelines for TB control. Central TB Division, Directorate General of Health Services. New Delhi, India: Nirman Bhavan, 1997

7. Indian Institute of Health Management Research, Jaipur, India 2003: Accessibility and utilization of RNTCP services by SC/ST population. http://www.tbcindia.org (accessed on 16th, Feb 2007).

8. World Health Organisation. Addressing poverty in TB control: Options for National TB control Programmes WHO/HTM/TB 2005.352

9. R Subramani, T Santha, TR Frieden, S Radhakrishna, PG Gopi, N Selvakumar, K Sadacharam and PR Narayanan. Active community surveillance of the impact of different tuberculosis control measures, Truvallur, south India, 1968-2001. International Journal of Epidemiology doi:10.1093/ije/dy1216