

ORIGINAL ARTICLE

Evaluation of treatment outcome of tuberculosis patients in the urban field practice area of D. Y. Patil Medical College, Pimpri, PuneBalkrishan Lanjewar¹, Jitendra Bhawalkar², Sumit Jethani³, Anjali Dhone⁴¹Resident, ²Professor and Head, ^{3& 4}Assistant Professor, Department of Community Medicine, D. Y. Patil Medical College, Pune

Abstract	Introduction	Methodology	Results	Conclusion	References	Citation	Tables / Figures
--------------------------	------------------------------	-----------------------------	-------------------------	----------------------------	----------------------------	--------------------------	----------------------------------

Corresponding Author

Address for Correspondence: Dr Sumit Jethani, Assistant Professor, Department of Community Medicine, D. Y. Patil Medical College, Pune
E Mail ID: sumit.jethani@gmail.com

Citation

Lanjewar B, Bhawalkar J, Jethani S, Dhone A. Evaluation of treatment outcome of tuberculosis patients in the urban field practice area of D. Y. Patil Medical College, Pimpri, Pune. Ind J Comm Health 2014;26(3):238-242

Source of Funding : Nil, **Conflict of Interest:** None declared

Article Cycle

Submission: 24/01/2014; ; **Revision:** 13/03/2014; **Acceptance:** 22/08/2014; **Publication:** 20/09/2014

Abstract

Background: Tuberculosis (TB) bacilli have lived in symbiosis with mankind since time immemorial. RNTCP is the largest and the fastest expanding programme throughout the world as 1.29 million patients in 2005, 1.39 million patients in 2006 and 1.48 million patients in 2007 were enrolled for treatment. In 2008, 1.51 million patients have already been placed on treatment. Treatment success rates have tripled from 25% to 86% & TB death rates have been cut 7 fold from 29% to 4% in comparison to the pre-RNTCP (Revised National Tuberculosis Control Programme) era.[1] **Objective:** To study treatment outcome in the form of cure rate, treatment completion rate, failure rate, death rate in the study area. **Method:** An ambispective study was done in urban field practice area attached to Padamshree Dr. D.Y. Patil Medical College Pimpri, Pune. The study was carried out during 1st July 2011 - 30th September 2013. **Results:** A total 429 subjects were enrolled in the study of which, 224(52.24%) were successfully completed the treatment, followed by 110(25.54%) which were cured, 34(07.92%) were defaulted, 28(06.52%) were transferred out, 17(03.96%) died and 16(03.72%) underwent treatment failure during the study period. **Conclusion:** In spite, of many efforts by RNTCP to treat tuberculosis patients it was found only 50 % of the subjects successfully completed the treatment.

Key Words

RNTCP; Treatment; Tuberculosis

Introduction

Robert Koch (1843–1910), a pupil of Henle, a gifted microscopist produced irrefutable evidence in 1882 that a specific microbe is the fundamental cause of tuberculosis. Using special staining techniques he succeeded in visualizing slender rods – which he called tubercle bacilli, Mycobacterium tuberculosis.[2] In the practice of public health regarding tuberculosis prevention and control, the natural history of Mycobacterium tuberculosis infection and tuberculosis disease underpins our understanding of tuberculosis epidemiology and the principles of tuberculosis control though the bacilli was discovered more than a century back by Sir Robert Koch in 1882 and effective drugs for treatment were available for more than half a century, still TB is ranked 7th in the world accounting

for 2.5 percent of all deaths as per the WHO global burden of disease estimates for the year 2004.[3,4] In India since 1993, under implementation of the Revised National Tuberculosis Control Programme (RNTCP), the diagnosis of Pulmonary Tuberculosis is also primarily sputum based in accordance with the WHO guidelines.[5] India has had an on-going National TB Program (NTP) since 1962, under this program main emphasis was given on diagnosis based upon X-ray and slightly on sputum examination. In 1992, a national wide review was conducted with the assistance of SIDA & WHO (GOI 1992) to address the reasons for the failure of (NTP) National Tuberculosis Program. Based on these finding WHO recommended DOTS strategy in 1997 with the support of World Bank. The target of DOTS program was successful treatment or cure rate of 85% of new smear positive cases and detection of

70% of such cases.[6] While many claims have been made about the success of DOTS expansion in terms of numbers covered[7-14], there are only a few reports providing details about actual treatment success rates.[15-17]

Aims & Objectives

To study treatment outcome in the form of cure rate, treatment completion rate, failure rate, death rate in the study area.

Material and Methods

An Ambispective study was carried out during 1st July 2011 – 30th September 2013 in urban field practice area attached to Padamshree Dr. D.Y. Patil Medical College Pimpri, Pune. Patients from DOTS centers in urban field practice population were the study subjects. Field practice area is situated at Landewadi, Bhosari, Pune. Population of field practice area is 1,10,000. Field practice area include 8 slums viz. Landewadi, Shanti Nagar, Gawali Nagar, Gawalimatha, Gavane Vasti, Balaji Nagar, Maali ali and Ambedkar Nagar. It runs under TU Bhosari, hospital of PCMC. There is one designated Microscopic centre and 30 DOTS providers in the area and some of which are taken for the qualitative study based on conventional sampling. Patients of tuberculosis who were registered from 1st July 2011 and completing treatment before 31st March 2013 were taken for the prospective study with informed consent and for retrospective analysis, data from DOTS registers was taken from 1st July 2010 to 30th June 2011. Regular visits were made to DOTS center and to patient's houses during prospective study attached to urban field practice area of Padamshree. Dr. D.Y.Patil Medical College, Pimpri, Pune. Interviews were taken using structured and pretested questionnaire for study with written informed consent from the patients. Statistical analysis: Data was entered in MS-EXCEL sheet, compiled and analyzed by Epi Info 6 version and SPSS 17 version by proper statistical tests (Percentage, Chi-square). P-value of < 0.05 was considered statistically significant. The study was approved by Institutional ethical committee.

Results

Out of 429 subjects, a total 266(62%) were male and 163(38%) were female, a total 121(28.20%) subjects were belonging to age category between 15-24 years (70-Male, 51-Female) followed closely by 118(27.50%) subjects were in age group between 25-34 years (Male-66, Female-52) while least subjects

were in age group between 0-14 years i.e. 33(07.69%) (Male-19,Female-14), mean age of the patients came out to be 31.89, std dev of 15.70, median of 28.0, mode 25.0 ([Table 1](#) & [Figure 1](#))

Out of the total 429 subjects, 224(52.24%) were successfully completed the treatment, followed by 110(25.54%) which were cured, 34(07.92%) were defaulted, 28(06.52%) were transferred out, 17(03.96%) died and 16(03.72%) underwent treatment failure during the study period. ([Table 2](#))

A total of 429 subjects enrolled in the study, the results shows that, among total 429 subjects, treatment success rate was 78% and among new smear positive subjects cured rate was 78%. Among total 429 subjects, failure rate was 4% and defaulter rate was 8%, retreatment sputum positive cases had cure rate of 28.57%, retreatment cases had treatment completion rate of 77%, failure rate of nil in others and 20% in retreatment sputum positive cases, defaulter rate of 10% in others cases and 26% in retreatment sputum positive cases. Total number of deaths during the study period was 17(4%), new smear negative cases who had completed treatment were 83%, failure rate was nil, defaulter rate was 10% and 2(03.07%) died. ([Figure 2](#)) New extra pulmonary subjects were 141 of which 89% were in the category of treatment completed, failures were 0.07% and 0.70% were died. Overall it was found that out of the total 429 subjects recorded, 78% were cured, 7.92% were the defaulter and 4% died. ([Table 3](#)).

Discussion

In our study it was found that, out of 429 subjects, there were 62% male and 38% female further it was found that new smear positive subjects were 129 (30.06%) while in the retreatment category there were 94(21.91%) subjects of which 10 were in Relapse, treatment after default (TAD) were 18, Failure were 7, Others were 59 and in new smear negative category a total of 65(15.15%) subjects were present, while in the new extra pulmonary there were 141(32.86%) subjects.

A study conducted in Ernakulum showed that Pulmonary Tuberculosis patients were 186(65.3%) out of these 90(31.6%) were smear positive and 96(33.6%) were smear negative patients. Extra pulmonary tuberculosis patients were 99(34.7%). In smear positive patients cured were 79(87.7%), failures were 2(2%), defaulters were 5(5%) and died were 4(5%). In smear negative pulmonary and extra pulmonary combined patients treatment completed

were 155(79.4%), defaulters were 25(12.8%), relapses were 4(2%) and died were 8(4%).[18]

In our study outcome of 429 patients enrolled in the study, the results showed that new smear positive had cured / treatment completion rate of 78%, failure rate was 6% and defaulter rate 4%, retreatment cases had cure rate of 77%, failure rate nil, defaulter rate of 10% and total number of deaths during the study period was 17(4%), new smear negative who were cured were 83%, failure rate nil lastly defaulter rate was 9% and 2 among them have died. New extra pulmonary subjects were 141 of which 89% were treatment completed, failure 1 (0.70%) & 1(0.70%) died.

A study conducted in Delhi by Chadha S.L. and Bhagi R.P. showed following results for category 1 and category 2, the sputum conversion rate after 2 months of intensive phase treatment was 92.6% and 76.9% and cure rate was 97% and 73.3%. 49 out of 639 defaulted over all default rate was 7.7%, failure rate was 1.6%. [19]

A study conducted by Dholakia Yatin in Mumbai on Relapse following directly observed therapy short course revealed cure rate of 83.59% whereas treatment failure and defaulter rate was 1.08% and 9.45% respectively.[20]

Xiangi chen et al in China showed that, in smear positive new cases the cure rate was 95.3%, treatment completed rate was 1.2%, death rate was 1.3%, failure rate was 0.9%, default rate was 0.7% and transferred out was 0.2% and others were 0.3%. In smear positive relapse cases the cure rate was 90%, treatment completed rate was 2.3%, death rate was 2.4%. Failure rate was 0.3% and others were 0.6%. In smear positive re- treatment cases the cure rate was 90%, treatment completed rate 2.3%, death rate was 2.3%, failure rate was 3.3%, default rate was 1.3%, and transferred out rate was 0.2% and others were 0.7%. [21]

In our study slightly higher failure rate was observed as compared to the studies described, while 0% failure rate was observed in retreatment cases which are far better that study done in China by Xiangi Chen et al. Defaulter rate was found to be less as compared to studies conducted by Chadha SL and Dholakia in Delhi. Jethani S et al found that out of 362 subjects 44.8% had past history of pulmonary tuberculosis and 5% subjects had family history of tuberculosis but 50% were sputum positive. [22]

Conclusion

On the basis of outcome in this study it is concluded that, 78% successfully cured / completed treatment cases, failure rate was 4%, default rate was 8% and death rate was 4%.

Recommendations

Today, even after half century have passed since the introduction of chemotherapy for Tuberculosis, the burden of tuberculosis still remain on the peak and with emergence of drug resistance control of cases of tuberculosis still remain a challenging task.

Various recommendations can be made, the key is Patient Awareness - Patients should be made aware with health education regarding treatment duration, completion of treatment to avoid failure and proper sputum disposal to avoid transmission of disease. Proper and Frequent Training of DOTS provider and Health Worker. Strengthening of DOTS Treatment Centres and active participation and involvement of Private sector and NGOs.

Limitation of the study

A wide area could have been surveyed to get a better picture but the study was time bound.

Relevance of the study

As Tuberculosis have become a notifiable disease since 2012 and with increasing number of relapse and defaulter cases it have become mandatory not only to identify the cases but also keep a watch on the treatment outcome so as to prevent simple TB cases to convert into MDRs (Multi Drug Resistant) and XDRs (Extensively drug resistant).

Authors Contribution

All authors have contributed to the study.

Acknowledgement

We would like to express our thanks and gratitude to Dr V A Kakrani, Dr Harshal Pandav, Dr Megha Mamulwar, Dr Kajal Srivastava for helping and providing valuable inputs.

References

1. Ministry of Health and Family Welfare. Socio-economic Impact. RNTCP status report 2009. TB India, New Delhi: Central TB Division, 2009.
2. Herzog H, Basil M. History of tuberculosis. *Respiration* 1998; 65:7-9.
3. Roger D, Robert B, Lansang M A, Martin G. Tuberculosis. In: Dermot Maher, Marcos Espinal, Mario Raviglione. *Oxford Textbook of Public Health: 5th ed.* New York (US): Oxford University Press; 2009;1213.
4. WHO. Tuberculosis. MediaCentre. www.who.int/mediacentre/factsheets/fs104/en/index.html/Accessed Jan 18 2013.
5. WHO. Global tuberculosis control: surveillance, planning, financing. <http://www.who.int/tb/publications/global-report/2008/en/index.html>/Accessed oct2012.

6. Park JE. Tuberculosis. Park K. Park's text book of Preventive & Social Medicine: 21st ed. Jabalpur: Banarsidas Bhanot. 2011;164.
7. Chauhan LS. Status report on DOTS expansion and implementation during the 4th quarter 2003. J Indian Med Assoc. 2004 May;102(5):256-7, 281. PubMed PMID: 15636028. [\[PubMed\]](#)
8. Khatri GR, Frieden TR. Rapid DOTS expansion in India. Bull World Health Organ. 2002;80(6):457-63. PubMed PMID: 12132002; PubMed Central PMCID: PMC2567532. [\[PubMed\]](#)
9. Frieden TR, Khatri GR. Impact of national consultants on successful expansion of effective tuberculosis control in India. Int J Tuberc Lung Dis. 2003 Sep;7(9):837-41. PubMed PMID: 12971666. [\[PubMed\]](#)
10. Frieden TR, Driver CR. Tuberculosis control: past 10 years and future progress. Tuberculosis (Edinb). 2003;83(1-3):82-5. Review. PubMed PMID: 12758194. [\[PubMed\]](#)
11. Granich R, Chauhan LS. Status report of the Revised National Tuberculosis Control Programme: January 2003. J Indian Med Assoc. 2003 Mar;101(3):150-1, 156. PubMed PMID: 14603959. [\[PubMed\]](#)
12. Chauhan LS. Status report on DOTS expansion and implementation during the 2nd quarter 2004 (April-June 2004). J Indian Med Assoc. 2004 Nov;102(11):627-8. PubMed PMID: 15868873. [\[PubMed\]](#)
13. Frieden TR, Munsiff SS. The DOTS strategy for controlling the global tuberculosis epidemic. Clin Chest Med. 2005 Jun;26(2):197-205, v. Review. PubMed PMID: 15837105. [\[PubMed\]](#)
14. Frieden TR. Tuberculosis control: critical lessons learnt. Indian J Med Res. 2005 Mar;121(3):140-2. PubMed PMID: 15802753. [\[PubMed\]](#)
15. Sharma SK, Lawaniya S, Lal H, Singh UB, Sinha PK. DOTS centre at a tertiary care teaching hospital: lessons learned and future directions. Indian J Chest Dis Allied Sci. 2004 Oct-Dec;46(4):251-6. PubMed PMID: 15515825. [\[PubMed\]](#)
16. Vijay S, Balasangameswara VH, Jagannatha PS, Saroja VN, & Kumar P. Treatment outcome and two and half years' follow-up status of new smear positive patients treated under RNTCP. Indian J Tuberc. 2004; 51(4):199-208.
17. Rodger AJ, Toole M, Lalnuntluangi B, Muana V, Deutschmann P. DOTS-based tuberculosis treatment and control during civil conflict and an HIV epidemic, Churachandpur District, India. Bull World Health Organ. 2002;80(6):451-6. PubMed PMID: 12132001; PubMed Central PMCID: PMC2567536. [\[PubMed\]](#)
18. Nirupa C, Sudha G, Thomas A, Gopi PG. Evaluation of directly observed treatment providers in the Revised National Tuberculosis Control Programme. Indian J Tuberc. 2005;52(2):73-77.
19. Chadha S.L. and Bhagi R.P. Treatment outcome in Tuberculosis patients placed under directly observed treatment short course - A cohort study. Indian J Tuberc. 2000;47(3):155-158.
20. Dholakia Y, Danuni U and Desai C. Relapse following directly observed therapy short course - A follow up study. Indian J Tuberc. 2000;47(4):233-236.
21. Xianyi C, Fengzeng Z, Hongjin D, Liya W, Lixia W, Xin D, Chin DP. The DOTS strategy in China: results and lessons after 10 years. Bull World Health Organ. 2002;80(6):430-6. PubMed PMID: 12131998; PubMed Central PMCID: PMC2567538. [\[PubMed\]](#)
22. Jethani, S., Semwal, J., Kakkar, R., & Rawat, J. STUDY OF EPIDEMIOLOGICAL CORRELATES OF TUBERCULOSIS. Indian Journal of Comm Health, 2013;24(4):304-9. Retrieved from <http://www.iapsmupuk.org/journal/index.php/IJCH/article/view/358> [\[Google Scholars\]](#)

-----X-----

Tables

TABLE 1 AGE WISE AND GENDER WISE DISTRIBUTION OF STUDY SUBJECTS

Age groups (years)	TB Subjects		
	Male	Female	Total
0-14	19(57.57%)	14(42.43%)	33(07.69%)
15-24	70(57.85%)	51(42.15%)	121(28.20%)
25-34	66(55.93%)	52(44.07%)	118(27.50%)
35-44	45(75.00%)	15(25.00%)	60(13.88%)
45-54	33(67.34%)	16(32.66%)	49(11.42%)
55 above	33(68.75%)	15(31.25%)	48(11.31%)
Total	266(62.00%)	163(38.00%)	429(100%)

TABLE 2 DISTRIBUTION OF TUBERCULOSIS SUBJECTS AS PER OUTCOME

Outcome as per DOTs	Number	Percentage (%)
Cured	110	25.54
Defaulted	34	07.92
Failure	16	03.72
Transferred out	28	06.62
Died	17	03.96
Treatment completed	224	52.24
Total	429	100

TABLE 3 CATEGORY VS TREATMENT OUTCOME DISTRIBUTION

Category	Number	Treatment outcome					
		Cured/Treatment completed	Died	Failure	Defaulted	Transfer	
New smear +ve	129(100%)	100(77.58%)	06(04.69%)	08(06.36%)	05(03.58%)	10(07.79%)	
Retreatment	S.+ve	35(100%)	10(28.57%)	05(14.28%)	07(20.00%)	09(25.73%)	04(11.42%)
	Other	59(100%)	45(76.27%)	03(05.10%)	00(00.00%)	06(10.16%)	05(08.47%)
New smear -ve	65(100%)	54(83.06%)	02(03.07%)	00(00.00%)	06(09.23%)	03(04.64%)	
New Extra Pulmonary	141(100%)	125(88.65%)	01(00.70%)	01(00.70%)	08(05.67%)	06(04.25%)	
Total	429(100%)	334(77.85%)	17(03.96%)	16(03.72%)	34(07.92%)	28(06.52%)	

(S.+ve- sputum positive)

Figures

FIGURE 1 AGE WISE AND GENDER WISE DISTRIBUTION OF STUDY SUBJECTS

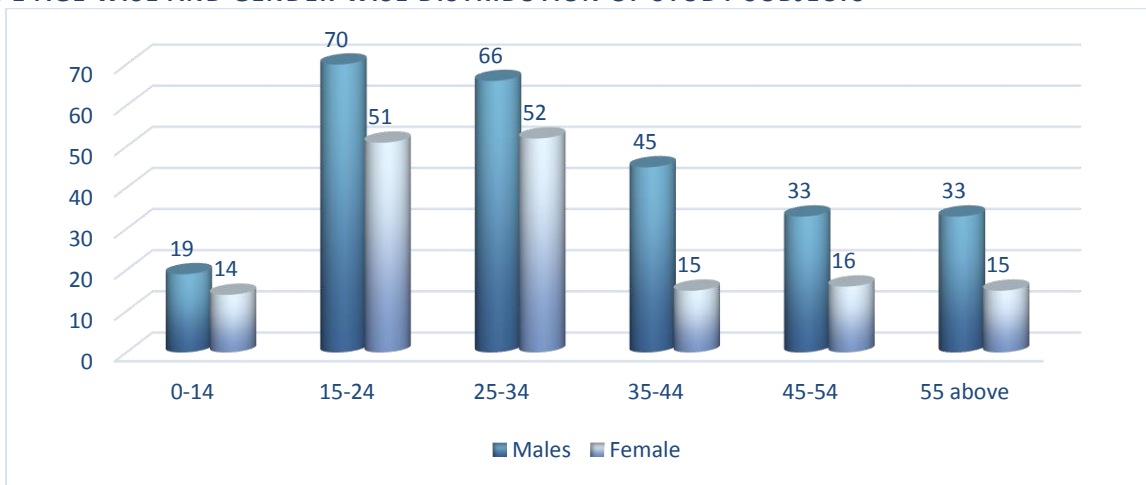


FIGURE 2 DISTRIBUTION OF TUBERCULOSIS SUBJECTS AS PER OUTCOME

