



International Journal of Current Research and Academic Review

ISSN: 2347-3215 Volume 3 Number 4 (April-2015) pp. 26-31

www.ijcrar.com



Evaluation of household contacts of MDR-TB cases in Wardha District, Maharashtra, India

S.S. Bendle* and R.C.Goyal

Department of Community Medicine, Jawaharlal Nehru Medical College, Sawangi (M), Wardha, India

*Corresponding author

KEYWORDS

MDR-TB,
Tuberculosis,
Pulmonary
Tuberculosis
Screening,
RNTCP guideline.

A B S T R A C T

Close contacts of MDR-TB patients are expected to be at increased risk of developing TB. Therefore, when patients are diagnosed with MDR tuberculosis, early detection and treatment of active tuberculosis in their close contacts is a particularly important element of prevention, stop further transmission, and prevent new cases of active tuberculosis. We conducted domiciliary visits to interview index cases as well as their household contacts. This study was a community based cross sectional study conducted in between June 2012 to December 2012 for all those house hold contacts in all 08 blocks of Wardha District, Maharashtra, India. Out of 259 close contacts of 84 index MDR-TB patients, 06 (2.31%) had active tuberculosis. An early identification and early initiation of treatment in potential cases will eventually translate into reduced morbidity, mortality and transmission of infection in the community.

Introduction

Tuberculosis (TB) persists as a global public health problem of serious magnitude requiring urgent attention. The South-East Asia Region of World Health Organization (WHO) accounts for 40% of the global burden of TB in terms of TB incidence. India and China together account for almost 40% of the world's TB cases. It is estimated that about 3.5 million new cases of TB continue to occur each year and about 480 000 people die of this disease annually, most of these in five countries, namely,

Bangladesh, India, Indonesia, Myanmar and Thailand (WHO, Annual TB Report, 2013). The emergence of resistance to drugs used to treat TB, and particularly Multi Drug-Resistant TB (MDR-TB), has become a significant public health problem and an obstacle to effective TB control (Singla *et al.*, 2011). Several studies have found that close contacts of MDR-TB patients have very high rates of TB (WHO, 2006; Kritski *et al.*, 1996; Schaaf *et al.*, 2000; Teixeira *et*

al., 2001; Schaaf *et al.*, 2002; Bayona *et al.*, 2003).

In Wardha district, there are 84 cases of diagnosed MDR-TB as per report of District Tuberculosis Office (DTO), Wardha in June 2012. Since the contacts are of high risk of developing TB, therefore contact screening is an essential for effective tuberculosis control, hence this study was undertaken.

The main objectives of this study to assess the household contacts for Pulmonary Tuberculosis status by screening as per RNTCP guideline.

Methodology

This study was an observational community based cross sectional study for all household contacts. This study was carried out in all 08 blocks of Wardha District, Maharashtra, India for half year (from June 2012 to Dec 2012.)

Study participants: All the household contacts (all ages and both sexes) of registered MDR-TB patients at District Tuberculosis Centre, Wardha.

Sample Size: This study included all known MDR-TB patients (84) registered at DTC and their household contacts.

Sample selection method

A list of MDR-TB patients registered at District Tuberculosis centre, Wardha was obtained with their detail address & contact number. The investigator contacted through home visit & screened every household contact of MDR-TB patients for presence or absence of Tuberculosis as per RNTCP guidelines. All chest symptomatic household contact was asked to provide two sputum specimens (1st spot & 2nd early morning)

for microscopy were brought at nearby DMC where index case resides for sputum microscopy as soon as possible.

Close contacts of MDR-TB patients who were found smear positive PTB, started on Category I in collaboration with DTO Wardha.

Data analysis: Data thus collected was analysed using software Systat 12.0 version, descriptive analysis was done by using mean, SD and analytical analysis using chi square, Anova, z-test, unpaired t test. The significance level was considered at $p < 0.05$.

Ethical consideration: Study was conducted after due written permission from the District Tuberculosis Officer (DTO), Wardha and approval from the Institutional Ethics Committee, DMIMS, Wardha.

Result and Discussion

Table I revealed that total male household contacts were 45.56% and female 54.44%. Maximum (25.09%) household contacts belonged to 11 to 20 year age group followed by 21 to 30 year (22.39%), 41 to 50 year (15.84%), 51 to 60 year (11.97%), and 31 to 40 year (11.19%).

There were 07.34% household contacts belongs to above 60 year and 06.18% contacts were belongs to less than 10 years age group.

It was also observed that male household contacts between 21 to 30 year age group were more (30.50%) while female household contacts (26.24%) in 11 to 20 year age group. The mean age of Male was 33.43 ± 18.48 and in females 32.79 ± 18.58 years. Overall mean age of contacts was 33 ± 18.50 years.

There was no significance difference in ages of households among male and female household contacts (p - value >0.05).

Table II indicates that prevalence of chest symptomatic among household contacts was (13/259) 05.02%. Prevalence of active TB cases (sputum positive) was 02.31%. Sputum positivity among chest symptomatic was (06/13) 46.15% which included 66.67% males and 33.33% females.

By applying z proportion test, it was found that there is no significance difference in male and female sputum positive cases among household contacts and chest symptomatics (p value >0.05).

It was clear from Table III that male affected more (50%) in 46 to 60 year age group and females (100%) in 15 to 30 year of age group. The mean age of sputum positive cases was 44.5 ± 16.35 years. For sputum positive males mean age was 54.25 ± 8.09 while in female 25 ± 0 years. There was age wise significance difference in male and female sputum positive contacts (p value <0.05).

Table IV describes distribution of chest symptomatic contact with relation to housing condition like overcrowding, kitchen condition, and sharing of same bedroom with index case. Among symptomatic contacts 46.15% were residing in overcrowded houses and 15.39% chest symptomatic contact had separate kitchen, sharing of same bedroom with index case was up to the tune of 38.46%.

By applying z proportion test we found no significance difference in overcrowding and sputum positive contacts as well as no significance difference in kitchen condition, sharing of bedroom and sputum positive contacts (p value > 0.05). Among sputum positive contacts, 50% were residing in

overcrowded houses and 60% shared same bedroom, however, all shared combined kitchen. One case each had diabetes and hypertension among sputum positive cases. All 06 smear positive Pulmonary Tuberculosis patients were put on Category I regimen in collaboration with DTO Wardha under RNTCP. Those 07 Chest symptomatic (smear negative) were treated with antibiotics and supportive care.

There were 259 household contacts found in present study. Female household contacts were more (54.44%) than male (45.55%). Similar finding was also observed by Singla *et al.* (2011), Bayona *et al.* (2003), Singh *et al.* (2013), Beccera *et al.* (2011). Maximum (25.09%) contacts belong to 11 to 20 year age group followed by 21 to 30 year (22.39%). The similar finding was reported by Singla *et al.* (2011) and Vella *et al.* (2011). The mean age of total household contacts was 33.08 ± 18.50 years with mean age of male was 33.43 ± 18.48 and female 32.29 ± 18.58 years. Becerra *et al.* (2011) and Grandjean *et al.* (2011) reported that mean age was 24.7 ± 18.7 and 26 years in household contacts which differ from present study.

Prevalence of sputum positive cases among household contacts was 2.31% and chest symptomatic 46.15% in present study. Nearly two third were males and one third females. Our findings were in accordance with Becerra *et al.* (2011) (2.60%), Attamna *et al.* (2009) (2.52%), Snider *et al.* (1985) (1.7%), Gregory *et al.* (2012) (3.1%). Among sputum positive contact, the present study revealed that male affected more (50%) in 46 to 60 year age group and females (100%) in 15 to 30 year of age group. The mean age of sputum positive cases was 44.5 ± 16.35 years. This finding was statistically significant in this study ($p < 0.05$). Similar finding were observed by Bayona *et al.* (2003).

Among sputum positive symptomatic contacts, 03/06 (50%) residing in overcrowded houses, 100% had combined

kitchen and sharing same bedroom with index cases was up to the tune of 50%.

Table.1 Age and Sex wise distribution of household contacts

Age group	Male		Female		Total	
	No	%	No	%	No	%
<10	07	05.94	09	06.39	16	06.18
11- 20	28	23.72	37	26.24	65	25.09
21-30	36	30.50	22	15.60	58	22.39
31-40	09	07.62	20	14.18	29	11.19
41-50	14	11.87	27	19.14	41	15.84
51-60	14	11.87	17	12.06	31	11.97
>60	10	08.48	09	06.39	19	07.34
Total	118	100.00	141	100.00	259	100.00

Mean difference = 0.64, unpaired 't' test = 0.27, p = 0.78.

Table.2 Distribution of sputum positive cases among chest symptomatic contacts

Sex	Number of MDR-TB cases	Total Household contacts	Chest symptomatic	Sputum positive cases	Z= 0.715 P= 0.475
Male	63(75%)	118 (45.56%)	07 (53.85%)	04 (66.67%)	
Female	21(25%)	141 (54.44%)	06 (46.15%)	02 (33.34%)	
Total	84(100%)	259 (100.00%)	13 (100.00%)	06 (100.00%)	

Figure in parenthesis shows percentages.

Table.3 Age and sex wise distribution of sputum positive contacts

Age(Years)	Sputum positive contacts				Total	
	Male		Female		No	%
	No	%	No	%		
15 to 30	00	00.00	02	100.00	02	33.34
31 to 45	01	25.00	00	00.00	01	16.66
46 to 60	02	50.00	00	00.00	02	33.34
61 to 75	01	25.00	00	00.00	01	16.66
Total	04	100.00	02	100.00	06	100.00

M.d=29.25, t= 4.82, p=0.009

Table.4 Distribution of chest Symptomatic contacts and sputum positive cases with relation to housing condition

Housing condition	Number of Chest symptomatic(13)	Sputum positive contacts	Proportion (%)	Z test
Overcrowding	No	No		Z= 0.27 P= 0.787
Present	06	03	50.00	
Absent	07	03	42.85	
Total	13	06		
Kitchen Condition				Z= 0.636 P= 0.525
Separate	02	00	0	
Combined	11	06	54.54	
Total	13	06		
Sharing same bedroom with index case				Z= 0.238 P= 0.812
Yes	05	03	60.00	
No	08	03	37.50	
Total	13	06		

Zhongwei Jia *et al.* (2013) showed a figure of 37% symptomatic contacts living in same bedroom with index case which was similar finding with our study.

Teixeiria *et al.* (2001) shows 57% residing in overcrowded houses. All 06 smear positive Pulmonary Tuberculosis patients were put on Category I regimen in collaboration with DTO Wardha under RNTCP and those 07 Chest symptomatic smear negative were treated with antibiotics and supportive care.

Conclusions

There was a huge delay in initiation of treatment of MDR-TB cases especially among low educated, unskilled and low income group. Inadequate treatment was also found in sizeable number of MDR-TB cases. The occurrence of diseases was related to poor housing condition more so among active TB disease. Regular monitoring and follow up of household contact helped early identification of suspected chest symptomatic and also active TB cases. An early identification and early initiation of treatment in potential cases will

eventually translate into reduced morbidity, mortality and transmission of infection in the community.

References

- Attamna, A., Chemtob, D., Attamna, S., Fraser, A., Rorman, E. 2009. Risk of tuberculosis in close contacts of patients with multidrug resistant tuberculosis: a nationwide cohort. *Thorax*, 64(3): 271.
- Bayona, J., Chavez-Pachas, A.M., Palacios, E., Llaro, K., Sapag, R., Becerra, M.C. 2003. Contact investigations as a means of detection and timely treatment of persons with infectious multidrug-resistant tuberculosis. *Int. J. Tuberc. Lung Dis.*, 7(12): 501–509.
- Becerra, M.C., Appleton, S.C., Franke, M.F., Chalco, K., Fernando, A., Bayona, J., Murray, M., Sidney, S. Atwood, Carole, D. Mitnick. 2011. Tuberculosis burden in households of patients with multidrug-resistant and extensively drug-resistant tuberculosis: a retrospective cohort study. *Lancet*, 377(9760): 147–152.

- Grandjean, L., Crossa, A., Gilman, R.H., Herrera, C., Bonilla, C. 2011. Tuberculosis in household contacts of multidrug-resistant tuberculosis patients. *Int. J. Lung Dis.*, 15(9): 1164–1269.
- Gregory, J. Fox, Simone, E. Barry, Warwick, J. Britton, Guy, B. Marks. 2012. Contact investigation for tuberculosis: a systematic review and meta-analysis. *ERJ Express*. doi: 10.1183/09031936.00070812.
- Kritski, A.L., Marques, M.J., Rabahi, M.F., Vieira, M.A., Werneck-Barroso, E., Carvalho, C.E., Andrade, G., de, N., Bravo-de-Souza, R., Andrade, L.M., Gontijo, P.P., Riley, L.W. 1996. Transmission of tuberculosis to close contacts of patients with multidrug-resistant tuberculosis. *Am. J. Respir. Crit. Care Med.*, 153(1): 331–335.
- Schaaf, H.S., Gie, R.P., Kennedy, M., Beyers, N., Hesselning, P.B. 2002. Evaluation of young children in contact with adult multidrug-resistant pulmonary tuberculosis: a 30-month follow-up. *Pediatrics*, 109(5): 765–771.
- Schaaf, H.S., Van Rie, A., Gie, R.P., Beyers, N., Victor, T.C., Van Helden, P.D., Donald, P.R. 2000. Transmission of multidrug-resistant tuberculosis. *Pediatr. Infect. Dis. J.*, 19(8): 695–699.
- Singh, J., Sankar, M.M., Kumar, S., Gopinath, K., Singh, N. 2013. Incidence and prevalence of tuberculosis among household contacts of pulmonary tuberculosis patients in a peri-urban population of South Delhi, India. *PLoS Med.*, 8(7): e69730.
- Singla, N., Singla, R., Jain, G., Hbib, L., Behera, D. 2011. Tuberculosis among household contacts of multidrug resistant tuberculosis patients in Delhi, India. *Int. J. Tuberc. Lung Dis.*, 15(10): 1326–1330.
- Snider, D.E. Jr., Kelly, G.D., Cauthen, G.M., Thompson, N.J., Kilburn, J.O. 1985. Infection and disease among contacts of tuberculosis cases with drug-resistant and drug-susceptible bacilli. *Am. Rev. Respir. Dis.*, 132: 125–132.
- Teixeira, L., Perkins, M.D., Johnson, L.J., Keller, R., Palaci, M.V., do Valle Dettoni, L.M., Canedo Rocha, S. Debanne, Talbot, E., Dietze, R. 2001. Infection and disease among household contacts of patients with multidrug-resistant tuberculosis. *Int. J. Tuberc. Lung Dis.*, 5(4): 321–328.
- Vella, V., Racalbutto, V., Guerra, R., Marrac, Gandhi, N.R., Shah, N.S. 2011. Household contact investigation of multidrug resistant and extremely drug resistant tuberculosis in a high HIV prevalence setting. Kwazulu natal- South Africa. *Int. J. Tuberc. Lung Dis.*, 15(9): 1170–75.
- World Health Organization. Guidelines for the programmatic management of drug resistant Tuberculosis. Geneva, WHO 2006. WHO/htm/TB/2006.361
- World Health Organization. Tuberculosis control in the South East-Asia region, Annual TB Report 2013, Regional office for South East Asia, Indraprastha Estate, Mahatma Gandhi Marg, New Delhi. 2013,
- Zhongwei Jia, Shiming Cheng, Yan Ma. 2014. Tuberculosis burden in China: a high prevalence of pulmonary tuberculosis in household contacts with and without symptoms. *BMC Infect. Dis.*, 14(64): 1471–2334.