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STUDY OF TUBERCULOSIS BURDEN IN ADULT HOUSE HOLD CLOSE CONTACTS OF SPUTUM SMEAR POSITIVE INDEX CASES OF MDR TUBERCULOSIS

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ABSTRACT

BACKGROUND: Tuberculosis is a infectious cause of mortality and morbidity in the world especially in the developing countries. For the early detection of transmission of infection Contact screening is very important.

METHODOLOGY: A cross sectional study was conducted in a tertiary care hospital to assess the burden of TB disease and latent TB infection among adult household close contacts of sputum smear positive MDR TB patients.

RESULTS: In the study 114 household contacts were screened and Latent TB infection was present among 45(39.47%) contacts and active tuberculosis was identified among 15 (13.2%) contacts, pulmonary tuberculosis was detected among 9 (7.9%) contacts, of which 6 contacts had sputum positive pulmonary tuberculosis, 2 (1.8%) contacts developed sputum positive MDR TB and 1 (0.9%) contact was sputum negative pulmonary TB and Extra pulmonary tuberculosis was detected in 6 (5.3%) contacts.

KEYWORDS : Household close contacts, MDR TB patients, Latent TB, Active TB

INTRODUCTION

Tuberculosis is an infectious disease caused by the bacterium Mycobacterium tuberculosis and is one of the top 10 causes of death worldwide. In 2015, there were around 10.4 million new TB cases in the world. over half of these were men (5.9million), and over a third (3.5 million) were women , and ten per cent of cases were among children (2). India accounts for one fourth of the global TB burden. An estimated 1.3 lakh incident multi-drug resistant TB patients emerge annually in India which includes 79000 MDR-TB Patients estimates among notified pulmonary cases. Systematic reviews which were conducted in 2008 and 2013 have shown that close contacts of TB and MDR-TB patients, especially children and people living in lower income countries are at an increased risk of developing TB and MDR-TB (3).The extent of household transmission of MDR-TB, which contributes to the burden of TB disease in the community, is often understudied (4). The risk of disease transmission from index case to their contacts increases if there is any delay in diagnosis and treatment. For the early detection of transmission of infection Contact screening is very important(5).

MATERIALS AND METHODS:

This is a cross sectional study conducted in tertiary care hospital.114 adult household close contacts of 54 sputum smear positive MDR TB patients were enrolled and study was conducted from November 2015 to June 2017. Contacts with Age less than 12 years were excluded. Consent was taken and clinical examination and investigations were done. Mantoux test, USG abdomen, chest –xray and sputum AFB was done for all contacts. If sputum AFB was positive and/or chest x-ray showed lesions Genexpert study was done. In cases with peripheral lymphadenopathy FNAC and Genexpert study of lymph node was done and if pleural effusion was present then pleural fluid analysis, ADA and GeneXpert study was done.

RESULTS

In the present study out of 114 contacts, 15 (13.2%) contacts had history of cough, 6 (5.3%) contacts had history of fever, 7 (6.1%) contacts had history of weight loss and decreased appetite was present in 4 (3.5%) contacts i,e 28.1%of the contacts were symptomatic.

In this study the total number of male household contacts was 51(44.7%) and the numbers of female household contacts was 63(55.3%) and 32 (28.1%) contacts had low BMI (<18.5).

In the present study out of the 114 contacts, 4 (3.5%) number of contacts had past history of pulmonary tuberculosis and 3 (2.6%) had past h/o of extra pulmonary tuberculosis.

In this study it was observed that of the 114 contacts, 8 (7%) number of contacts had infiltrates on chest x-ray, 3 (2.6%) contacts had pleural effusion, and 1 (0.9%) contact each had cavity, fibrotic lesion and mediastinal lymphadenopathy on chest x-ray (table1).

Table 1: DISTRIBUTION OF CHEST XRAY FINDINGS

CXR FINDINGS	NUMBER OF CONTACTS	PERCENTAGE%
INFILTRATES	8	7.0
PLEURAL EFFUSION	3	2.6
FIBROTIC LESION	1	0.9
CAVITY	1	0.9
MEDIASTINAL LN	1	0.9
NORMAL	100	87.7
TOTAL	114	100.0

In the present study it was observed that out of 114 contacts, 63 (55.3%) had mantoux test reading ≥ 10mm.

In the present study it was observed that out of the 114 contacts who were screened 15 (13.16%) developed TB disease. 8 (7.0%) had sputum AFB smear positive, out of which 2 contacts turned out to be MDR TB. sputum AFB was 1+ among 5 contacts and 2+ among 3 contacts.

In the present study Genexpert study was done in13 contacts and in that, MTB was detected among 4 contacts of which 2 contacts had rifampicin sensitivity and 2 had rifampicin resistance.

Table 2: Association of TB disease and LTBI with gender

Gender	Outcome			Total	p-value
	TB	LTBI	Normal		
Male	3	15	33	51	0.003
Female	12	30	21	63	
Total	15	45	54	114	

n the present study it was observed that there is a significant association between TB disease and LTBI with gender (Table 2).

DISCUSSION

In the present study it was observed that of the 114 contacts screened, 8 (7%) contacts had sputum for AFB positive and among these 6 (5.3%) contacts had sputum positive pulmonary TB and 2 (1.8%) contacts were sputum positive MDR TB, 1 (0.9%) contact had sputum negative PTB, 6 (5.3%) contacts had EPTB of which 3 contacts had EPTB lymphadenopathy and 3 contacts had EPTB pleural effusion. 45 (39.5%) contacts had LTBI and 54 (47.4%) had no

TB (table 3). In a study conducted by N. Singla et al. in Delhi, of the 302 contacts, 16 (5.29%) developed TB: nine had pulmonary and seven had extra-pulmonary disease; two (0.66%) had MDR-TB (6). In the study by Shah et al. the yield was 47.2% for latent tuberculosis (7) and J. Morrison et al. found that Latent tuberculosis infection was found in 51.4% of contacts (8). In a study done by L. Teixeira et al. 4% contacts of the MDR-TB cases were found to have active TB (9).

Table 3: DISTRIBUTION OF OUTCOME OF CONTACT TRACING

Final outcome	Number of contacts	Percentage
Pulmonary Sputum Positive TB	6	5.3
Pulmonary Sputum Positive MDR TB	2	1.8
Sputum Negative Pulmonary TB	1	0.9
Extra Pulmonary TB	6	5.3
LTBI	45	39.5
Normal	54	47.4
Total	114	100.0

In the present study it was observed that chest x-ray was abnormal in 14 contacts (table1). In a study in Delhi by Singla et al. 11 had an abnormal CXR (6).

In the present study, among the contacts who got infected from their respective index patients 44 (38.6%) contacts were first degree relatives, 12 (10.53%) contacts were spouses, 3 (2.63%) contacts were second degree relatives and 1 (0.88%) contact was third degree relative. In a study by J Singh et al. 52 (62.7%) were first-degree relatives, 18 (34.6%) second-degree relatives and 12 (14.5%) spouses who got infected from their respective index patients (10).
In the present study it was observed that there is a significant association between TB disease and LTBI with gender. Among those contacts that developed TB, 12 contacts were females and among those who developed LTBI, 30 contacts were females (Table 2). Females have got more chance of developing TB disease and LTBI than males. The reason for this may be because, females spend most of the time in the house with the TB patient, while males go out for work and remain outside the house.

In this study it has been observed that out of the 15 contacts who developed TB, 13 contacts were living in a single room house, and of the 45 contacts that developed LTBI, 23 contacts were living in a single room house. It shows that there is a significant association of TB disease and latent TB infection with the number of rooms (Table 4). The chance of developing TB disease and latent TB is more if contacts are living in a single room house with the index case. It was also found that in three households, 2 household contacts from each of the household developed TB from the index case and in nine household's single household contact developed TB from the index case.

Table 4: Association of TB disease and LTBI with the number of rooms in the house.

Number of rooms	Outcome			Total	p-value
	TB	LTBI	Normal		
1room	13	23	22	58	0.032
2room	2	15	19	36	
3room	0	7	13	20	
Total	15	45	54	114	

CONCLUSION

Thus, this study has demonstrated that there is a high prevalence of TB infection and Latent TB infection among adult house hold close contacts of sputum smear positive index cases of MDR tuberculosis. There is convincing evidence from the present study to mandate screening for all household close contacts of MDR TB patients.

LIMITATIONS OF THE STUDY

This was a cross sectional study, so we couldn't keep follow up of the contacts to see whether they developed tuberculosis later and Sample size was very limited and not all the contacts in the household could be traced. Genexpert was not done in all contacts. Culture and Genotyping was not done in the study.

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