



RESEARCH ARTICLE

A SIX MONTHS OBSERVATIONAL STUDY ON *MYCOBACTERIUM TUBERCULOSIS* INFECTION AND ITS PATTERN AMONG THE RURAL POPULATION OF CHENGALPATTU INDIA

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ABSTRACT

**Aim:** The aim of the study is to identify *Mycobacterium tuberculosis* infection among the rural population and to analyze the pattern of infection (pulmonary and extra pulmonary) in various age and sex wise distribution of the disease.

**Methodology:** A total no of 1,31,600 patients attended Out Patient Department (OPD) of Karpaga Vinayaga Institute of Medical Sciences and Research Centre (KIMS-RC), over a period of six months between October 2015 and March 2016 and were clinically examined. Among them, 273 tuberculosis suspected cases were identified and included in this study. Specimens were collected from pulmonary and extra pulmonary suspected cases. Sputum samples were collected as per CDC guidelines collection procedure and the procedure was clearly explained to the patients and the collections were made under the supervision of a trained technician. Mucus and purulent part of the sputum samples were used to prepare the AFB smear. For extra pulmonary cases, body fluids and urine samples were collected. Smears were prepared as per the standard method and were stained by Zeil-Neelson's procedure. Stained smears were studied by using oil immersion objective and the acid fast bacilli (AFB) were identified and graded as per standard guide lines.

**Results:** Results were analyzed and it was found that the incidence of tuberculosis among the OPD attended cases (general population) it is only 0.21%. Among the tuberculosis suspected cases, 20.15% were positive for AFB and the pattern of infection was as follows. 52.7% were belonged to pulmonary tuberculosis and 47.3% were extra pulmonary cases.

**Conclusion:** It is concluded that our study results revealed an alarming level of increase in extra pulmonary tuberculosis infection in this study population. Further our report indicated, as the age increases the rate of tuberculosis infection also increases. Male patients are found to be more prone for tuberculosis than females.

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INTRODUCTION

Tuberculosis (TB) is an infectious disease caused by the bacilli *Mycobacterium tuberculosis*. It is one the major global health care problem (Gerald Collee *et al.*, 1996; Diseases IUATaL, 2005). Worldwide 9.6 million people are estimated to infect with tuberculosis in 2014. (Mohammad Khaja Mafij Uddin *et al.*, 2013; International Union Against Tuberculosis and Lung Diseases, 1996; WHO Library Cataloguing-in-Publication Data Global tuberculosis report, 2015) In India, approximately two to three million people were affected by tuberculosis. (World Health Organization (2009)) According to

WHO statistics 2011, it is found that India is the largest TB burdened country. (TB Statistics for India (2012)) Annual status report New Delhi indicated that TB prevalence in India estimated 256/100000. (Annual Statistics Report New Delhi. RNTCP; 2013) Yet another report highlighted that Tamil Nadu showed 388/100000 among the population in a rural district of Thiruvallur. (Kolappan *et al.*, 2013) The greater prevalence rate of tuberculosis infection is due to various reasons. When people with TB in their lungs, the spread may due to cough, laugh, sneeze or talk. The bacteria that cause tuberculosis may spread in to the air and if a person breaths in the germs, there are chances to become infected. (Tuberculosis - Causes, Symptoms, Treatment, Diagnosis (2013)) Other causes for the tuberculosis infections are close and prolonged contact with those patients. Further people who work in or residents of longer period of time and especially health care workers. (Joshi

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et al., 2006) Malnutrition or poor nutrition, poor housing quality and overcrowding associated with poverty are increased susceptibility to tuberculosis. (Cegielski and McMurray, 2004; Hill et al., 2006; Boccia et al., 2009) Under revised National Tuberculosis Control Program (RNTCP), lot of awareness has been created about TB including cause, symptoms and its cure, as well as various misconceptions through consistent communication. Studies on awareness of TB and treatment have been carried out in various parts of India. (Malhotra et al., 2002; Sharma et al., 2007) Different groups were conducted studies on awareness among general population especially people lived in urban slums regarding the importance of TB and its timely seeking treatment. (Lung India 2013) It has been identified through studies that literacy is an important factor that decide the level of awareness (Yadav et al., 2006) TB can infect any system primarily the lungs because the mode of infection is by direct inhalation of aerosolized bacilli contained in the droplet nuclei. Other forms of tuberculosis are of much less importance in public health. (Arti Kapil, 2009) Disease patterns since have been changed with a higher incidence of disseminated infection results in extra pulmonary disease. Reports of recent studies now found extra pulmonary sites of infections commonly include are lymph node, pleura and ostioarticular areas, all though any organ can be involved. (Golden and Vikram, 2005) Keeping this in mind an observational study was conducted in the rural population around Chengalpattu and Kanchipuram districts of Tamil Nadu to evaluate the present scenario of tuberculosis in these epidemic areas.

## MATERIALS AND METHODS

Among the 1,31,600 patients attended the OPD of KIMS-RC, a careful clinical examination was carried out and 273 cases were found to be suspected for TB and were included in this study. The period of study was between October 2015 and March 2016. Samples were collected from pulmonary and extra pulmonary TB suspected cases. The samples collected include sputum, laryngeal swab, body fluids and urine samples from respective cases. Direct smears were prepared from sputum and laryngeal swabs, whereas centrifugal deposits were used in the cases of renal tuberculosis and with other body fluids.

Radiological investigations such as X-ray for chest, bone and joints and other clinical signs were also considered for extra pulmonary TB. Air dried and heat fixed smears were stained by Ziehl Neelsen's staining procedure. Stained smears were examined under the oil immersion objective. Morphology was studied. Typical pink colored slender rods with slightly curved ends were identified (Gerald Collee et al., 1996; Diseases IUATaL, 2005; Mohammad Khaja Mafij Uddin et al., 2013; International Union Against Tuberculosis and Lung Diseases; 1996). In the cases of sputum samples, the number of bacilli presented per oil immersion field were counted and graded accordingly. A minimum of three urine samples were collected from renal TB suspects, whereas a total of two sputum samples were obtained, one at the spot and the other at early morning home collection from pulmonary TB suspected cases and the results were analyzed and compared.

## RESULTS

Tuberculosis infection among the 1,31,600 out patients who were attended the OPD for six months were analyzed and it was found only 273/1,31,600 (0.21%). Among the 273 TB suspected cases, investigation results revealed a TB positivity of 20.15% (55/273) and the detailed report was showed in Table 1. Among the TB positive cases, it was observed that only 58.2% (32/55) cases were belonging to pulmonary tuberculosis. Remaining 41.8% (23/55) were belonging to extra pulmonary tuberculosis. Our study result also indicated that within the 23 extra pulmonary cases, 16 showed sputum positive 16/23 (69.6%) the other 7 were sputum negative 7/23 (30.4%). The table 2 highlighted month wise distribution of TB positive cases. Age and sex wise distribution of tuberculosis infection was also analyzed and the report suggested that tuberculosis infection is directly proportional to the age. As the age advances the rate of TB infection also increases. It is also proved in our study that the TB is more commonly seen in male population than females (Table 3).

## DISCUSSION

Though the *Mycobacterium tuberculosis* can infect any organ like kidney, lymph nodes bones joints etc the disease is commonly occur in lungs (Tuberculosis - Causes, Symptoms, Treatment, Diagnosis. (2013).

Table 1. Data of Clinical Suspected TB and TB detected During October 2015 –March 2016

Months	October	November	December	January	February	March	Total
O.P attended	22258	20647	21815	20405	22848	23627	131600
Medical cases	3234	3380	3593	3063	3469	3620	20359
Chest diseases	1362	1389	1387	1105	1058	1035	7336
TB suspected	58	27	41	52	32	63	273
TB positive	9	10	7	13	6	10	55

Table 2. Month wise TB positive cases and their distribution

Distribution	October	November	December	January	February	March	Total
Pulmonary TB Positive	3	5	6	7	3	8	32
Ex Pmonary TB (With sputum Positive)	2	4	1	5	2	2	16
Ex Pmonary TB (With sputum Negative)	4	1	0	1	1	0	7
Total TB Positive	9	10	7	13	6	10	55

Table 3. Age wise distribution of TB in Male and in Female cases

Age (Years)	Male			Female			Total
	Pulmonary	Ex Pulmonary (Sputum +ve)	Ex Pulmonary (Sputum -ve)	Pulmonary	Ex Pulmonary (Sputum +ve)	Ex Pulmonary (Sputum -ve)	
1-10	0	2	0	0	0	0	2
11--20	0	2	0	0	2	0	4
21 -30	2	1	0	1	3	0	7
31 -40	4	3	0	1	1	0	9
41 -50	11	1	1	0	0	0	13
51 -60	4	1	6	1	0	0	12
60 -and above	6	0	0	2	0	0	8
Total	27	10	7	5	6	0	55

A similar result was observed in the present study. However other study reports suggested a steady increase in the extra pulmonary association of tuberculosis due to the higher incidence of disseminated nature of the disease. In India 2013 Annual status report indicated that TB prevalence was estimated 256/100000. Yet another study in Tamil Nadu conducted among non tribal population in a rural district of Thiruvallur near Chennai showed 388/100000 of population. Present study report stated 207/100000. Datta *et al.* Published in their report that TB prevalence was found under estimated when symptom screenings or x-ray alone were performed. When both methods were used, there was an increase of 25 percent in the detection of pulmonary TB (Datta *et al.*, 2001) Therefore present study include various diagnosis procedures such as clinical signs and symptoms, radiological investigations and staining methods. Our study result correlated with two different study groups findings on the prevalence of TB among male patients, which was higher than that observed among females (Bhot *et al.*, 2009). A survey for Tuberculosis in North Arcot district pointed out a positive relationship between TB prevalence and the age of the patients. (Datta *et al.*, 2001) A similar finding was observed in our study. Prevalence of real smear-positive cases is likely to be a good epidemiological index, when the intervention measure is either very effective (close to 100%) or when there is no treatment at all. It is understood that inefficient treatment services would only multiply the prevalence of smear-positive cases, due to pooling of inadequately converted cases (International Union Against Tuberculosis and Lung Diseases, 1996; WHO, 2015). The incidence cases, on the other hand, occur from the breakdown among those previously infected decades back. The incidence rates are therefore constant year to year, representing the aging and progress of the infected cohort of previous decades, with time (World Health Organization (2009); Cegielski and McMurray, 2004; Golden and Vikram, 2005). Thus this study may have its own wide applications to diagnose the infections in time and to treat the patients appropriately.

### Conclusion

It is concluded that our study results revealed an alarming level of increase in extra Pulmonary tuberculosis infection in this group of study population. Further our report indicated, as the age increases the rate of tuberculosis infection also increases. Male patients are found to be more prone for Tuberculosis rather than females.

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