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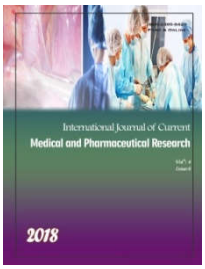

Research Article

INCIDENCE OF SPUTUM POSITIVE TUBERCULOSIS AMONG PATIENTS ADMITTED IN TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Tuberculosis is a serious disorder, unlike many other diseases seen in adults and elderly, tuberculosis is curable if treated early. The study was conducted to identify sputum positive tuberculosis incidence rates in TB patients.
Methods: A retrospective study based on record review was conducted at tuberculosis and chest department (TBCD). Clinical profile and sputum examination results for a period of 1 year in between Apr 2017- Mar 2018 of patients aged between 14 to 99 years were included in the study.
Results: Among 2605 patients, who visited TBCD, 55 patients were aged between 14 to 20 years and 2019 were aged between 20-59 years. Among 2019 middle age group patients, 501 were positive for Acid Fast Bacilli (AFB) and 1518 were sputum negative. The incidence of middle age group tuberculosis patients was predominant in 1245 males (61.66%) than 774 females (38.33%). Among 531 old age patients, 107 were AFB positive and 424 were sputum negative. The incidence of old age group tuberculosis patients was predominant in 404 males (76.08%) than 127 females (23.91%). Proportion of smear positive PTB was 23.84% in TB patients and smear negative was 76.16%.
Conclusion: High incidence rates and increasing time trend of tuberculosis in adults & elderly is a serious problem, especially among those aged 30-65 years. The physicians need to have a high catalogue of idea for the diagnosis of tuberculosis.

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INTRODUCTION

Tuberculosis (TB) remains one of the world's most lethal diseases. An estimated one-third of the world's population is infected with Mycobacterium tuberculosis and 7-8 million people develop TB each year[1, 2]. India has more tuberculosis (TB) cases annually than any other country globally, with an estimated disease prevalence of 256/100,000 population, incidence of 185/100,000 and deaths of 26/100,000 [1]. Tuberculosis in old people may be either exogenous or endogenous in origin. Over 90% of Cases in the elderly represent endogenous tuberculosis, i.e., reactivation of dormant infection in the lungs or elsewhere in the body. In the rest, it may be exogenous, i.e., acquired from an outside source, usually a sputum positive case. In individual cases, it is rarely possible to be sure which of these two mechanisms has been responsible, but there are theoretical reasons to believe that in old people, endogenous reactivation is more[3].

The majority of TB in older patients is secondary to reactivation of Latent TB Infection; with age, the T-cell mediated immune response wanes allowing for latent TB to become active[4, 5].

Other factors contributing to reactivation of TB include[4, 6,7]:

- Age-associated diseases: Malignancy, Diabetes
- Poor nutrition
- Chronic renal failure
- Chronic institutionalization: 2-3 fold higher incidence of TB in nursing home residents.

The Revised National Tuberculosis Control Programme (RNTCP) provides free diagnosis and treatment to all TB patients in the public sector, and has successfully treated over 15 million patients in the past 10 years. Currently under RNTCP, any person presenting with a cough of more than two weeks is screened for pulmonary TB (PTB) by two sputum smear examinations, (one spot and one overnight sample) at designated microscopic centres[1].

The internationally agreed definition of a sputum smear-positive TB case is[8]:

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1. Two or more initial sputum smear examinations positive for AFB, or
2. One sputum smear examination positive for AFB plus radiographic abnormalities consistent with active pulmonary TB as determined by a clinician, or
3. One sputum smear positive for AFB plus sputum culture positive for Mycobacterium tuberculosis.

Treatment of TB patients is based on the internationally recommended directly observed treatment short course (DOTS) strategy. Newly diagnosed smear positive TB patients are treated with a 6-month thrice weekly regimen (Category I); 2 months isoniazid (H) rifampicin (R) pyrazinamide (Z) ethambutol (E) (HRZE)/4 months HR, and retreatment patients with a 8-months thrice weekly regimen (Category II); 2 months HRZES (S streptomycin)/1 month HRZE/5 months HRE[1, 2]. The present study, which employed a retrospective study, provided unique information on the incidence of TB in suspect patients in the developing community.

METHODOLOGY

This was a retrospective study based on record review of 1 year cases at tuberculosis and chest department (TBCD) of a tertiary care hospital.

Inclusion criteria

Patients of age group between 14 to 99 years and patients with or without co-morbidities, patients who are willing to participate

Exclusion Criteria

Patients who are not willing to participate in the study and patients admitted in in-patient department.

Data collection

Specially designed Proforma was prepared to collect data which includes Patient Demographics, patient history along with general, systemic examinations and their habits etc. The data collected from the records includes patients newly diagnosed with sputum positive and patients previously treated with anti tubercular drugs which may be category I, II or III and patients with or without co morbidities.

RESULTS

A retrospective study was conducted for a period of 1 year at tuberculosis and chest outpatient department of a tertiary care teaching hospital. A total number of 2605 cases were collected.

Age wise distribution of patients

Out of 2605 patients, 2019 (77.5%) were between 20 to 59 years, 531 (20.4%) were between 60 to 99 years, followed by 55 (2.1%) were between 14 to19 years of age.

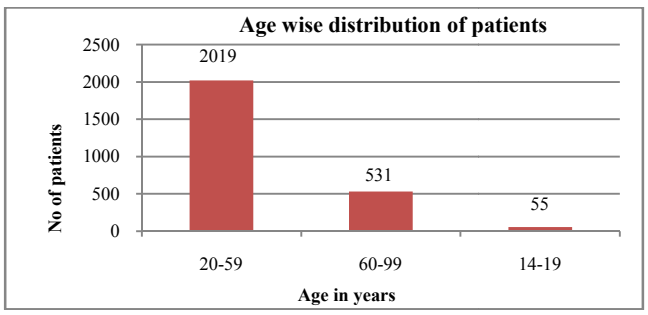

Figure 1 Age Wise Distribution of Patients

Gender wise distribution of middle and old age group patients: Out of 2550 patients 64.6% are males and 35.3% are females.

Gender wise distribution of middle age group patients: Out of 2019 middle age group patients males are major portion i.e., 1245 (61.6%) than females 774 (38.3%).

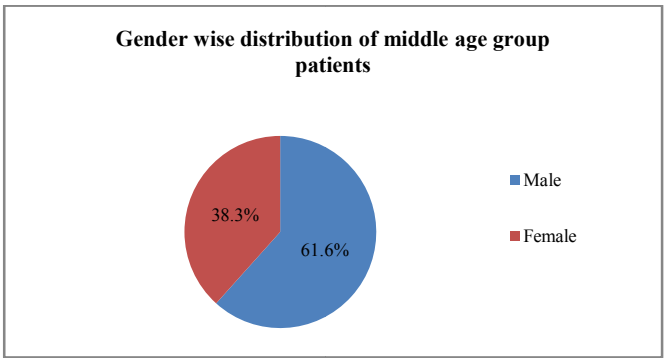

Figure 2 Gender wise distribution of middle age group patients

Gender wise distribution of old age group patients

Out of 531 old age patients males are major portion of 404 (76.1%) than females 127 (23.9%).

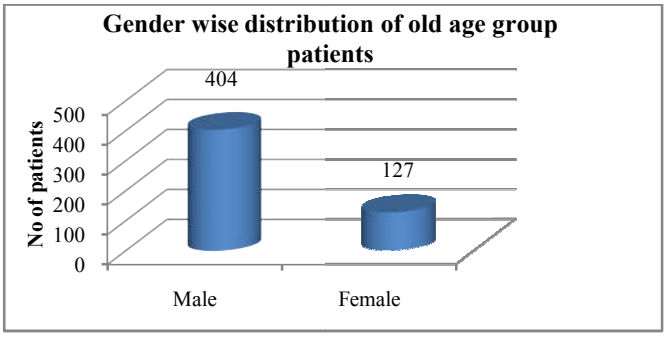

Figure 3 Gender wise distribution of old age group patients

Number of patients between 14 to 20 years age group: Out of 2605 patients there are only 55 (2.1%) patients were between 14 to 20 years of age group

Total number of sputum positive (newly diagnosed and previously treated) patients other than age group between 14 to 20 years

Total of 2550 both middle and old age patients 608 (23.84%) are sputum positive followed by 1942 (76.16%) were sputum negative. Out of 608 sputum positive patients 501 (82.4%) were in middle age group followed by 107 (17.6%) were in old age group. Out of 501 middle age sputum positive patients male are higher 322 (64.3%) than females i.e., 179 (34.7%). Out of 107 old age sputum positive patients male are higher 76 (71%) than females i.e., 31 (29%).

Patients newly diagnosed with sputum positive: Total of 608 sputum positive patients 382 (62.8%) patients were newly diagnosed and out of 382 patients 317 (83%) are middle age group and 65 (17%) are from old age group patients. Out of 317 middle age patients newly diagnosed with sputum positive male patients are higher 198 (62.5%) than females i.e., 119 (37.5%). Out of 65 old age patients newly diagnosed with sputum positive male patients are higher 50 (77%) than females i.e., 15 (23%).

Patients previously treated with sputum positive: Total of 608 sputum positive patients 226 (37.2%) patients were previously treated and out of 226 patients 184 (81.4%) are middle age

group patients and 42 (18.6%) are old age group patients. Out of 184 middle age patients previously treated with sputum positive males occupy 124 (67.4%) and females are 60 (32.6%). Out of 42 old age patients males occupy 26 (62%) and females with 16 (38%).

Table 1 Middle age and old age patients with newly diagnosed and previously treated with sputum positive

	Sputum positive						
	Middle age group patients			Old age group patients			
	Male number (%)	Female number (%)	Total number (%)	Male number (%)	Female number (%)	Total number (%)	Grand total (%)
Newly diagnosed patients	198 (62.5%)	119 (37.5%)	317 (83%)	50 (77%)	15 (23%)	65 (17%)	382 (62.8%)
Previously treated patients	124 (67.4%)	60 (32.6%)	184 (81.4%)	26 (62%)	16 (38%)	42 (18.6%)	226 (37.2%)
Total sputum positive cases	322 (64.3%)	179 (34.7%)	501 (82.4%)	76 (71%)	31 (29%)	107 (17.6%)	608 (100%)
Total	501 (82.4%)			107 (17.6%)			
Grand total	608 (100%)						

Middle age patients with TB screening: Total of 2019 middle age group patients 1245 patients was males and 774 were females. Out of 1245 male patients 304 (24.4%), 373 (29.9%) patients are in between 30-39 and 40-49 age groups and out of 774 female patients 218 (28.1%), 214 (27.6%) patients are in between 30-39 and 40-49 age group respectively.

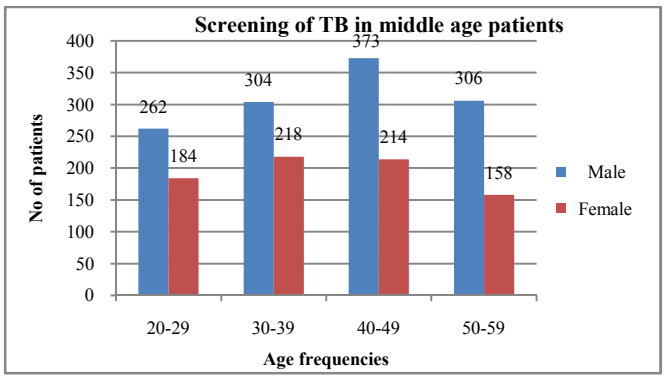

Figure 4 Screening of TB in middle age patients

Old age patients with Tb screening: Total of 531 old age group patients 404 patients was males and 127 patients were females. Out of 404 male patients 196 (48.5%), 147 (36.3%) patients are in between 60-69 and 70-79 age groups and out of 127 females patients 57 (44.8%), 41 (32.2%) patients are in between 60-69 and 70-79 age group respectively.

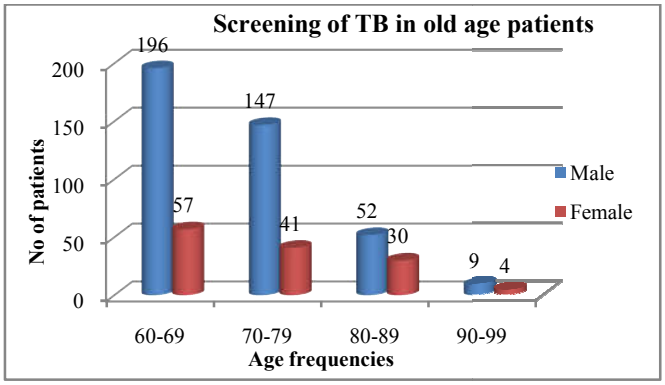

Figure 5 Screening of TB in old age patients

Total number of sputum positive (newly diagnosed and previously treated) patients in age frequencies between 20-99 years

Middle age patients with newly diagnosed and previously treated with sputum positive Tb: Total of 501 middle age group patients 317 (63.3%) was newly diagnosed and 184 (36.7%) were previously treated patients. Total of 317 newly diagnosed patients, 198 (62.46%) patients were males and 119 (37.5%) patients were females. Out of 198 male patients 58 (29.2%), 53 (26.7%) patients are in between 40-49 and 30-39 age groups and out of 119 female patients 41 (34.4%), 31 (26%) patients are in between 40-49 and 20-29 age group respectively. And total of 184 previously treated with sputum positive patients, 124 (67.4%) patients were males and 60 (32.6%) patients were females. Out of 124 patients 45 (36.2%), 37 (30%) patients are in between 40-49 and 50-59 age groups and out of 60 female patients 22 (36.6%), 16 (26.6%) and 15 (25%) patients are in between 40-49, 20-29 and 30-39 age groups respectively.

Old age patients with newly diagnosed and previously treated with sputum positive TB: Total of 107 old age group patients 65 (60.7%) was newly diagnosed and 42 (39.2%) were previously treated patients. Total of 65 newly diagnosed patients, 50 (77%) patients were males and 15 (23%) patients were females. Out of 50 male patients 32 (64%), 11 (22%) patients are in between 60-69 and 70-79 age groups and out of 15 female patients 10 (66.6%), 4 (26.6%) patients are in between 60-69 and 70-79 age groups respectively. And total of 42 previously treated with sputum positive patients 26 (62%) patients were males and 16 (38%) patients were females. Out of 26 male patients 10 (38.4%), 9 (34.6%) patients are in between 60-69 and 70-79 age groups and out of 16 female patients 7 (43.7%), 6 (37.5%) patients are in between 60-69 and 70-79 age groups respectively.

Table 2 Age frequency wise distribution of sputum positive patients

	Age frequencies										
	Middle age group					Old age group				Total sputum positive cases	
	Newly diagnosed patients		Previously treated patients			Newly diagnosed patients		Previously treated patients			
	M (%)	F (%)	M (%)	F (%)		M (%)	F (%)	M (%)	F (%)	M (%)	F (%)
20-29	42 (21.2%)	31 (26%)	15 (12%)	16 (27%)	60-69	32 (64%)	10 (66.6%)	10 (38%)	7 (44%)	99 (25%)	64 (30.4%)
30-39	53 (26.8%)	27(22.6 %)	27(22%	15 (25%)	70-79	11 (22%)	4(26.6%)	9 (35%)	6 (36%)	100(25 %)	52(25%
40-49	58 (29.3%)	41(34.5 %)	45(36%	22 (35%)	80-89	7 (14%)	1(6.6%)	6 (23%)	3 (19%)	116(29 %)	67(32%
50-59	45 (22.7%)	20(16.8 %)	37(30%	7 (12%)	90-99	0 (0%)	0 (0%)	1 (4%)	0 (0%)	83(21%	27(13%
Total patients	198 (62.46%)	119(37.: %)	124(67.4 %)	60 (32.6%)		50 (77%)	15 (23%)	26 (62%)	16 (38%)	398 (65.5%)	210(34.: %)
Total	317 (63.3%)		184 (36.7%)			65 (60.7%)		42 (39.2%)		608 (100%)	
Grand total	501 (82.4%)					107 (17.6%)				608 (100%)	

DISCUSSION

Tuberculosis is emerging as a significant health problem in the elderly. The symptoms are often non-specific and may be attributed to changes related to age. This often leads to a delayed diagnosis and more advanced disease at presentation. In this study the incidence of smear positive PTB was 23.84% in TB patients and smear negative was 76.16%.

Chan *et al* studied the effect of age on the presentation of patients with tuberculosis. They included all patients diagnosed as tuberculosis over a period of two years. There were 78 young and 94 elderly (> 65 years) patients[3,4]. In this study 2019 (77.5%) were between 20 to 59 years, 531 (20.4%) were between 60 to 99 years. The elderly patients had lower

body weight, less haemoptysis but more non-specific complaints. Co-existing medical illnesses and past history of tuberculosis were much more common in the elderly[3].

The prevalence of TB increased with age among the younger age groups up to the age of 45 years. However, a high TB incidence rate was observed among the older age group. The high TB incidence among the elderly is probably indicative of a latent TB reactivation. Further study is required to fully understand why the observed high TB prevalence among younger individuals also corresponded to a high incidence in the older age group[9]. In our study out of 2019 middle age group patients 1245 (61.6%) were males and 774 (38.3%) were females. The high incidence of TB in middle age patients in between age group 30-59 years is related to more exposure of them due to being in the open environment, especially men. In case of older patient, out of 531 patients 404 (76.1%) were males and 127 (23.9%) are females. The high incidence TB in old age patients in between age group 60-79 years can be attributed to their weak immune system[10].

There is consistent with Nirmal Chand *et al*. (2007) who studied TB in elderly and treatment outcome[11,12]. The male predominance among both elderly and young patients could be explained by their higher social and labour activities than females, thus favouring the transmission of TB[13].

The total sputum positive cases in both middle and old age group patients were 608 (23.84%) and sputum negative were 1942 (76.16%). Where middle age group patients 501 (82.40%) were more than old age group patients i.e., 107 (17.59%). The high prevalence of TB among the younger population may suggest ongoing TB transmission in the community.

In this study newly (initial) diagnosed patients were 317 (82.98%) are in middle age group and 65 (17.01%) are from old age group patients and previously treated patients were 184 (81.4%) are middle age group patients and 42 (18.6%) are old age group patients. It is difficult to diagnose the elderly patients due to the following challenges.

- Nonspecific symptoms are common including: Chronic fatigue/weakness, Cognitive impairment, Anorexia/weight loss, Persistent low-grade fever, Changes in activities of daily living, Symptom duration may be greater in the elderly
- May be confused with age-related illnesses: Malignancy, Diabetes Mellitus, Malnutrition[5,14,15].

Although currently underappreciated, tuberculosis among older adults will create major challenges to global tuberculosis control in the future. There is sufficient data to articulate a clear concern, but not enough to understand the full scale and underlying determinants of the problem. Recognition is a critical first step. World Tuberculosis Day focused on children in 2012[16], similar acknowledgement of older adults would raise awareness and overlay the way for action. Future tuberculosis surveys should include a specific focus on older adults, while national tuberculosis programs should consider active case finding among older people and their inclusion in prevention strategies[17].

Along with the elderly population's growth in numbers, there has been an increase in the number of TB cases among elderly populations[12]. The loss of cellular immune reactivity (i.e., negative tuberculin skin test) to Mycobacterium tuberculosis occurs in some elderly population who were previously infected with this organism, there by rendering them vulnerable to re-infection. Also, the elderly are at a greater risk for reactivation of latent TB. In elderly, approximately three-quarters of all TB cases occur in the respiratory tract. Although, the mortality rate of TB in elderly is six times higher, TB is a preventable cause of death in elderly patients. An active approach to diagnose, treat and prevent TB in the elderly is indicated. Elderly TB patients should remain under observation until adherence with their treatment regimen[11].

Some of the observed differences between younger and older patients may be related to a decrease in the immunologic status associated with aging. It is well known that older people have an impaired T-lymphocyte function, including the proliferative response, [19] which can account for the lower number of leukocytes[18].

CONCLUSION

This study showed that adults and elderly comprise the highest proportion of sputum positive TB. The elderly population contribute substantially to the incidence of TB, though there is a generalized perception that TB is a disease more frequently seen in the younger age group. This misconception may have been due to the fact that clinical feature of TB in the elderly patient are less prominent posing diagnostic difficulties. The physicians need to have a high catalogue of idea for the diagnosis of tuberculosis when elderly patients present with non-specific and vague symptoms, non-resolving pulmonary infiltrates on chest x-ray and laboratory abnormalities which remain unexplained. The primary prevention and control programs for education and timely referral to the Health Network may be effective in diminishing the morbidity due to TB. Special attention needs to be given to the monitoring for compliance with treatment, side effects of drugs and drug interactions.

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