

## Prevalence of Tuberculosis among Elderly and Senile-Aged Patients: An Indian Cohort Study

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### Abstract:

**Background:** The increase in the number of elderly people due to improved life expectancy presents special challenges to the control of tuberculosis (TB) in India. The clinical course of tuberculosis (TB) among elderly and senile-aged patients differs in very slow regress. The current study aimed to ascertain the regional incidence of tuberculosis among elderly and senile-aged individuals.

**Objective:** This observational, hospital based, single-center study aimed to ascertain the regional incidence of tuberculosis among elderly and senile-aged individuals.

**Materials and Methods:** This study was carried out in the Department of pathology, Himalayan Institute of Hospital trust, University, Swami Ram Nagar, and Dehradun with 284 patients over a period of 12 months between March-2008 to March-2009. The data was entered; tabulated and statistical analysis was performed by using Statistical Package for the Social Sciences (SPSS 24.0) and Graph Pad Prism Version 5. A value of  $p < 0.05$  was considered significant.

**Result:** In our study, the maximum cases 11.61% (n=33) were seen in the fifth decade followed by sixth decade 10.27% (n=29). Incidence of tuberculosis was highest in the fifth decade whereas lowest in eighth decade of life. In females, 05 cases were recorded between 41-80 years for tuberculosis of the Female Genital Tract. Whereas single case was recorded in 51-60 years for tuberculosis of the Breast. In males, 04 cases recorded between 51-70 years for tuberculosis of the Urogenital Tract, whereas no cases were recorded for 41-50 and 71-80 years for tuberculosis of the Urogenital Tract.

**Conclusion:** The current study highlighted the age wise distribution of regional incidence of tuberculosis cases among elderly and senile-aged individuals.

**Keywords:** Prevalence, Tuberculosis, India, Elder, Senile.

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### Introduction

It has long been recognised that older people are vulnerable to develop tuberculosis. This is widely acknowledged in high-income countries, but rarely considered in developing country settings. [1] The 2010 Global Burden of Disease estimates show that 57% of all tuberculosis deaths globally occurred among people older than 50, with more than half of these deaths in those aged 65 and above. TB presentation in older patients may differ from that in younger patients and should be classified as a separate entity. Elderly and senile-aged individuals have more comorbidity, increasing the risk of active TB and altering its presenting symptoms. [2]

This age-associated increase in tuberculosis incidence has been most pronounced in several countries. Register-based data from Hunan Province in China showed that the prevalence of tuberculosis was more than twice as high in those aged 65 years and older than in younger adults (aged 15–64). Older adults face further complications due to the presence of drug-resistant strains of tuberculosis. The elderly are estimated to make up 14% of all tuberculosis patients and have a higher likelihood of unfavourable outcomes due to drug-related adverse events, increased comorbidity, and a higher rate of poverty than

younger adults. [3] Similarly, within the Americas, the disease burden among older adults appears to be increasing. A study which examined tuberculosis rates in Brazil, Uruguay, Mexico, Chile and Venezuela found that older adults were particularly vulnerable to develop active tuberculosis within these countries. [4] These observations are very similar to findings in the United States where consistently higher incidence and mortality rates have been reported in people older than 65 years of age. [5] In India, one of the data rich Asian countries with exceptionally high TB incidence rates, there has been a paucity of research on the topic. In view of this, this observational, hospital based, single-center study undertaken in Department of pathology, Himalayan Institute of Hospital trust, University, Swami Ram Nagar, and Dehradun was aimed to ascertain the regional incidence of tuberculosis among elderly and senile-aged individuals.

### Method

Between March-2008 to March-2009, this observational, hospital based, single center study carried out in the Department of pathology, Himalayan Institute of Hospital trust, University, Swami Ram Nagar, Dehradun enrolled 284 patients. For prospective cases the cytological material for the study was collected by fine needle aspiration cytology (FNAC). For retrospective cases of past one year were retrieved from the records. TB suspected cases were evaluated by Ziel-Nelson (ZN), Auramine-Rhodamine (A-R) staining techniques and by PCR. All cases which

showed tuberculosis were re-evaluated. The study protocol was performed in accordance with the principle of the declaration of Helsinki and after approval by the Institutional ethical review board.

**Statistical analysis:** The data was entered; tabulated and statistical analysis was performed by using Statistical Package for the Social Sciences (SPSS 24.0) and Graph Pad Prism Version 5. Data had been summarized as mean and standard deviation for numerical variables and count and percentages for categorical variables. A value of  $p < 0.05$  was considered significant.

### Results

During a period of twelve months between March-2008 to March-2009, 284 patients were enrolled in our study. Their mean age and median was 49.23 and 48.00 years (range, 41-80 years). Our study recorded age wise distribution of incidence of tuberculosis cases in the study patients in four age-range beginning from 41-50 years, 51-60 years, 61-70 years and 71-80 years. In our study, the maximum cases 11.61% (n=33) were seen in the fifth decade followed by sixth decade 10.27% (n=29). Incidence of tuberculosis was highest in the fifth decade whereas lowest in eighth decade of life. In females, 05 cases were recorded between 41-80 years for tuberculosis of the Female Genital Tract. Whereas single case was recorded in 51-60 years for tuberculosis of the Breast. In males, 04 cases recorded between 51-70 years for tuberculosis of the Urogenital Tract, whereas no cases were recorded for 41-50 and 71-80 years for tuberculosis of the Urogenital Tract.

**Table 1: Age wise distribution of prevalence of tuberculosis cases in the study patients**

SN	Organs	41-50 years	51-60 years	61-70 years	71-80 years
1.	Reticuloendothelial System	15	06	02	01
2.	Bone and Joints	07	05	02	04
3.	Gastrointestinal Tract	04	03	-	01
4.	Soft tissue	03	02	02	-
5.	Respiratory System	02	05	02	-
6.	Skin	-	03	01	-
7.	Female Genital Tract	01	02	-	02
8.	Urogenital Tract	-	02	02	-
9.	Breast	-	01	-	-
10.	Hepatobiliary	-	-	01	-
11.	Endocrine	01	-	-	-
12.	Central Nervous System	-	-	-	-
	Total (284)	33	29	12	08
	Percentage	11.61%	10.27%	4.25%	2.81%

### Discussion

This study provides evidence of the large burden of tuberculosis among elderly and senile-aged individuals aged 41-80 years.

A number of factors underlie the high and rising rates of tuberculosis seen among older adults. Older

adults tend to be more vulnerable as a group than younger adults. This may be ascribed to compromised immune responses resulting from increased co-morbidity, due to a range of chronic diseases (e.g. diabetes or chronic lung disease) and immunosuppressive therapy (with arthritis, organ transplants or cancer etc.), and age-related immune-

senescence. Diabetes triples the risk for active tuberculosis, so with rates of diabetes rapidly rising in many tuberculosis endemic areas, it is likely that the present tuberculosis epidemic will be sustained – in particular among older people most affected by diabetes.

Glycaemic control, necessary to address diabetes and also to improve tuberculosis outcomes, is particularly challenging in the context of multimorbidity. The results of our study are in agreement with the studies undertaken by Ananthkrishnan et al (2013) [6], Velayutham et al (2014) [7], Pratt et al (2011) [8], Karstaedt et al (2014) [9] and Thomas and Rajagopalan (2001) [10]. It is well known that immunocompetency declines with increasing age.

In TB, cell-mediated immunity plays a key role in controlling infection. As age advances the related decline in immunity increases the chance of reactivation of latent disease. Much of the research into the ageing immune system has been done in mice rather than humans. The mode of TB infection is always difficult to determine. However, over 90% of TB in the elderly is felt to be reactivation of dormant infection (endogenous) rather than new (exogenous) infection.

Diagnostic difficulties in the elderly are common in many diseases, not solely TB. Problems, such as poor memory, deafness, blindness/partial sight, impaired speech, poor short-term memory, all contribute, often making an accurate history difficult. Non-specific symptoms with a lack of focal signs are more common in such patients with reduced immune competency.

Such patients may present with a lack of respiratory symptoms and may be unable to expectorate sputum due to physical weakness. [11] The adherence to and tolerance of anti-TB treatment is a larger problem in the elderly due to factors, such as poor vision (unable to read labels and therefore use correct doses/frequency), poor mobility and low income (unable to collect prescription), poor memory (unable to remember to take drugs or at correct dose/time), increased risk of drug interactions and adverse events, and increased rates of depression/low mood (may lack determination to complete full 6-month treatment regimen). [12]

### Conclusion

In conclusion, this study provides evidence of the large burden of tuberculosis among elderly and senile-aged individuals aged 41–80 years.

This study assumes significance from the fact that there is an increasing pool of vulnerable older adults who may develop active tuberculosis by reactivation of previous “latent” or new M. tuberculosis infection. In some cases, older people cluster in aged-care facilities where they may be exposed

to tuberculosis. Relatively large proportions of the elderly population in India live in slums; with a lack of adequate sanitation and overcrowding creating a perfect environment for the propagation of tuberculosis. Social marginalization, reduced mobility and financial dependency often discourage health care seeking. This study believes that currently tuberculosis among older adults is grossly underappreciated, and if it remains such then it will pose major challenges to global tuberculosis control in the future.

**Ethical approval:** The study was approved by the Institutional Ethics Committee

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