RESEARCH ARTICLE ISSN: 2349-2678

Contents lists available at www.ijpba.in

*International Journal of Pharmaceutical and Biological Science Archive*

Volume 5 Issue 4; July-August; 2017; Page No.08-11

# Incidence of pulmonary TB in chronic asthmatic patients: cross sectional study

**Dr. Madhurmay**

Assistant Professor Dept. of Respiratory Medicine Maharani Laxmi Bai Medical College, Jhansi, UP

## ABSTRACT

**Background**: In our country, chronic obstructive pulmonary disease (COPD) and tuberculosis (TB) are two major causes of death and morbidity. In underdeveloped countries, asthma is the most frequent form of COPD.

**Aim and objective**: At a tertiary health care facility, researchers looked into the prevalence of pulmonary tuberculosis in chronic asthmatic patients.

**Methodology**: The current investigation was a prospective study involving 300 asthmatic patients who had been on medication for more than 5 years. A pre-tested questionnaire was used to collect data. Demographic information, clinical history, and a clinical examination were all included in the study. All of the patients had a chest x-ray and a Zeil nelson stain sputum analysis for acid fast bacilli. Statistical tests were used to analyse the data.

**Results**: The patients' average age was 38.25 3.2 years. 1.76:1 was the male-to-female ratio. The majority of the patients (40.7 percent) were from the lower middle class, with the upper lower class coming in second (28 percent ). In our study, the prevalence of pulmonary tuberculosis was 4%.

**Conclusion**: Patients who smoke and use steroids are at a higher risk of developing pulmonary tuberculosis.

**Key Word**: pulmonary tuberculosis, chronic asthma, sputum examination.

## INTRODUCTION

In India, respiratory diseases such as asthma, bronchitis, tuberculosis, and pneumonia are among the most common. Indoor pollution, solid-cooking fuels, inadequate housing, low nutritional status, and hygienic conditions are all linked to these disorders[1]. Population density, industrial and textile pollution, and cigarette smoking may all have a role in the link between respiratory illnesses and geographic location. With an estimated incidence of 2.74 million cases, India has the greatest TB burden in the world, accounting for 27% of global cases[2]. Because India has the biggest TB burden in the world, it is anticipated to have a high prevalence of TB-related COPD. India has a developing COPD population and, behind China, ranks second in terms of the number of cases of obstructive lung disease morbidity and mortality. Malnutrition, overcrowding, drunkenness, smoking, and immunological weakened states are all risk factors for tuberculosis[3]. COPD, or chronic obstructive pulmonary disease, is the third biggest cause of death in the world, affecting 65 million people. 90% of these deaths occur in low- and middle-income nations, which have the highest rates of pulmonary tuberculosis (TB). The interplay between tuberculosis and COPD is quite complicated[4,5]. A large number of tuberculosis patients develop post-tubercular airway disease, often known as TB-associated COPD. Various studies on tuberculosis and COPD have been conducted. Various links between tuberculosis and COPD have been established. COPD is a prevalent comorbidity among TB patients[6]. Exacerbations of COPD are more common in patients who have had tuberculosis. Patients with COPD are also at a higher risk of contracting pulmonary tuberculosis. COPD has an impact on the clinical manifestations of tuberculosis and is a risk factor for increased TB morbidity and death[7]. Steroid use, physical and mental stress, and a poor socioeconomic level due to pay loss due to asthma may predispose a patient to tuberculosis. Tobacco use is a prominent aetiological factor in COPD development. Several early investigations found a link between cigarette use and the risk of developing tuberculosis[8]. Steroid use has also been linked to the development of tuberculosis in these patients due to immunosuppression. Changes in the mucosa and lining epithelium are common in asthmatic patients due to chronicity. They are more susceptible to secondary bacterial infection, which can worsen asthma attacks. Immunosuppression is common

**Corresponding author: Madhurmay |*

when they are treated with steroids and antibiotics[9]. Antibiotics are usually effective, but if they aren't, a sputum culture is recommended, and antibiotics were prescribed based on the patient's antibiotic sensitivity pattern. If the patient still doesn't respond, further options were considered. The majority of the research focused on tuberculosis-related COPD and patients who were developing COPD while also having tuberculosis[10]. In COPD patients, TB has only been seen in a few investigations. In our country, asthma is the most common type of COPD.

**Aims & objectives**: The goal of this research was to determine the prevalence of tuberculosis in chronic asthmatic patients in a tertiary health care facility.

**MATERIAL AND METHODS**: The current study was a prospective study that took place at a tertiary health care facility. The study included 300 asthmatic patients who had been on treatment for more than 5 years.

**Criteria for inclusion**: 1. Patients who have had asthma for more than five years and are currently receiving treatment

**Criteria for exclusion**: 1. Patients who have had asthma for fewer than 5 years. 2. Patients who refuse to take part in the research.

The study was authorised by the institute's ethics committee. After explaining the study to the patients, they signed a proper written consent form. A pre-tested questionnaire was used to collect data. Demographic information such as age, gender, and occupation were included in the data. The patients were asked to provide a detailed clinical history. Clinical history was taken, including length of asthma, asthma therapy, frequency of asthmatic attacks, TB history, and asthma in the family. The patients were given a complete clinical evaluation. Antihistaminics, steroids, antibiotics, bronchodilators, and metre dosage inhaler pumps were used on and off regularly for all of these individuals. Routine testing such as a complete blood count, renal function tests, and liver function tests were performed. The ESR is the most common haematological test, however it is equivocal because the patients are given steroids. All of the patients had a chest x-ray and a zeil nelson stain sputum examination for acid-fast bacilli. Statistical software for social sciences (SPSS) was used to analyse the data (SPSS v 21.0, IBM). For categorical data, descriptive statistics such as frequencies and percentages have been shown, while numerical data has been represented by Mean and SD.

**RESULTS**

The distribution of patients by age group is shown in Table 1. The majority of the patients were in the age range of 31-40 years (30%), with 41-50 years coming in second (20.67 percent ). Patients between the ages of 51 and 60 made up 18.67 percent of the total. Patients between the ages of 18 and 30 made up 17.33% of the total. Patients over the age of 60 made up 13.33 percent of the total. The patients' average age was 38.5 ± 3.1 years.

**Table 1: Distribution of patients of chronic asthma according to age group**

| Sr no | Age group (years) | No of patients | Percentage |
|---|---|---|---|
| 1 | 18-30 | 52 | 17 % |
| 2 | 31-40 | 90 | 30 % |
| 3 | 41-50 | 62 | 21 % |
| 4 | 51-60 | 56 | 19 % |
| 5 | >60 | 40 | 13 % |
| | **Total** | **300** | **100%** |

Males made up the majority of the patients in our study (190). (63 percent ). In our study, there were 110 women (37 percent ). 1.76:1 was the male-to-female ratio. The patient's socioeconomic status was determined using the Kuppuswamy socioeconomic status scale. The majority of the patients (40.7 percent) were from the lower middle class, with the upper lower class coming in second (28 percent ). Patients from the upper middle class made about 14% of the total. Patients at the extremities of the class, i.e. upper class and lower lower class, accounted for 2% and 15.33% of the total. (see table 2)

**Table 2: Distribution of patients of chronic asthma according to Socioeconomic status**

| Sr no | Socioeconomic class | No of patients | Percentage |
|---|---|---|---|
| 1 | Upper | 06 | 2 % |
| 2 | Upper Middle | 42 | 14 % |
| 3 | Lower Middle | 122 | 41 % |
| 4 | Upper Lower | 84 | 28 % |
| 5 | Lower Lower | 46 | 15 % |
| | **Total** | **300** | **100%** |

Out of the 300 patients in our study, 260 were outside workers and 40 were housewives. In our investigation, we inquired about the patients' smoking habits. 160 (53 percent) of the 300 patients were nonsmokers. The average age of current smokers was 80. (27 percent). Approximately 20% of the patients have quit smoking. Current smokers have smoked for anywhere from one and twenty-three years. (See table 3)

**Table 3: Distribution of patients of chronic asthma according to smoking habits**

| Sr no | Smoking habits | No of patients | Percentage |
|---|---|---|---|
| 1 | No smoker | 160 | 53 % |
| 2 | Current smoker | 80 | 27 % |
| 3 | Past smoker | 60 | 20 % |
| | **Total** | **300** | **100 %** |

Antihistaminics, steroids, antibiotics, bronchodilators, and metre dosage inhaler pumps were used to treat all of the patients. Inhaled steroids were utilised by the majority of patients (120 percent), followed by bronchodilators (96 percent) (32 percent). Pulmonary function tests were performed on 300 patients, with the results pointing to obstructive lung disease. All of the patients had a chest x-ray and a Zeil nelson stain sputum analysis for acid fast bacilli.

Twelve individuals were discovered to have acidfast bacilli on ZN stain, out of a total of 300. Out of 300 patients, only four X-rays were suspected of having Koch's disease. As a result, the prevalence of pulmonary tuberculosis in our study was 4%. There were two females and ten males among the positive patients. Inhaled steroids were used by all of the positive patients. The average time spent with an inhaled steroid was 9.82 ± 2.14 years. We were unable to discuss MDR cases in this study due to the lack of an AFB culture facility and a Gene expert study.

**DISCUSSION**

The majority of the patients in our study were in the age bracket of 31-40 years (30%), followed by 41-50 years (30%). (21 percent). The average age of the patients was 38.25 years and 3.2 years. Lee et al. found a mean age of 54.5 22.9 years among COPD cases, which is similar to our findings. Males made up the majority of the patients in our study (190). (63 percent). In our study, there were 110 women (37 percent). 1.73:1 was the male-to-female ratio. Lee et al. found a male–female ratio of 1.6:1 in a study similar to ours. The majority of the patients (41%), we discovered, were from the lower middle class, followed by the upper lower class (28 percent). Previous research has shown a link between socioeconomic level and respiratory disorders such as COPD and TB[11-12]. Twelve individuals were discovered to have acidfast bacilli on ZN stain, out of a total of 300. As a result, the prevalence of pulmonary tuberculosis in our study was 4%. In a research by Popescu et al., 90% of patients got bronchial asthma following tuberculosis, and 10% of patients presented with bronchial asthma and later developed pulmonary tuberculosis. Out of 300 patients in our study, 160 (53.33 percent) were nonsmokers. The average age of current smokers was 80. (27 percent). Approximately 20% of the patients have quit smoking. Current smokers have smoked for anywhere from one and twenty-three years. Eight of the positive patients were current smokers, with a smoking history spanning from two to seventeen years. Four of the patients had previously been smokers. Cigarette smoking also triples or fivefolds the risk of contracting tuberculosis. Smoking lowers the function of alveolar macrophages, dendritic cells, and natural killer cells and suppresses the innate and adaptive immune responses by lowering levels of pro-inflammatory cytokines and circulating

immunoglobulins. Inhaled steroids were utilised by the majority of patients (120 percent), followed by bronchodilators (96 percent) (32 percent). Inhaled steroids were used by all of the positive patients. The average time spent with an inhaled steroid was 9.82 ± 2.35 years. In a study of patients taking inhaled corticosteroids, researchers discovered that ICS use was an independent risk factor for the development of pulmonary tuberculosis in patients with a normal chest radiograph[13,14]. (hazard ratio: 9.079; 95 percent confidence interval: 1.012-81.431; P =.049) Steroids can raise the risk of tuberculosis through a variety of routes. Steroids have a significant impact on the immunological response of cells. Glucocorticoids block Fc receptor binding and activity, as well as the lymphokine action and monocyte chemotaxis.

## CONCLUSION

Zn stain should be used to check for AFB in all chronic asthmatic patients. Glucocorticoids reduce the quantity of monocytes in the peripheral circulation as well as their activities, resulting in decreased bactericidal activity and the production of interleukin-1 and TNF-. Glucocorticoids also suppress T cell activation, resulting in decreased proliferative responses and cytokine generation, as well as lymphocyte redistribution (mostly T cells) out of the circulation, resulting in peripheral lymphocytopenia. These diverse glucocorticoid effects on the cellular immune system may play a substantial role in tuberculosis infection predisposition.

## REFERENCES


1. Saxena S. Dayal V. Emergency Enviornment. Monitor 13. 93-102.
2. Lozano R, Naghavi M, Foreman K, Lim S, Shibuya K, Aboyans V, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: A systematic analysis for the Global Burden of Disease Study 2010. Lancet. 2012;380:2095–128.
3. Snider GL, Doctor L, Demas TA, Shaw AR. Obstructive airway disease in patients with treated pulmonary tuberculosis. Am Rev Respir Dis 1971;103:625-40.
4. Jain NK, Thakkar MS, Jain N, Rohan KA, Sharma M. Chronic obstructive pulmonary disease: Does gender really matter? Lung India 2011;28:258-62.
5. Verma SK, Kumar S, Narayan K, Sodhi R. Post tubercular obstructive airway impairment. Indian J Allergy Asthma Immunol 2009;23:95-9.
6. Zakaria M, Moussa H. Chronic obstructive pulmonary disease in treated pulmonary tuberculosis patients. Egypt J Bronchol 2015;9:10-3.
7. Lee CH, Lee MC, Star CC, Lim CS, Wang JY, Lee LN, et al. Risk factors for pulmonary tuberculosis in patients with chronic obstructive airway disease in Taiwan: A nationwide cohort study. BMC Infect Dis 2013;13:194-6.
8. Aktogu S, Yorgancioglu A, Cirak K, Köse T, Dereli SM. Clinical spectrum of pulmonary and pleural tuberculosis: A report of 5,480 cases. Eur Respir J 1996;9:2031-5.
9. Didilescu C, Ibraim E, Plopeanu D. A study of the risk factors for relapse in pulmonary tuberculosis patients and the results of the re-treatment. Pneumologia 2000;49:247-52.
10. Wang JY, Lee LN, Hsueh PR. Factors changing the manifestation of pulmonary tuberculosis. Int J Tuberc Lung Dis 2005;9:777-83.
11. Rizvi N, Shah RH, Inayat N, Hussain N. Differences in clinical presentation of pulmonary tuberculosis in association with age. J Pak Med Assoc 2003;53:321-4.
12. Shprykov AS, Zhadnov VZ. Effects of tobacco smoking on the course of infiltrative pulmonary tuberculosis and effectiveness of its treatment. Probl Tuberk 1994;5;26-7.
13. Leung CC, Yew WW, Chan CK, Tam CM, Lam CW, Chang KC, et al. Smoking and tuberculosis in Hong Kong. Int J Tuberc Lung Dis 2003;7:980-6
14. Smit KR. National Burden of disease in India from indoor air pollution. 2000. Proc Natl Acad Sci USA. Nov 21, 97(24). 13286-93.