



## STUDY OF PREVALENCE OF EXTRAPULMONARY TUBERCULOSIS AND SPUTUM POSITIVE PULMONARY TUBERCULOSIS WITH ITS CHEST ROENTGENOGRAPHIC PATTERNS AMONG PATIENTS IN A TERTIARY CARE HOSPITAL

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### ABSTRACT

**Introduction:** Tuberculosis (TB) remains one of the major global health threats leading to morbidity and mortality (1,2). One in three persons across the world representing 2–3 billion individuals are known to be infected with Mycobacterium Tuberculosis (M. Tuberculosis) of which 5–15% are likely to develop active TB disease during their lifetime. Smear positive PTB cases are more infectious than the smear negative cases(3). Using the Directly Observed Treatment-Short course (DOTS) program the World Health Organization's global target was to detect 70% of new sputum-smear positive PTB cases.

**Aims and objectives :** (1) To study the prevalence of extrapulmonary and sputum positive pulmonary tuberculosis among patients in a tertiary care hospital

(2) To study the various chest roentgenographic patterns in sputum positive tuberculosis patients

**Materials and methods :** A prospective study conducted between 1<sup>st</sup> October 2016 to 28<sup>th</sup> feb 2018, where 100 adult patients with cough of duration of 2 weeks or longer underwent diagnostic evaluation for TB and other pneumonias, including sputum examination and mycobacterial culture, and chest radiograph(CXR). Radiologists reviewed CXRs using a standardised interpretation.

**Results :** Of the 100 cases, 78 of them were males and 22 females. 97 were pulmonary tuberculosis and 3 were extrapulmonary tuberculosis. Among 97 pulmonary tuberculosis, 31 were sputum positive remaining negative. The commonest chest radiographic pattern observed is heterogenous opacities suggestive of infiltrates (36.08%), followed by that is cavities(26.8%). Commonest chest radiographic pattern among sputum positive patients is also pulmonary infiltrates(58%). among 3 cases of extrapulmonary TB, 2 were neurotuberculosis and 1 was lymph node TB.

**Conclusion :** Tuberculosis remains one of the most deadly infectious diseases and has claimed millions of lives for many years. The smear positive PTB case detection rate indicated in this study is significantly lower than the countries which met the 70% target of the World Health Organization. Serial sputum examination showed a considerable rate of positivity in the second sputum sample when compared with the others. radiographic correlation with symptoms still remains a way for starting of antitubercular treatment.

**KEYWORDS :** Smear Positive Pulmonary Tuberculosis, extrapulmonary Tb, who, chest Radiograph

### Introduction:

Tuberculosis (TB) remains one of the major global health threats leading to morbidity and mortality (1,2). Smear positive PTB cases are more infectious than the smear negative cases (3). In 2014, an estimated 9.6 million people fell ill due to TB, around 1.5 million people died from the disease including 1.1 million HIV-negative persons and 400,000 HIV patients (3). While TB is present in every country majority of TB sufferers live in low income and middle income countries especially in regions such as Sub-Saharan Africa and South East Asia (2). Over the past decade, significant progress has been made towards TB control with most of the TB targets set as part of the Millennium Development Goals (MDGs) having been achieved (3). TB mortality for instance has declined by 47% since 1990, with nearly all of that happening in the era of the MDGs. Nonetheless, more than nine million people still develop active TB each year and nearly two million die (4). The Directly Observed Treatment-Short course (DOTS) strategy of tuberculosis is the World Health Organizations (WHO) recommended approach, which involves passive detection of PTB cases, primarily using sputum smear microscopy. The global target using the DOTS program was to detect 70% of new sputum-smear positive PTB cases (5). However, only 32% of the new smear positive PTB cases estimated were detected throughout the globe (6). Most National TB control programs in developing countries are implementing direct sputum microscopy primarily for tuberculosis case detection (7). Though culture is more sensitive than microscopy, in developing countries, diagnosis is primarily based on AFB microscopy owing to its simplicity, less cost and rapidity. It is highly specific for MTB, which appear as long, curved and beaded. ZN staining has a low sensitivity of 22–43% for a single smear. Maximum sensitivity has been found to be up to 60% under optimal conditions when compared with that of cultures (8,9). The threshold of detection of AFB in sputum samples under optimal conditions is found to be between 10<sup>4</sup> and 10<sup>5</sup> bacilli per ml. The yield is often decreased further under program conditions due to technical and operational constraints (10). The sensitivity is even lower in pediatric and human immunodeficiency

virus (HIV)/AIDS patients who usually present a pauci-bacillary picture.

### Aims and objectives :

1. To study the prevalence of extrapulmonary and sputum positive pulmonary tuberculosis among patients in a tertiary care hospital
2. To study the various chest roentgenographic patterns in sputum positive tuberculosis patients

### Materials and methods :

**Study design :** A prospective study conducted between 1<sup>st</sup> October 2016 to 28<sup>th</sup> feb 2018 at SDMCMS&H, Dharwad

**Sample size :** 100 patients

A total of 100 patients fulfilling inclusion criteria during the above study period was selected randomly. They had detailed examination and investigations to detect tuberculosis (pulmonary and extrapulmonary) infection in them. It included sputum smear examination, HIV testing, chest radiograph which was reviewed by a radiologist and other routine blood investigations. All study participants provided spot sputum on day 1 of attending the hospital and early-morning sputum on day 2. Patients who were unable to produce a sample underwent sputum induction with nebulised hypertonic saline according to routine procedures practised on the pulmonary ward. The patients were after 2 months with clinical examination and repeat sputum analysis, if clinically indicated. A hospital radiographer performed baseline posteroanterior (PA) and then at follow up after 2 months

### Inclusion criteria:

1. Patients with cough of more than 2 weeks duration
2. Age more than 18 years.

### Exclusion criteria:

1. Age less than 18 years

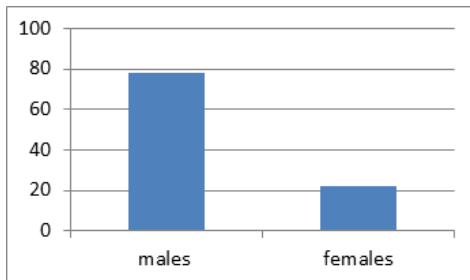
2. Previously diagnosed and treated completely or partially with antitubercular drugs
3. Patients with HIV
4. Patients whose chest radiographs not-readable by radiologists.

**Statistical analysis:** Data obtained is entered into the Microsoft word excel 2007 and results obtained are published using bar graphs, pie charts. Random sampling was done to select patients.

Etical clearance obtained from institutional ethics comitee.

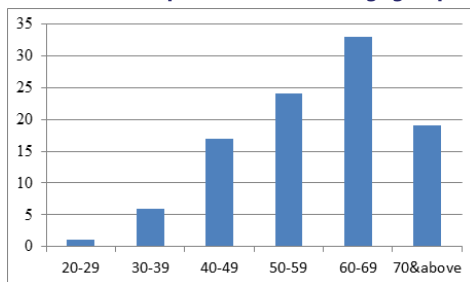
**Results:**

**Graph 1: Gender distribution**



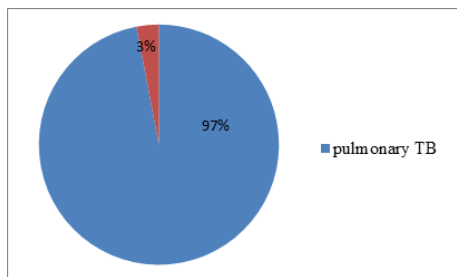
Of the 100 patients 78 were males and 22 were females

**Graph 2: Distribution of patients in different age groups**



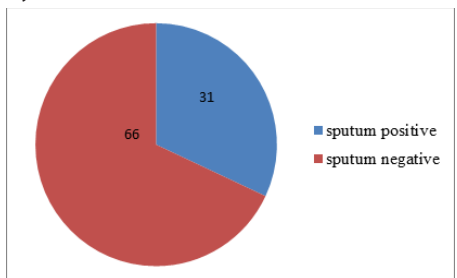
Maximum number of patients were in the age group of 60-69 years(33%)

**Fig 1: Distribution of pulmonary and extrapulmonary TB(N-100)**



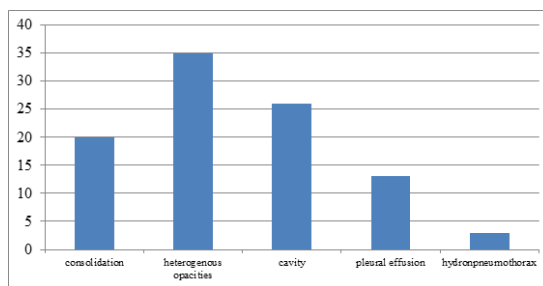
Of the 100 cases, majority(97%) of them included pulmonary tuberculosis

**Fig 2 : distribution of sputum positive and sputum negative pulmonaryTB(N-97)**



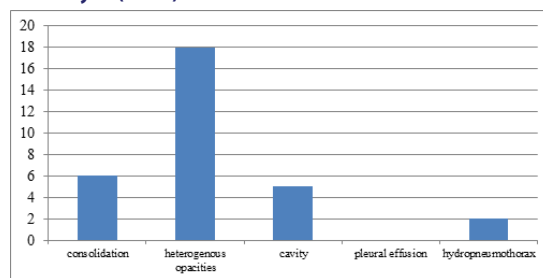
Among the pulmonary tuberculosis cases,31(31.9%) were sputum smear positive and remaining 66 cases were negative.

**Graph 3: Chest radiographic patterns in pulmonary tuberculosis patients(N-97)**



Among the chest radiographic patterns, heterogenous opacities in the different lung zones suggestive of infiltrates were seen in 36.08% of patients, consolidation in about 20.6%, cavity in 26.8%, pleural effusion in 13.4% and hydropneumothorax was observed in 3.09% of patuents respectively.

**Graph 4: Chest radiographic patterns among sputum positive pulmonary TB(N- 31)**



Patients with sputum positive tuberculosis also had pulmonary infiltrates in 18(58.06%)patients followed by other patterns.

**Discussion:**

A 100 patients meeting the inclusion criteria attending our hospital in the given study period were included. These patients underwent detailed examination and other investigations for the diagnosis of tuberculosis in them. They were followed up then after two months and adequate ATT was given. All had symptomatic ,microbiological and radiographic improvement significantly. In our study, among 100 patients of tuberculosis, 78 males and 22 females that is observed in other study as well<sup>(9)</sup>. Also , the maximum number of patients were in the age group of 60-69 years(33%).

Among the 100 diagnosed of tuberculosis, 97 had pulmonary and 3 had extrapulmonary tuberculosis. And among 97 cases of pulmonary tuberculosis, only 31(31.9%) were sputum smear positive which is comparable to the study <sup>(11)</sup>where it is 21.6%. Among the 3 extrapulmonary cases, 2 were neurotuberculosis and 1 was lymph node tuberculosis.

There are various patterns of pulmonary tuberculosis seen on a chest radiograph. In our study , among 97 cases of pulmonary tuberculosis 20 had consolidation , 35 had pulmonary infiltrates, 26 had an cavities, 4 had pleural effusion, and 5 had hydropneumothorax respectively which is comparable to the another study<sup>(11)</sup>

There were 31sputum positive pulmonary tuberculosis, their chest radiographic patterns were also studied and even in them pulmonary infiltrates(58.06%) were more common followed by consolidation(19.35%) and then others. The patients were started on with antitubercular agents and then followed up in the next 2 months, all had symptomatic, microbiological and radiographic improvement

**Conclusion:**

The overall prevalence of sputum smear positive cases of 31.9% indicates that the disease is of major clinical significance in the study

area. The most vulnerable groups were males, and individuals in the age range 60-69 years. Serial sputum examination showed a considerable rate of positivity in the second morning sputum sample when compared with the others. In developing country like ours, with high incidence of pulmonary tuberculosis and low sputum smear positivity, it is justified to start with antitubercular agents on reviewing at different and common patterns in the chest radiographs.

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