



# A REVIEW OF PULMONARY AND EXTRA - PULMONARY TUBERCULOSIS INFECTION IN THE URBAN AND RURAL POPULATION OF DISTRICT MEERUT

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## Abstract

Tuberculosis is an infectious disease caused by *Mycobacterium tuberculosis*. It is estimated that 3 million people die from Tuberculosis each year. The annual incidence of new case of tuberculosis is estimated to be about 8 million worldwide. According to recent estimate of WHO, the number of persons infected with the Tuberculosis bacillus is estimated to be about 1.7 billion, out of which 1.3 billion live in developing countries (Anonymous, 2000). In India, more than 40% of adults are infected with tuberculosis and approximately 1.5 million cases are put on treatment every year but 38.5 million case are left uncured due to poor Diagnostic facility and unawareness, and estimated 5 lack death occur from TB every year in India alone .Thus the investigator intends to pursue work on tuberculosis with the objective - To know the type of infection (pulmonary /extra pulmonary) in the area by Chest X-ray (CXR), sputum test and for Extra Pulmonary TB FNAC/Biopsy of related organ. For this purpose investigator make a general survey of an urban tuberculosis unit and a rural tuberculosis unit of Meerut District for infection of tuberculosis.

**Keywords:** Pulmonary Tuberculosis, extra pulmonary, *Mycobacterium tuberculosis*, meningitis, lymphadenitis.

## Introduction

This disease is one of the major public health problems in the developing countries. No any other disease has so much sociological, economical and health problems on human population. It appears that the prevalence of Tuberculosis is an index of the stage of social organization and standard of living of the community. it has declined in most of the developing countries almost to the stage of control. High growth in population and decline in living standard and nutritional status promotes and provide a suitable environment for growth of tuberculosis bacterium. The greatest burden of tuberculosis incidence mortality in developing countries is in adult (15 to 16 years). These include the most productive member of the society such as parents, workers and community leader while there have been a tremendous decrease in tuberculosis case in developing countries in last 40 years (Murry et al 1990).

Temperature also affect the infection this disease. In 1980, WHO reported that the distribution of TB patient in cold countries and warm countries was just equal during 1955- 1960. There was an increase in data of the patient of warm countries as compared to cold countries. It is also reported that 79% of the TB patient were living in Asia, Africa, and South America. In Europe number of TB patient is growing very quickly. WHO also listed only Greenland is devoid of TB infection.

## Historical review

The history of tuberculosis highlights men's struggles against a disease that dates from antiquity and is the story of failures and successes of disaster and hope. Tuberculosis is referred to as "rogaraj" or the king of disease and "rajayakshma" or the disease of

the king in ancient Indian Vedas (2000BC). The disease also had been referred as "consumption" Phthisis and white plague. It is also called captain of all these men of death by John Bunyan. It is described in ancient Chinese literature of a condition as leaping is consistent with tuberculosis.

The father of medicine "Hippocrates" (460-377 BC) recognized the symptomology of tuberculosis and was the view that attention to Tuberculosis patients was a waste of time and they were a burden of the state. However, during this period, in Arabia, physician Rhazes (850-923) and Avicenna (980-1037AD) searching for cure of disease prescribed camphor, sugar distilled from grapes, and dry air and remedies of TB. As tuberculosis disease was then known - touching the king's feet for the cure of King's evil was prevented during the 11th and 12th century in England and elsewhere.

An increasing morbidity and mortality from TB in the near future is forecast for the world at large, with the number of newly occurring cases predicted to increase from 7.5 million a year in 1990 to 8.8, 10.2 and 11.9 million in the year 1995, 2002 respectively, an increasing amount to 58.6% over a 15 year period (Dolin, 1993). Pamra et al., (1970) described an epidemiological study which was carried out in a well-defined metropolitan population of old Delhi from 1962 to 1991. The population resided in the area that had been allotted to the New Delhi tuberculosis Centre as its domiciliary treatment jurisdiction. During this period 8 successive surveys were conducted. The findings of the successive survey one in the de-facto population of the area each time up to 1982 have already been reported. Hegde (1996) observed that poverty, ignorance, overcrowding, bad sanitary surroundings, population migration, wars, feminizes and pestilence, caused much of human misery and reported that 70% of death in Sub Sahara were due to microbial disease. Samal et al., (2000) reported 120 cases of genital tuberculosis in Wardha.

In regarding the epidemiology of Tuberculosis with a reference of pulmonary and extra pulmonary tuberculosis large number of workers contributing regarding knowledge and control of TB in rural and urban area of our country such as Chadha et al., Agnihotri et al., Gopal(2001), Gupta (2001) Agrawal (2001) Anupama(2001), Malhotra(2002) and Anuradha(2001).

## Materials and methods

Presently, Government of India provides all the facilities for controlling this dreadful disease by the financial help extended by WHO. In developing countries including India the fight against TB can be successfully carried out only within the setting of a national tuberculosis control program. Tuberculosis is an infectious disease caused by Micro bacterium tuberculosis. Pulmonary tuberculosis is the most common form of TB (affect the lung), while extra pulmonary tuberculosis can affect almost entire body except hair and nail. Transmission takes place by air borne spread of infectious droplets and droplet nuclei containing the tubercle bacilli. The source of infection is a person with sputum's smears positive pulmonary TB.

During the course of study, the investigator developed collaboration with tuberculosis unit, district tuberculosis centre, Meerut, for urban area and tuberculosis unit Bhawanpur for rural area. Detailed present or past history of TB patient was reported on a separate Proforma regarding type of infection, either is pulmonary or extra pulmonary, with the help of hospital record.

### Diagnosis of Pulmonary tuberculosis (*Ziehl-Neelsen Staining*)

The suspects are asked to produce by forced coughing at the time of sputum collection. The collection was made in a paper cup or plastic cup. Selected a new unscratched glass slide and labeled it using a diamond marking pen. Make a smear from the yellow muco-purulent portion of the sputum sample using a broomstick, and then allowed the slide to dry in Air for 15 to 30 minutes. Fixed the slide by passing it over a flame and then apply 1% filtered Carbol fuchsin. Gently heat the slide with the Carbol fuchsin on it until vapor rises. Leave Carbol Fuchsin on the slide for 5 minutes. Gently washed the slide with tap water until all the free Carbol Fuchsin stain was washed away. Pour 25% sulfuric acid on to the slide, rinsed gently with tap water, then tilted the slide to drain off the water. Now decolorized slide appeared light pink in colour.

Apply pure 0.1% Methyl blue on the slide. Leave the Methyl blue on the slide for 30 seconds, and washed gently with tap water. Allowed the slide to dry and examined the slide under the microscope, using a drop of immersion oil if the bacteria are seen in the slide then the patient is sputum positive with pulmonary tuberculosis.

### Diagnosis of Extra-Pulmonary Tuberculosis

A patient with extra pulmonary Tuberculosis may have general symptoms like weight loss, fever with evening rise, and night sweats. Other symptoms depend on the organ affected. Examples of these symptoms are, swelling of a lymph node in TB lymphadenitis, pain and swelling of joints in TB Arthritis, and neck stiffness and disorientation in a case of TB meningitis. Patient with extra Pulmonary TB who has coughed for three weeks, should have three sputum samples examined. If the smear results are positive, the patient is classified as pulmonary TB and his/ her treatment regimen will be that of a case of smear positive Pulmonary TB patient. They are further classified as new or re-treatment case based on the history of previous treatment for TB.

Patient with suspected extra pulmonary TB should be referred to a competent medical practitioner for expert opinion. Diagnosis of such patients may be made by using appropriate diagnostic procedure such as FNAC/biopsy as well as clinical method. Chest X-ray (CXR) also has been done by these types of cases being exposed to X-ray can cause mutations in our DNA and, therefore carry a risk of causing cancer many years later due to Ionization radiation, which is harmful for human. But this risk is thought to be very small. Wilhelm Rontgen is credited with describing X-rays. It is used in chest Radiography for detecting Tuberculosis, also uses the smallest amounts of radiation. Exposure to high radiation levels can have a range of effects, such as vomiting, bleeding, fainting and hair loss.

### Observation

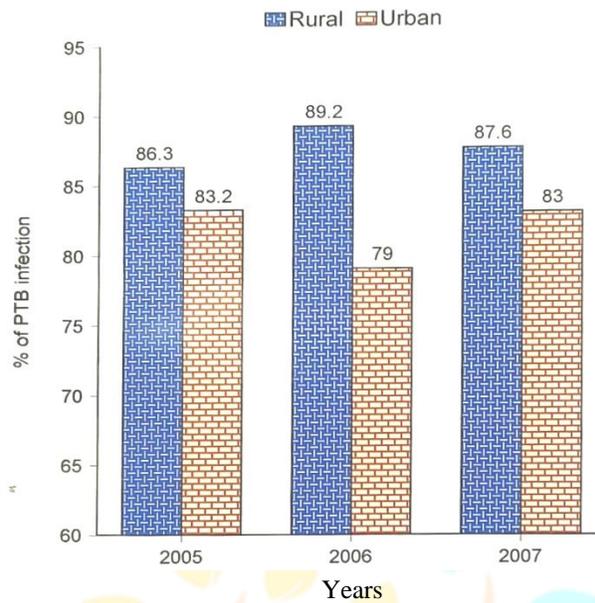
During the course of study which was performed during January 2005- December 2007, in one rural population namely Tuberculosis unit Bahawanpur and one urban population Tuberculosis Unit District Tuberculosis Centre Meerut selected. Populations covered by these units are 4.96 and 8.5lacs respectively. Data recorded for both area given in Table 1 and 2 respectively. In rural area, it was found that total percentage of TB patient was found to be 0.43% .Out of which 87.9% of Pulmonary Tuberculosis and 12.1% of extra Pulmonary Tuberculosis. However, in urban area in all 0.77% of population were found infected with TB out of which 80.7% was pulmonary TB and 18.3% of extra pulmonary TB.

**Table 1: Showing Pulmonary and Extra Pulmonary TB in rural population at Tuberculosis Unit (TU) Bhawanpur during 2005-2007**

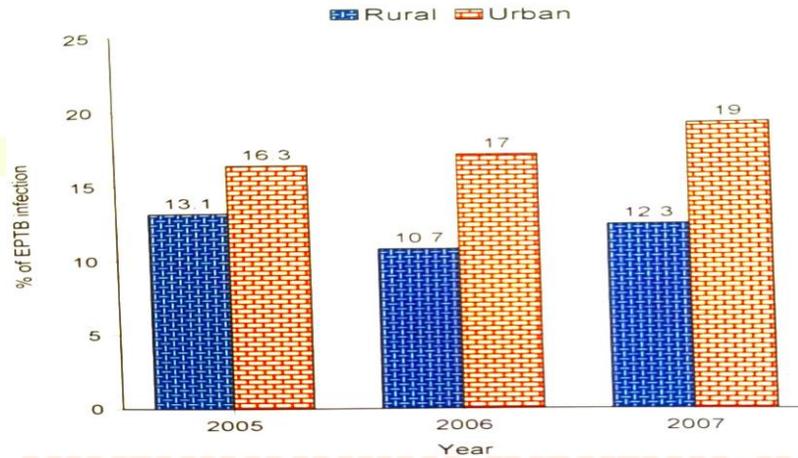
Year	PTBP		EPTBP		Total TBP		Total Population (In lacs)
	No.	%	No.	%	No.	%	
2005	537	86.3	80	13.1	607	0.12	4.96
2006	694	89.2	84	10.7	778	0.16	4.96
2007	677	87.6	95	12.3	772	0.15	4.96
<b>Total</b>	<b>1898</b>	<b>87.9</b>	<b>259</b>	<b>12.1</b>	<b>2157</b>	<b>0.43</b>	<b>4.96</b>

**Table 2 : Showing Pulmonary and Extra Pulmonary TB in Urban population at Tuberculosis Unit (TU) District Tuberculosis Centre Meerut during 2005-2007**

Year	PTBP		EPTBP		Total TBP		Total Population (In lacs)
	No.	%	No.	%	No.	%	
2005	1696	83.2	341	16.3	2037	0.22	8.95
2006	1829	79.0	414	17.0	2313	0.26	8.95
2007	2086	83	501	19.0	2517	0.28	8.95
<b>Total</b>	<b>5611</b>	<b>81.7</b>	<b>1256</b>	<b>18.3</b>	<b>6867</b>	<b>0.77</b>	<b>8.95</b>



**Fig.1. Histogram Showing trend of infection of PTB in Urban and Rural Population during 2005-2007**



**Fig.2. Histogram Showing trend of infection of EPTB in Urban and Rural Population during 2005-2007**

In general a tendency of increase in the intensity of infection in both rural and urban areas was noticed during the course of 3 years. As far as pulmonary TB is concerned, this also exhibited the increasing trend during 2005-2007. The increase was more intense in rural population as compared to urban population. On the other hand extra pulmonary TB exhibited increasing trend in urban area.

## Discussion

Extra pulmonary TB has existed as a disease entity for century. It is milder form of disease in term of infectivity as compare to pulmonary TB. The infection of TB broadly can be divided into two categories- Pulmonary and Extra Pulmonary TB. Pulmonary TB is concerned with the infection of lungs whereas the infection other than lungs in the body is known as Extra Pulmonary TB. TB infects any part of body except hair and nail. Extra Pulmonary Infection is more in male sex.

A large number of workers described the percentage of infection to be more in male in female. Mishra et al., (1995) in study of tuberculosis meningitis (Brain TB) in children found that male sex was predominant (71%) over female at Allahabad. Eapen et al., (1999) reported that tuberculosis lymphadenitis (EP) was predominant in female among all groups 63% except 0– 14 years. it is an increase in age of primary infection and possible a decreasing rate of infection. Mehta and Sachdeva (1993) observed that TB of gut (EP) occurred with approximately equal prevalence in men and women at Chandigarh. Arora and Chopra (2007) analyzed the data of TB patient in India and found that 20% extra pulmonary TB in all TB cases. it prevents in the country varies between 8.3-18.1% in different district. They also found in the year 2006, 183,180 extra pulmonary TB case were registered in comparison to 555, 601 pulmonary TB. According to status report 2007, pulmonary TB and extra pulmonary TB ratio is 1:03.

The high rate of Pulmonary TB is due to the infectious nature but extra pulmonary TB is non-infectious in nature. One sputum positive pulmonary TB patient infects 10-15 healthy person annually, so increase the pool of infection of Pulmonary TB in geometric ratio.

## Conclusion

A total number of 2157 (0.43%) TB patients were examined for TB infection in rural area, for three study year viz, 2005 to 2007. In which 1898 (87.9%) TB patients are pulmonary TB; where as 259 (12.1%) were extra pulmonary TB patients. In urban area, total 6867(0.77%) TB patients were examined. In which 5541(80%) TB are pulmonary TB where as 1256 (18.3%) were extra pulmonary TB patients. In general, a tendency of increase in intensity of Pulmonary TB infection in both areas was noticed as shown in fig 1 and fig 2.

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