



## SHORT COMMUNICATION

# Epidemiology of Pulmonary Tuberculosis in Western U.P.

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### ABSTRACT

*Pulmonary tuberculosis is endemic globally and responsible for considerable morbidity and mortality. Present study was carried out from 2007-2009 to assess the prevalence and risk factor of pulmonary tuberculosis in Western Uttar Pradesh. The prevalence of pulmonary tuberculosis was significantly higher ( $\chi^2=6.2$ ,  $d.f.=2$ ,  $P=0.045$ ) in low income group as compared to high income group. Odds ratio (OR 0.15, 95% CI 0.03-.079) also reveals that the population of high income group has low prevalence than low income group. Poor socio-economic status with its poor education is associated with poor knowledge of tuberculosis, risk of infection and dissemination, inadequate and delayed availability of health care. Poverty also results in poor nutrition, which is likely to render the immune system more vulnerable to the invading organism.*

**Key words:** Pulmonary tuberculosis, Immunity, Epidemiology, Zeihl Neelsen staining, Poverty.

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### INTRODUCTION

Pulmonary tuberculosis remains a worldwide public health problem despite the fact that causative pathogen was discovered more than 100 years ago and highly effective drugs and vaccines are available making tuberculosis a preventable and curable disease. WHO reported that tuberculosis continues to be a major public health problem in India, with over 1.9 million new cases annually, making it the highest TB burden country in the world [14]. Prevalence of tuberculosis is an important epidemiological index to measure the burden of the disease in a community. Epidemiological information on tuberculosis is also vital for the planning of control strategies and service delivery systems. It is reported that every year approximately 2.2 million people develop tuberculosis of which about 1 million are new smear positive cases and about 5 lac people die of tuberculosis every year in India [4]. WHO reported that India has highest number of multidrug-resistant patient of tuberculosis in South East Asia [3]. Multidrug-resistant tuberculosis is another threat to tuberculosis eradication program [11]. Present study was carried out from 2007 to 2009 to assess the prevalence and risk factors of tuberculosis urban and rural population of Western Uttar Pradesh. Present study is an attempt to highlight the risk factors closely associated with its prevalence in urban and rural population of western U.P. The information derived from present study is important in determining the status, health risk assessment of pulmonary tuberculosis. It will also help in the rehabilitation of human population suffering from pulmonary tuberculosis.

### MATERIALS AND METHODS

The demographic profile of present study reveals that, 84 symptomatic patients of pulmonary tuberculosis were included in the study. Personal visits were made to each individual volunteer to collect the required information and sputum specimens. Clinical symptoms and sign of the diseases like low grade fever, pleural pain, cough for more than three weeks, haemoptysis and weight loss were treated as primary diagnostic tools. Wide mouthed sterile plastic jars of 50-ml capacity with screw cap were given to all symptomatic patients to collect the sputum specimen. All patients were instructed to collect first morning sputum as it represents the pulmonary secretions accumulated overnight and most desirable specimen for the laboratory investigation. Sputum specimens of all symptomatic patients' were examined by using Ziehl Neelsen staining [2]. For the study of risk factor place of residence, age group, gender, marital status and economical status were included in the study For the study of economical status, all registered population were divide in to three category

viz. low income group (monthly income up to Rs. 5000), average income group (monthly income Rs. 50000-12000) and high income group (monthly income > Rs. 12000). Epidemiological data were analysed by involving Chi square analysis. Odds ratio (OR) and ninety five percent confidence interval (95% CI) of values were also calculated.

## RESULTS AND DISCUSSION

Out of 84 sputum samples tested for Zeihl Neelsen staining 38 (45.2%) were collected from rural population and 46 (54.8%) were from urban population. The age factor analysis showed that 12(14.3%) subjects were below 15 year of age, 39(46.4%) were between 15-35 year of age group and 33(39.3%) were more than 35 year of age. Sex wise distribution showed that 62 (73.8%) sample collected of females and 22 (26.2%) of male subjects. Out of 84 patients 44 (52.4%) got married while 40 (47.6%) were unmarried. 23 (27.4%) patients were from low income group, 28 (33.3%) were from medium income group and 33 (39.3%) were belonged to high income group. Out of 84 sputum samples investigated for Zeihl Neelsen staining, 15.8% were positive from rural, and 15.2% were positive from urban population. The age factor analysis showed that 16.7%, 7.7% and 24.2% subjects were positive from 1-15 year, 15-35 years and more than 35 year of age group respectively. Sex wise distribution showed that 16.1% sample were positive of females and 13.6% were positive of male subjects. Distribution according to marital status showed that 15.9% patients were positive from married category and 15% were positive from unmarried category. 30.4%, 14.3% and 6.1% patients were from low income group, medium income group and high income group respectively. The result of the present study provides vital information on the epidemiological situation of tuberculosis in rural and urban population in this region. Result showed overall 15.5% prevalence of pulmonary tuberculosis in this region. This is comparable to the prevalence 13.6 % pulmonary tuberculosis reported in district Kota [13]. However, it was lower than the prevalence 30 % reported by National Tuberculosis Institute [8]and prevalence 48% of latent *Mycobacterium tuberculosis* infection among prisoners [6]. In our study, only Zheil Nelson staining of sputum was considered as diagnostic tool. It may be the reason of low prevalence in our study in comparison to above.

Present study revealed that age more than 35 year and rural population were found to be independently associated with higher risk of pulmonary tuberculosis. This is supported by several studies[1 & 7]. However gender and marital status did not achieve independent significance [7]. The association between poverty and health is well documented [9]. In the present study person suffering from pulmonary tuberculosis had a statistically significant ( $\chi^2=6.185$ , d.f.=2,  $P<0.05$ ) association with low income group. Odds ratio (OR 0.15, 95% CI 0.03-0.79) also reveals that the population belonged to high-income group have low prevalence as compared to low-income group. This is in agreement with several studies in India and other countries. In a study person, suffering from tuberculosis had increased odds for decreasing socio economic status. In more recent times, tuberculosis continues to involve the groups, which are socio-economically, disadvantaged [5]. In another study among urban residents of New York City, tuberculin positivity was present in 5.5% in the area of highest socio-economic status versus 22.4% in the lowest [10]. Exactly how poverty may lead to tuberculosis remains unclear. Poor socio-economic status with its poor education is associated poor knowledge of tuberculosis, Inadequate and delayed availability of health care also associated with tuberculosis. Poverty also results in poor nutrition and low body weight, which are likely to render the immune system more vulnerable to the invading organism [12]. Results of the presents study suggest that the need of the large community based integrated study involving vaccination, chemotherapy in addition to educating the general population about the dangers and preventive methods to the elimination of the disease.

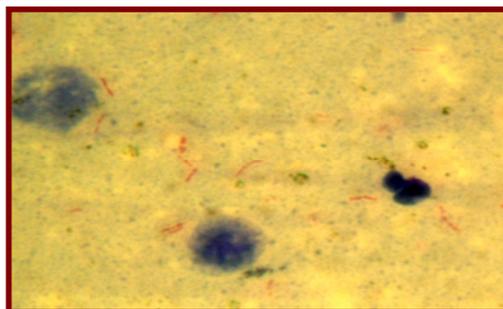


Fig-1. Sputum Ziehl Neelsen staining of a patient of pulmonary tuberculosis showing Acid Fast Bacilli.

Table-1. Prevalence and odds ratios (OR) for risk factor analysis for pulmonary tuberculosis positive subjects

Characteristic	N	-ve	+ve	OR (95% CI)	Prevalence %
<b>Place of residence</b>					
Rural <sup>c</sup>	38	32	6	1	15.8
Urban	46	39	7	0.96 (0.29-3.14)	15.2
<b>Age Group</b>					
0 to 15 yrs <sup>c</sup>	12	10	2	1	16.7
15+ to 35 yrs	39	36	3	0.42 (0.06-2.85)	7.7
35+ yrs	33	25	8	1.6 (0.29-8.88)	24.2
<b>Gender</b>					
Male <sup>c</sup>	22	19	3	1	13.6
Female	62	52	10	1.2 (0.30-4.91)	16.1
<b>Marital Status</b>					
Unmarried <sup>c</sup>	40	34	6	1	15
Married	44	37	7	1.07 (0.33-3.51)	15.9
<b>Economical Status*</b>					
Low <sup>c</sup>	23	16	7	1	30.4
Average	28	24	4	0.38(0.10-1.52)	14.3
High	33	31	2	0.15(0.03-0.79)	6.1

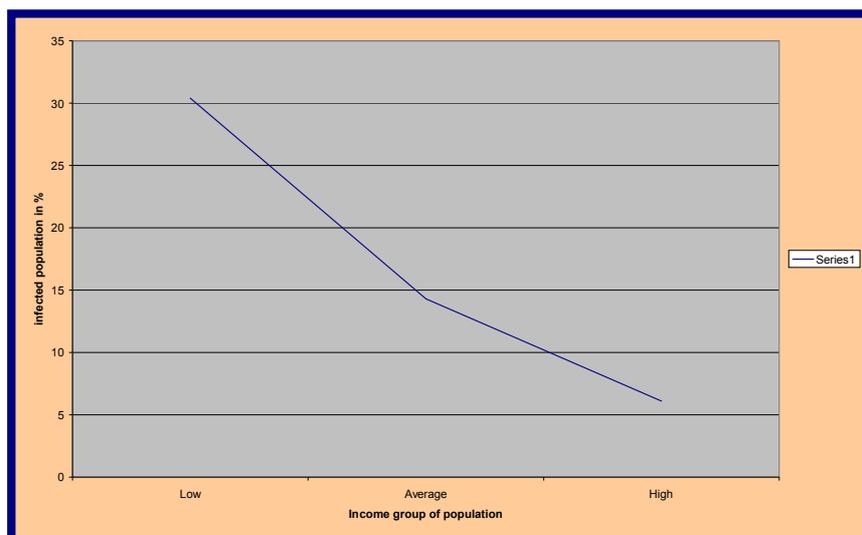
<sup>c</sup> Reference category\*  $\chi^2=6.185$ , d.f.=2, P=0.045

Fig-2. Association between prevalence of pulmonary tuberculosis and poverty.

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