

# PREVALENCE AND RISK FACTORS OF TUBERCULOSIS IN TWIN CITIES OF PAKISTAN: A PROBLEM WITH A COLD SHOULDER

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## ABSTRACT

**Introduction:** Tuberculosis (TB) is acknowledged as a global health problem. It is a major public health problem in Pakistan and it has been one of the ignored health areas. **Objective:** To check the prevalence and risk factors linked with tuberculosis in twin cities of Pakistan (Rawalpindi and Islamabad). **Design:** The Cross sectional study. **Setting:** In Rawalpindi General Hospital and Federal Government Poly Clinic (FGPC) hospital Islamabad. **Duration:** For the year 2016. **Methods:** To identify possible current TB risk factors, A questionnaire-based survey was managed on weekly basis throughout in 2016. To assess possible risk factors, a pre-structured questionnaire was designed. ANOVA was performed to calculate significance at 95% confidence intervals. **Results:** The sample (n= 1087) consist of all TB patients recorded in four years (2013-2016). Due to social and cultural values, TB prevalence was gradually increasing in females. Prevalence increased in males with age while adult females (21-30) were more receptive. A significantly ( $p < 0.05$ ) higher percentage of TB was found in the smokers. **Conclusions:** Risk factors like smoking, poverty, lung and kidney disease, contact with TB patients and diabetes were found. To achieve long-term TB control target, intervention should be done to cut TB transmission risk factors.

**Key Words:** Tuberculosis, Risk factors, Epidemiology, Pakistan

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## INTRODUCTION

Globally 8.8 million people were infected and 10.4 million people died of TB in 2015 and studied as one of the 10 cause of death globally<sup>1</sup>. TB is a key public health issue in Pakistan and sadly, it has been neglected in the past. The impact of TB on socioeconomic status is substantial<sup>2</sup>. Tuberculosis is closely related to different risk factors. The poor are at greatest risk because their immune system gets weakened due to poor nutrition<sup>3</sup>. A necessary risk factor for TB prevalence is the contact with a person with disease<sup>4</sup>. Other risk factors include HIV infection, smoking, air pollution, alcohol and diabetes<sup>5</sup>. The risk of non-adherence to TB treatment is largely linked with unemployment, low status, low annual income and cost of traveling to TB treatment facility<sup>6</sup>. Additionally, age is associated with a progressive abnormality of the immunity

that leads to high risk of reactivation of infection<sup>7</sup>.

Currently, Pakistan ranks 5<sup>th</sup> with annual TB incidence of 510000<sup>8</sup>. The information regarding prevalence and risk factors of TB in Rawalpindi and Islamabad region sarescarce. This work will provide with sufficient basis for the effective TB control programs, in order to decrease the morbidity rate in twin cities. So, our aim was to check the prevalence and risk factors linked with tuberculosis in twin cities of Pakistan (Rawalpindi and Islamabad).

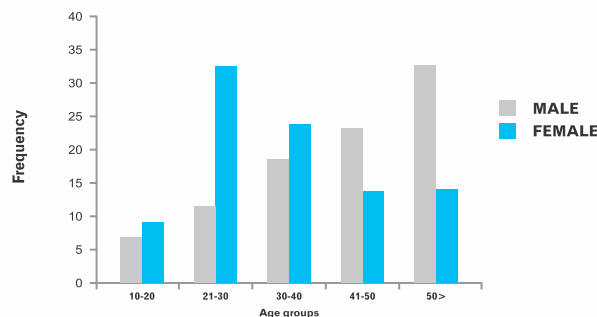
## MATERIALS AND METHOD

The current study was conducted to evaluate the prevalence of TB and its risk factors in the patients attending outdoor units of Rawalpindi General Hospital and Federal Government Poly Clinic (FGPC) hospital Islamabad. A proper ethical

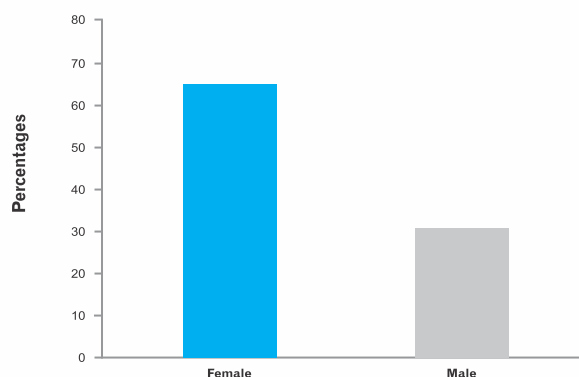
approval for the purpose of study was taken prior, from Poly Clinic (FGPC) hospital Islamabad. The selected hospitals are tertiary care centers with the major influx of patients from both urban and rural areas of twin cities<sup>9</sup>. A questionnaire-based survey was conducted on weekly basis throughout the whole year (2016) to identify possible TB risk factors. Patients not only from urban but also from rural areas of twin cities came in these two big hospitals as they are well equipped to handle TB patients and record data. TB prevalence, data from past four years was collected (2013-2016) from these hospitals. Data obtained from the answers to the questionnaire were analyzed using ANOVA in R version 3.3.1.<sup>10,19,20</sup>

**RESULTS**

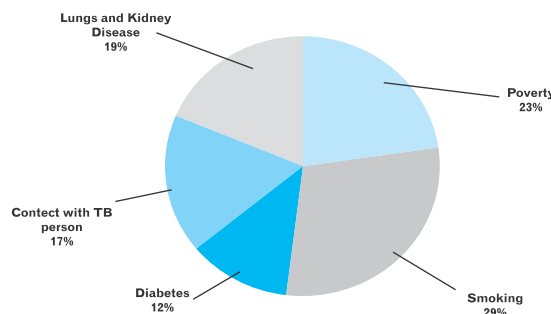
**Total 1087 TB patients were recorded in four years. The prevalence (n=338) was high in 2015 (Fig 1).** The percentage frequency of TB patients was increased in males when comparing the data of four years of different age groups (Fig. 2). Elders males (50>) were reported more and females of age 21-30 were observed highest with TB but the sudden drop was observed with age. In four year TB data, **prevalence was high in females (67.86%) and low in males(32.14%) (Fig.3).** Exposure to certain risk factors like smoking, poverty, lungs and kidney disease, contact with TB person and diabetes were observed as possible risk factors (Fig.4). A significantly higher percentage of TB were found in the smokers ( $p < 0.05$ ; Fig. 5).



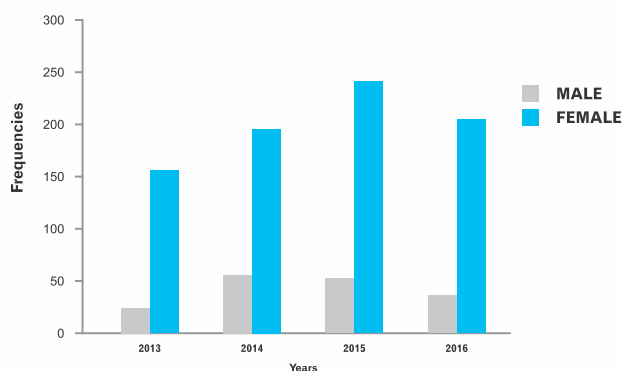
**Figure 2. Frequency of Tuberculosis in Male and Female Patients in Different Age Groups.**



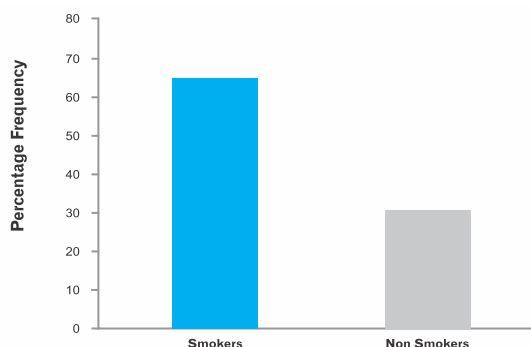
**Figure 3. Gender based Percentage Prevalence of Tuberculosis in Four years (2013-2016).**



**Figure 4. A Pie chart showing Association of Different Risk Factors for Tuberculosis. Patients with Smoking, Poverty and Lungs and Kidney Disease were Found more Susceptible to TB.**



**Figure 1. Gender based Frequency of Tuberculosis During Four years (2013-2016).**



**Figure 5. Bar Chart Showing Significant Difference Between Smokers and non Smokers in Term of TB Prevalence ( $p < 0.05$ ).**

## DISCUSSION

TB is getting high with each year in twin cities. This might be due to lack of government interest in grass root level of community and poor implementation of National Tuberculosis Program<sup>11</sup>. In males, due to low socio-economic status in Pakistan, young males did not consider their health problem more seriously. As time passed, males were more likely to have acquired infection<sup>12</sup>. The body immune system get weakens, allowing inactive (dormant) bacteria to become reactivated. On the contrary, females suffered from TB in young age were observed as female **reproductive age has a higher risk of developing active TB than the males of the same age**<sup>13</sup>. Traditionally, females are more likely in contact with the TB infection patient at home. Females living in such atmosphere where TB prevalence, are particularly at high risk of infection<sup>6</sup>.

Women having TB has a negative effect on child growth and family welfare<sup>14</sup>. Socio-economic dynamics also have an influence on TB control efforts in young women, especially who suffer from unequal poverty, minor social status, less education, restriction to health care and partial freedom to travel<sup>6</sup>. This is according to an earlier study in India found that male patients with TB expected their wives to care for them but infected wives seldom acknowledged care<sup>13</sup>.

Smoking was found major risk factor for TB. It decreases immune response and damages the function of cilia in the airways which causes TB<sup>16</sup>. Cigarette smoking is a risk factor for pulmonary tuberculosis in adults, with a dose-response link and the number of cigarettes consumed daily<sup>17</sup>. Other risk factor were poverty, patients having a history of lungs and kidney diseases and those who have close contact with TB patients. Most of the tuberculosis patients, therefore, live in the poor countries. Rapid urbanization and poor nutrition are the leading cause of TB<sup>18</sup>. Association between TB and diabetes is complex<sup>10</sup>. Earlier studies show that there is no

direct contact between TB and diabetic patients but diabetes is known to render the patient more susceptible to any infection<sup>5</sup>.

This prevalence ration uphold that smokers are more susceptible for tuberculosis than non-smoker in the twin cities (2013-2016).

## CONCLUSION

Tuberculosis (TB) is a key public health problem in Pakistan and considered 85 amongst the countries with the highest load of TB in the world. Different socioeconomic and risk factors like smoking, poverty, lungs and kidney disease, contact with TB person and diabetes were observed as a possible cause of an increase in TB. In summary, to achieve a long-term target for TB control, intervention should be done to cut TB transmission. Such intervention may include improving living standard, social hygiene, awareness of TB to root level of community and reduction of the possible risk factor for TB.

### Declarations

### Acknowledgement

We acknowledge the contribution of colleagues and hospital staff for the collection of data of past years. Also, we are thankful to the ethical committee to give us permission to record data.

### Ethics approval and consent to participate

Ethical clearance was obtained from the Ethics Review Committee of Federal Government Poly Clinic (FGPC) hospital Islamabad.

### Consent for publication

Not applicable

### Competing interests

The authors declare that they have no competing interests.

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This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sector.

### Availability of data and material

The dataset used and analyzed during the

current study are available from the corresponding author on reasonable request.

#### Authors' contributions

RIH & IY did the sampling. RIH wrote the manuscript.

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**AUTHORSHIP AND CONTRIBUTION DECLARATION**

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Raja Imran Hussain	Writing and analysis	
2	Iqra Yousaf	Data collection	