

ORIGINAL ARTICLE

Frequency of Tuberculosis and its Outcomes After Anti-Tuberculosis Treatment According to Age and GenderJAI DEV MAHESHWARI¹, SHABANA QABULIO², MUKESH KUMAR³, ALI NAWAZ BIJARANI⁴, JAI KIRSHIN AMBWANI⁵, DAMNI ADVANI⁶¹Lecturer, Department of Community Medicine, SMBBMC Lyari Karachi²Lecturer, Department of pathology, Shaheed Mohtarma Benazir Bhutto Medical College Lyari Karachi Pakistan.³Assistant professor, Department of Pathology, Shaheed Mohtarma Benazir Bhutto medical college Karachi⁴Lecturer, Department of Pharmacology, Shaheed Mohtarma Benazir Bhutto Medical College Lyari Karachi.⁵Associate Professor department of pathology Suleman Roshan Medical college Tando Adam⁶Medical student (4th year)Corresponding author: Jai Dev Maheshwari. Email: jaidevmaheshwari83@gmail.com**ABSTRACT****Objective:** To determine the frequency of pulmonary tuberculosis and its outcomes after anti-tuberculosis treatment according to age and gender.**Methods:** This cross-sectional study was conducted at the department of Microbiology, Basic Medical Sciences Institute, Jinnah Postgraduate Medical Centre Karachi, with the collaboration of different DOTs centers and chest ward JPMC, Karachi Medical and Dental College, Karachi. All newly diagnosed pulmonary tuberculosis patients who registered for treatment, of either gender, were included. All the patients were followed until the end of the treatment, and they were assessed regarding treatment outcomes in terms of the success and failure of the treatment according to the age and gender of the patients. A self-made proforma was structured to collect the information, and SPSS version 26 was used for the purpose of data analysis.**Results:** A total of 237 cases were observed, their mean age was 41.80+16.44 years and their mean weight was 51.09+7.90 kg. Males were in majority 84.0% and females were 16.0%. The majority of cases (96.2%) had completed treatment, while 3.8% of cases had not yet completed treatment. 91.0% of the patients were cured, while the remaining 8.40% were still not cured during the study period. Treatment outcome was statistically significant according to age ($p = 0.001$), while statistically insignificant according to gender ($p = 895$).**Conclusion:** As per the study conclusion, the frequency of pulmonary tuberculosis was frequently higher among males compared to females. Treatment outcome was influenced by age greater than 60 years, while no gender effects were observed.**Keywords:** Tuberculosis, age, gender, treatment**INTRODUCTION**

Traditionally, pulmonary tuberculosis is discovered when sick people visit hospitals for treatment.¹ In the past, public healthcare professionals have played a little part in encouraging the behavior of seeking health treatment for this stigmatized illness. Conversely, some policy experts think the healthcare system could become more aggressive in diagnosing tuberculosis (TB) to boost early diagnosis.^{1,2} An infectious and deadly disease, tuberculosis primarily affects developing nations. It is brought on by the *Mycobacterium tuberculosis* bacteria, which spreads through the air and affects the lungs as well as other organs and body parts of those who come into touch with infected people.³ Approximately 2 billion individuals are believed to be infected with TB, and every year, 1.3 million individuals pass away from it, making it a persistently serious worldwide health issue. In 95% of all instances, 99% of deaths take place in developing nations, especially in Sub-Saharan Africa and Southeast Asia, where higher burden of the disease.³ Although China and India together accounted for 38% of all cases of TB worldwide, India alone was responsible for an approximate quarter (26%) of those cases.³ Although in Pakistan, the prevalence of tuberculosis is rising for a number of reasons, such as poverty, difficulty accessing TB treatment services, non-compliance with medication, cultural stigma, etc.¹ TB project leaders assert that a shortage of qualified human resources and a deficiency of tuberculosis treatments and diagnostic facilities are two main factors that compromise TB management.¹ Numerous low-income nations estimate twice as many instances of tuberculosis in males as in females, this disparity is typically attributed to biological and epidemiological factors in addition to social and cultural challenges to healthcare access.⁴ Despite the fact that older age seems to be an important predictor of both TB-specific deaths and non-TB-specific deaths when contrasted with some of those aged 25–44 years.⁵ From 841 million in 2013 to even more than 2 billion in 2050, the proportion of individuals in the world who are 60 or older is predicted to more than double.⁶ Gender differences in the control of genetic, hormonal, and environmental processes affect the incidence, manifestations, and management of disease, making biological sex a significant factor in health.^{7,8} Moreover, since these variations

also result from the socialization of gender, biology does not fully account for the gender discrepancies that are observed throughout the world.^{7,9} Mostly gender-specific studies regarding tuberculosis have focused on variations in women's access to medical care and the ensuing delays in obtaining health treatments. Another study found that being a married woman, a housewife, or a female is significantly linked with delays in diagnosis.^{10,11} There is proof that females are more likely than males to stick with their treatment plans through to the end once they have enrolled in hospital, leading to greater therapeutic efficacy. Unfortunately, evidence on gender variations in TB treatment responses are scarce and occasionally contradictory, and there could be particular factors, impacting either gender, that alter how each gender responds to therapy.^{10,12} However, this study has been conducted to determine the frequency of tuberculosis and its outcomes after anti-tuberculosis treatment according to age and gender.

MATERIAL AND METHODS

This cross-sectional study was done at the microbiology department, Basic Medical Sciences Institute, Jinnah Postgraduate Medical Center Karachi, with the help of various DOT centers and the chest ward at JPMC, Karachi Medical and Dental College. Before the study, ethical approval was obtained from the hospital's ethical committee, JPMC Karachi. All newly diagnosed pulmonary tuberculosis patients of either gender registered for treatment in the above-mentioned centers were included. Patients who were not willing to participate in the study, those who lost the treatment follow-up, and those with chronic diseases were excluded. Baseline characteristics of the participants were recorded, including their age, gender, sputum smears, status of the mycobacterium TB, findings of the chest x-rays, and other essential information regarding tuberculosis (TB). After obtaining informed consent from each participant, data were collected on those patients who were diagnosed as the cases of pulmonary tuberculosis. All the patients were followed until the end of the treatment, and they were assessed regarding treatment outcomes in terms of the success and failure of the treatment according to the age and gender of the patients. A self-made proforma was structured to collect the information, and SPSS version 26 was

used for the purpose of data analysis. Post stratification chi-square test was applied, and a p-value <0.05 was considered significant.

RESULTS

A total of 210 patients presented with dyspepsia at A total of 237 cases were observed, their mean age was 41.80+16.44 years, mean weight was 51.09+7.90 kg and mean ESR was 84.41+13.28. Males were in majority 84.0% and females were 16.0%. As per the CXR findings, most of the cases 73.4% had infiltrations, 22.8% had cavitation, and 03.8% cases had pleural effusions. Most of the cases 96.2% had completed treatment, while in 03.8% of the cases were under treatment yet. Table.1

As per the treatment outcome, 91.0% of the patients were cured, while the remaining 8.40% were not yet cured. Table.2

Treatment outcome was statistically significant according to age (p = 0.001), while statistically insignificant according to gender (p = 0.895). Table.2

Table 1: Demographic information of tuberculosis patients n=237

Variables	Statistics		
Age (mean + SD)	41.80+16.44 years		
Weight	51.09+7.90 kg		
ESR	84.41+13.28		
Gender	Male	199	84.0%
	Female	38	16.0%
CXR findings	Cavitation	54	22.8%
	Infiltration	174	73.4%
	Pleural effusion	09	03.8%
Sputum-AFB	1+	54	22.8%
	2+	63	26.6%
	3+	120	50.6%
	Total	237	100.0%
Treatment status	Complete	228	96.2%
	Uncomplete	9	03.8%
	Total	237	100.0%

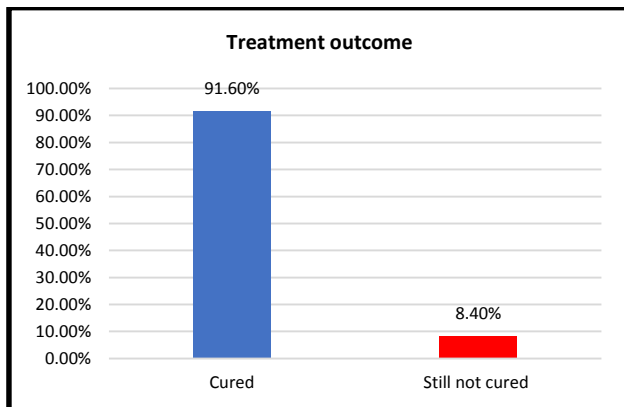


Fig. 1: Treatment outcome n=237

Table 2: Treatment outcome according to age and gender n=237

Variables		Treatment outcome		Total	p-value
		Cured	Not cured		
Age groups	< 20 years	20	1	21	0.001
		8.4%	0.4%	8.9%	
	20-40 years	104	3	107	
		43.9%	1.3%	45.1%	
	41-60 years	72	7	79	
		30.4%	3.0%	33.3%	
61-70 years	17	3	20	0.895	
		7.2%	1.3%		8.4%
	>70 years	4	6		10
		1.7%	2.5%	4.2%	
Gender	Males	35	3	38	0.895
		14.8%	1.3%	16.0%	
	Females	182	17	199	
		76.8%	7.2%	84.0%	

DISCUSSION

Tuberculosis seems to be the disease with the highest risk of transmission.¹³ It is also one of the infective disorders where cases are continuing to rise and which is a leading cause of mortality around the world.¹³ This study has been done to evaluate the frequency of pulmonary tuberculosis and its outcomes after anti-tuberculosis treatment according to age and gender. A total of 237 cases were observed, their mean age was 41.80+16.44 years, and we found males in the majority 84.0% while females were 16.0%. Consistently, Chen HG et al¹⁴ reported that the median age of the patients was 38 years, and males were most common 60.4%, while females were 39.6%. In another study by Safwat TM et al¹⁵ reported that the patient's average age was 37±14 years, and out of 126 patients of tuberculosis, the males were 98 and females were 28. In the favor of this study Rajarao P et al¹⁶ also reported that the out of 585 cases, males were 80% and females were only 20%, for a male-to-female ratio of 4:1. The specific causes for this predominance of reported male patients are yet not-known, while it has been estimated that women having tuberculosis are subjected to higher stigma and difficulties to accessing health care.¹⁵ Although it is a popular assumption that the gender disparity in tuberculosis is the result of systematic underrepresentation and underdiagnosis of the disease in females.^{15,17}

In this study, as per the CXR findings, most of the cases 73.4% had infiltrations, 22.8% had cavitation, and 03.8% cases had pleural effusions. In the comparison of this study Rizwan HM et al¹⁸ reported that the as per the most common radiological presentation include cavitation was in 49.2% cases, alveolar consolidation was in 42.4%. On the other hand, it is stated that the Pulmonary consolidation and infiltrates occur in combination with nodal hypertrophy in a significant number of adolescents (at least 70%) and adults (at least 80%–90%).^{19,20} In adults, infiltrates are seen in the middle and bottom lung lobe fields more frequently than in the superior or inferior lobes. However, in children, the lower and the upper lobes are equally affected.¹⁹

In this series, most of the cases 96.2% had completed treatment, while in 03.8% of the cases treatment had not yet been completed, while according to the treatment outcome, 91.0% of the patients were cured, and furthermore treatment outcome was statistically significant according to age (p = 0.001), while statistically insignificant according to gender (p = 0.895). Although Rajarao P et al¹⁶ reported that the rate of recovery was lower in females (53%) than in males (74.8%), with a significant difference. In the study by Safwat TM et al¹⁵ reported that male patients were significantly more likely to cooperate with the treatment (93.9% of males versus 71.4% of women). Drug-related complications became significantly more prevalent in female patients, while 95.9% of men did not experience any drug-related problems. However, on the other hand, it is approximated that both healthy and unhealthy behavior patterns can be influenced by a person's gender.¹³ In this specific context, females are more likely than males to seek therapy. Females are typically more obedient to tuberculosis management than males.¹³ Men are more likely to have pulmonary tuberculosis than women because men have a predisposition for leading unhealthy lifestyles, including such smoking, which can impair lung function and raise the risk of pulmonary TB.¹³ Moreover, because males frequently leave the house in search of employment, they are less likely to take their OAT medication at the prescribed times, as advised by medical professionals.^{13,21,22} According to the studies cited above, there are significant disagreements on the effectiveness of treatment dependent on a patient's gender. Due to the fact that this study has a number of limitations, such as a small sample size and a single-center study, as well as the fact that the ratio of female participants to total participants is quite low, so these findings cannot be definitively applied. Consequently, additional large-scale studies with participants of both genders in equal numbers are strongly encouraged so that accurate conclusions can be drawn.

CONCLUSION

According to the study conclusion, the frequency of pulmonary tuberculosis was frequently higher among males compared to females. Treatment outcome was influenced by age above 60 years, while no gender effects were observed. Due to several limitations and the inequality in gender frequency, further studies with equal numbers of both genders are suggested on this subject.

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