

**Original Research Article**

Pulmonary Impairment after Tuberculosis: Perception of patients about their illness?- A Questionnaire Based Study

Authors

**Dr Gajendra Vikram Singh¹, Dr Santosh Kumar², Dr Parul Mittal^{3*},
Dr Komal Lohchab⁴, Dr Hariharan³, Dr Bhanu Pratap Pandey³, Dr Achal Singh³**

¹Associate Professor, Department of T.B. & Chest Diseases, S.N. Medical College, Agra

²Associate Professor & Head, Department of T.B. & Chest Diseases, S.N. Medical College, Agra

³Junior Resident, Department of T.B. & Chest Diseases, S.N. Medical College, Agra

³Senior Resident, Department of T.B. & Chest Diseases, S.N. Medical College, Agra

*Corresponding Author

Dr Parul Mittal

Department of T.B. & Chest Diseases, S.N. Medical College, Agra, India

Abstract

Objective: To assess The Knowledge, Attitude and Practices of Patients regarding Pulmonary impairment after Tuberculosis

Materials and Method: We evaluated 93 patients suffering from pulmonary impairment after Tuberculosis presenting to S.N. Medical College, Agra for this study. Method of data collection was explained to the participants and informed consent was taken and confidentiality assured to all subjects to get their co-operation. A "predefined 19 questions formatted in standardized questionnaires" was used for the purpose of data collection from stable patients who can read, write and understand Hindi and were willing to participate in our study by using interview method. The data was organized, tabulated and analyzed by using descriptive and inferential statistics.

Observations: Out of 93 patients in study, majority of the patients had poor knowledge (75.5%), positive attitude was found only in (31%) and good adherence to treatment (Practice) was observed in only 19.2% respondent regarding their respiratory diseases. Overall KAP score was (1.7) poor.

Conclusion: We conclude that the majority of patients had poor KAP because they are suffering with respiratory diseases with is entirely different from their primary disease i.e Tuberculosis. Misconceptions and myths about etiology, management and prevention of this clinical entity are very common. Like COPD, Asthma, Tuberculosis and lung cancer, awareness regarding post tuberculosis complication is not well addressed in general population. Importance of this disease also not got appropriate and serious place in various national and international guidelines of tuberculosis management. Sincere and sustained efforts are required to impart health education in these patients.

Keywords: Knowledge, Attitude, Practice, Pulmonary impairment.

Introduction

According to a report by the World Health Organization (WHO), the deaths due to lung

diseases in India were on the rise accounting for 11 per cent of the total deaths. As many as 142.09 in every one lakh, died of one form of lung disease or

the other giving India the dubious distinction of ranking first in lung disease deaths in the world in recent years.¹

TB is one of the most ancient diseases caused by various strains of *Mycobacterium Tuberculosis*. Tuberculosis is a worldwide pandemic and is a major global health problem. It causes ill-health among millions of people each year and with death toll of 1.5 million it ranks as the tenth leading cause of death worldwide.² A third of the world's population is infected with *Mycobacterium tuberculosis* (MTB), and over 9 million new cases of tuberculosis (TB) are reported annually.³ Over the last four decades treatment of TB has significantly improved. Tuberculosis is curable disease provided strain are sensitive to first line anti-tuberculosis drugs and these drugs are prescribed by treating physicians and taken by patients as per standards of Tb care.^{4,5} An estimated 58 million lives were saved through TB diagnosis and treatment between 2000 and 2018 globally.² For significant numbers of tuberculosis patients, microbiological cure is not the end of their illness but is a beginning of more complicated disease process which is little been addressed especially in our country. Pulmonary TB survivors frequently experience structural and functional lung sequels that vary in severity that have recently been more completely described⁶. The histopathological abnormalities after treatment for pulmonary TB include fibrosis, collapse, calcification, bronchiectasis, and bronchial stenosis, all of which can cause pulmonary function abnormalities in significant numbers of tuberculosis survivors. These findings call for strategies to address pulmonary impairment after TB (PIAT). Pulmonary impairment after tuberculosis was described as a non-fatal negative health effect^{7,8,9}. Pulmonary impairment after tuberculosis (PIAT) refers to chronic pulmonary function loss that occurs in persons who have achieved microbiologic cure of pulmonary tuberculosis. They may be obstructive, restrictive or mixed depending upon underlying pathological changes.^{10,11,12} Pulmonary impairment after

tuberculosis pose a substantial risk of distressing symptoms like dyspnoea, exercise intolerance, frequent exacerbations, recurrent health care use, poor quality of life and ultimately reduced longevity despite of successful treatment of their primary disease.^{13,14,15}

Post-tuberculous lung impairment is one obvious cause of morbidity and mortality following successful anti-tuberculosis treatment. Nearly one hundred years ago, lung function studies in males and females with TB showed evidence of restrictive lung disease. More recent studies have shown that pulmonary TB (PTB) is associated with largely irreversible changes to bronchial and parenchymal structures, leading to distortions in bronchial vasculature, bronchiectasis, emphysema and fibrosis.¹⁶⁻²¹ A restrictive pattern of lung disease is common and is independent of tobacco smoking.²² Although pulmonary impairment is more likely after extensive parenchymal involvement, significant declines may also be observed in patients with localised PTB.²³ Chronic airway obstruction can also be a result of PTB, and this association has been known about for over 50 years.^{24,25}

In India, huge number of patients is suffering from pulmonary impairment after tuberculosis and precious burden of this illness is unknown. In our country due to a multiplicity of causes patients approach the physician very late after onset of the disease when the pulmonary impairment has established itself to a great extent. There is no doubt that the knowledge and attitudes of patients have an impact on the management of their illnesses, and improving knowledge is known to improve compliance with treatment of common respiratory diseases. Poor compliance with prescribed drugs is a common and important problem in clinical practice which can result in treatment failure and poor outcomes. KAP surveys are effective in providing a baseline for evaluating intervention programs. This study was aimed to assess the baseline levels of KAP among the patients of pulmonary impairment after tuberculosis related to their illness.

Material and Method

This prospective, observational questioner based study carried out on 93 bacteriologically cured but symptomatic patients diagnosed as PIAT attending S.N. Medical College, Agra from March 2017 to March 2019 i.e., over the time period of 24 months.

Inclusion Criteria

1- Patients enrolled in the study were either those who came to the hospital as previously adequately treated or those who were diagnosed as active pulmonary TB cases and went on to complete the treatment and declared as cured according to RNTCP guidelines during our study period. In either case, confirmation of pulmonary TB as bacteriologically cured was done by getting sputum smear negative & sputum culture on Lowenstein-Jensen medium performed at "National Jalma Institute of Leprosy and other Mycobacterial Diseases, Agra.

2-Those patients who were confirmed as bacteriologically cured pulmonary tuberculosis with some degree of respiratory discomfort and symptoms were enrolled.

3- Those symptomatic healed Tuberculosis patients having pulmonary function loss as per levels of impairment determined via spirometry using American Medical Association's Guide to Evaluations on Permanent Impairment (fifth edition)¹⁴ were defined as patients of pulmonary impairment after tuberculosis (PIAT).

4- Only those Patients of PIAT who were interested to participate in study were included.

Exclusion Criteria

Symptomatic healed Tuberculosis patients having pulmonary function loss with history of COPD and Bronchial Asthma, Coronary artery diseases, Systemic hypertension, Diabetes, bone and Joint Disease, Cognitive impairment, Neuromuscular Disorder, Rheumatic Heart disease, history of recent surgery (major) or trauma (major) were exclude from this study.

The study was carried out after getting the verbal and written consent from the participants who were enrolled in the study. A "predefined questions

formatted in standardized questionnaires" was developed for assessment of knowledge, attitude and practice about common respiratory diseases. This questionnaire was validated on 25 indoor and outdoor patients of TBC department of S.N. Medical College, Agra. The special case sheets were prepared, containing all the information as age, sex, occupation, family history, personal history, social history, environmental history including lifestyle factors and risk factors and marital status of the patients. The questionnaire to study the KAP of these patients was also included in the case sheets and the obtained results were analysed by using descriptive and inferential statistics. The data have developed to present in the form of tables and figures.

Results

The questionnaire for assessment of KAP's regarding their illness covered three areas of KAP. There were a total of 19 questions in the KAP questionnaire for Respiratory illness, with 7 questions related to knowledge, 6 questions to assess the attitude of the patient toward the 6 questions regarding the practices of their current illness. This questionnaire was filled in at a face-to-face interview with the participant. The demographic details and the KAP of the 93 patients were recorded in Table 1.

Most of the respondents age ranges between 21 and 30 with 58.1% patients belongs lower middle class of socio-economic status as per kuppuswamyscale¹⁵, and 63.43% were having per capita income below Rs.1500. Majority of the patients belongs to the primary school education. 68.8% were living in overcrowded houses and 80.6% having indoor air pollution in their houses. This finding is not unexpected as the patients' level of education is generally known to have a positive influence on their understanding of specific health education programs and relevant behaviour change techniques. Among the males, 28.84% were smokers and 9.7% were alcoholics. About 65.8% patients not vaccinated with BCG vaccine.

Category-II treatment was the most prominent taken by the patients (55.9%) followed by Category-IV (22.5%), Category-1 (21.5%) respectively. (Graph-1)

The most common pattern of Ventilatory defect observed was mixed (45.16%) followed by pure obstruction (32.25%). Pure restrictive was observed in 22.58% patient. (Graph-2)

Residual radiological sequelae were observed in around 84.4% of case with highest in CAT II treated patients. (Table-2)

The participants' knowledge was assessed based on their understanding toward respiratory disorders which included the causes, common symptoms, diagnostic modalities, treatment, preventive measures and pulmonary rehabilitation. Participants were specifically asked about the important causes of respiratory illness, their diagnostic and treatment modalities and preventive measures necessary for management of respiratory disorders based on options given in Tables. Participants were considered to have answered the questions correctly. Most of the questions were not answered correctly by the participants, indicating a relatively little (low) overall knowledge toward the disease.

However, 45.20% participants had average knowledge about the major causes of respiratory disorders. Furthermore, near to half of the participants (44.10%) lacking knowledge regarding various diagnostic modalities of respiratory disorders and 'yogic breathing exercises'. It was observed that only 3% patients had good knowledge the common respiratory diseases. In this study, we have observed that 75% patients of PIAT had 'little to No' knowledge regarding their respiratory disorders.

Patients showing maximum positive attitude was towards controlling measures of common respiratory diseases (45.2%), maximum negative attitude was towards right approach to discuss about their respiratory illness and maximum

indifferent attitude towards the use of inhalers in exacerbation of their respiratory illness (63.4%) and Pulmonary Rehabilitation practice (68.8%).

Most common practices regarding to take correct first-aid remedy for their respiratory diseases (30.10%) when respiratory symptoms appeared and approach timely visit to doctor for treatment (31.18%) only. Patients were shows very poor Pulmonary Rehabilitation practices (7.52%) in our study.

Table-1: Demographic profile of Patients Evaluated

VARIABLES	No. OF PATIENTS (%)
Gender	
Male	55.9
female	44.1
Marital status	
Married	67.7
Unmarried	32.3
Age (years)	
Below 20	15.03
21-30	37.63
31-40	10.75
41-50	20.43
Above 50	16.12
Socio-economic status	
Lower	28.0
Upper lower	7.5
Lower middle	58.1
Upper middle	6.5
Upper	0
Per capita income (in Rs.)	
< 1000	19.35
1001-1500	44.08
1501-3000	24.73
>3000	11.8
Living in house	
Crowded	68.8
Not crowded	31.2
Smoking Index	
Smoker	17.2
Non-smoker	82.8
Alcohol abuse	
Non- alcoholic	90.3
Alcoholic	9.7
Indoor air pollution	
Present	80.6
Absent	19.4

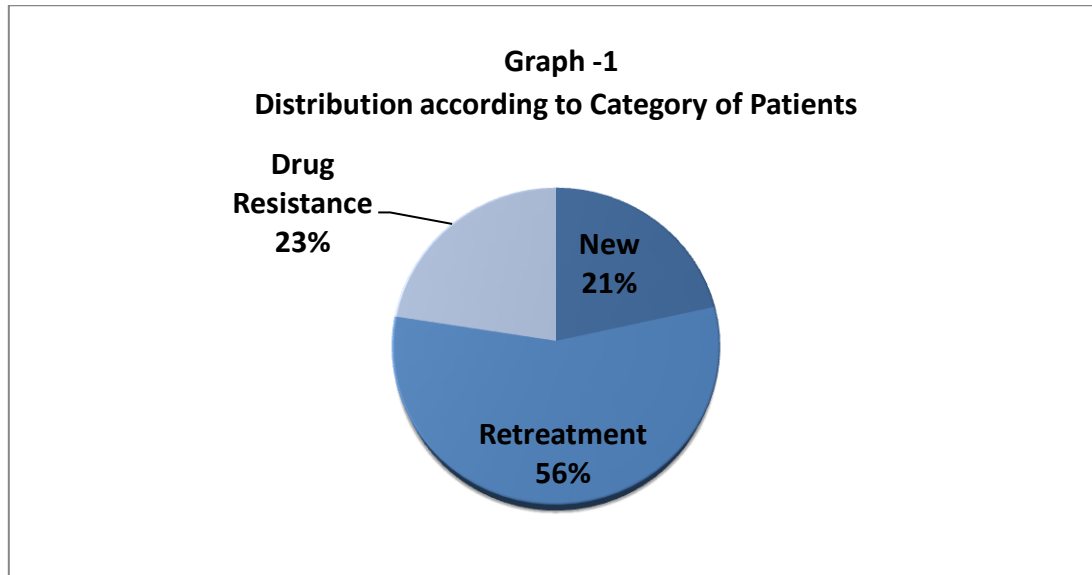


Table 2: Distribution according to type of anti-tuberculosis Treatment

Type of Patient	No.	%
Retreatment	52	55.9
New	20	21.5
Drug resistance	21	22.5
TOTAL	93	100

Table 3: Distribution of patients according to presence of radiological abnormality

Type of anti-tuberculosis treatment	YES%	No.%
CAT-II	87	12.4
CAT-I	77.9	22.05
CAT-IV	86.04	13.9
TOTAL	84.4	15.5

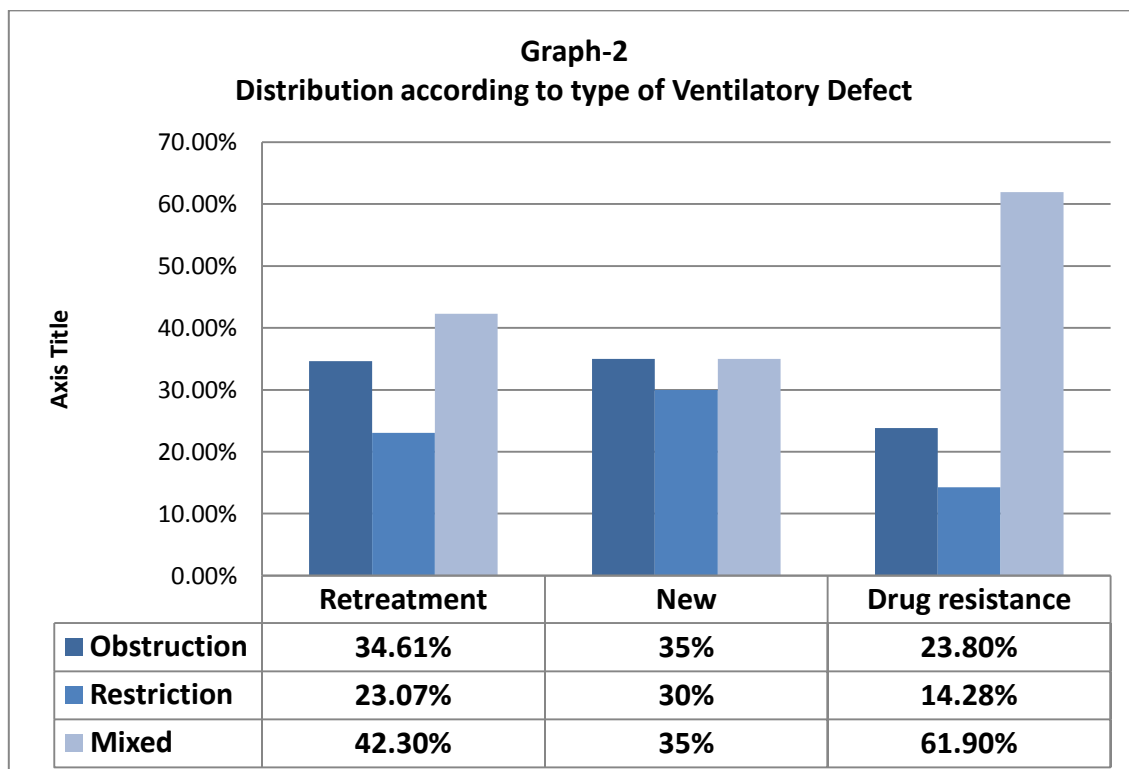


Table 4- Distribution according to type of Ventilatory defect

Type of Patients	Obstruction	%	Restriction	%	Mixed Ventilatory defect	%
Retreatment	18	34.61	12	23.07	22	42.3
New	7	35	6	30	7	35
Drug resistance	5	23.8	3	14.28	13	61.9
TOTAL	30	32.25	21	22.58	42	45.16

Table 5: Response of the participants to the knowledge questions in assessment of KAP of Common Respiratory Diseases

S. No	PATIENT'S KNOWLEDGE QUESTIONS	KNOWLEDGE							
		NO	%	Little	%	AVERAGE	%	GOOD	%
1	Knowledge about various respiratory illness	26	28	51	54	12	12.9	4	4.3
2	Knowledge about causes of their respiratory diseases	12	12.9	55	59.1	21	22.6	5	5.4
3	Knowledge about the common symptoms of respiratory diseases	16	17.2	31	33.3	42	45.2	4	4.3
4	Knowledge about diagnostic modalities of various respiratory diseases	41	44.1	37	39.8	11	11.6	4	4.3
5	Knowledge about medication available for their illness	26	28	47	50	20	21	0	0
6	Knowledge about the preventive measures to prevent propagation of various respiratory illness	22	23.7	43	46.2	26	28	2	2.2
7	Knowledge about Pulmonary Rehabilitation and its effect	41	44.1	44	47.3	7	7.5	1	1.1

Table 6: Response of the participants to the attitude questions in assessment of KAP of their Respiratory Diseases

S. No.	Questions of attitude	Negative		Indifferent		Positive	
		No.	%	No.	%	No.	%
1	Attitude towards approach to a doctor for treatment of their diseases	31	33.3	34	36.6	28	30.1
2	Attitude towards preventive measures of their respiratory illness	14	15.1	37	29.8	42	45.2
3	Attitude towards that their respiratory illness are treatable	34	36.6	22	23.7	37	39.8
4	Attitude towards right approach to discuss about their respiratory illness	47	50.5	7	7.5	39	41.9
5	Attitude about use of inhalers in exacerbation of their respiratory illness	7	7.5	59	63.4	27	29
6	Attitude towards Pulmonary Rehabilitation	29	31.2	64	68.8	0	0

Table 7: Response of the participants to the practice questions in assessment of KAP of their Respiratory Diseases

S. No.	Questions of practices	correct answer	%
1	When respiratory disease appeared, patient have <u>taken right first-aid remedy</u>	28	30.10
2	Patient <u>approached timely to doctor</u> for respiratory disease treatment	29	31.18
3	<u>Took proper treatment</u> for common respiratory diseases as per doctor's instructions	20	21.50
4	<u>Correct modality</u> patient used when he/she got acute attack of breathlessness	23	24.75
5	Patient practicing ' <u>yogic breathing exercises</u> '	07	7.52
6	<u>Adopted the preventive measures</u> for common respiratory diseases	18	19.35

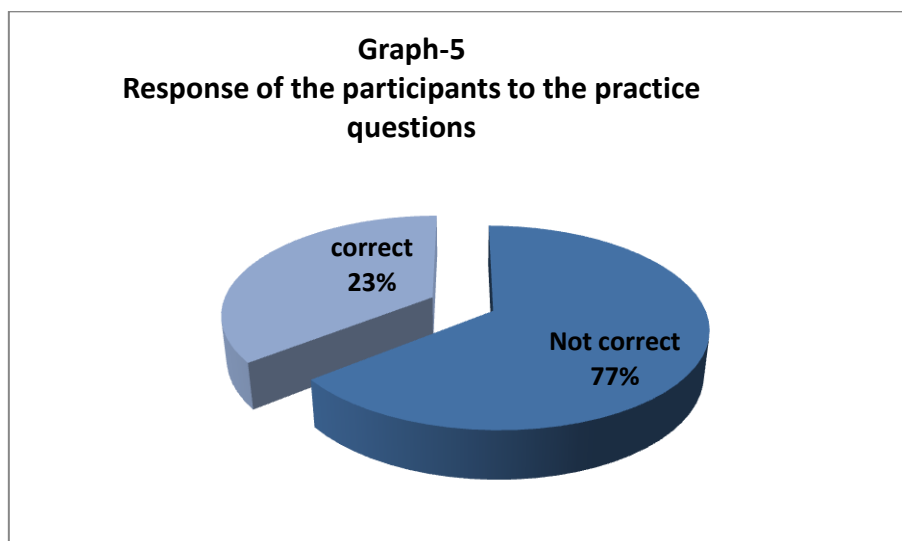
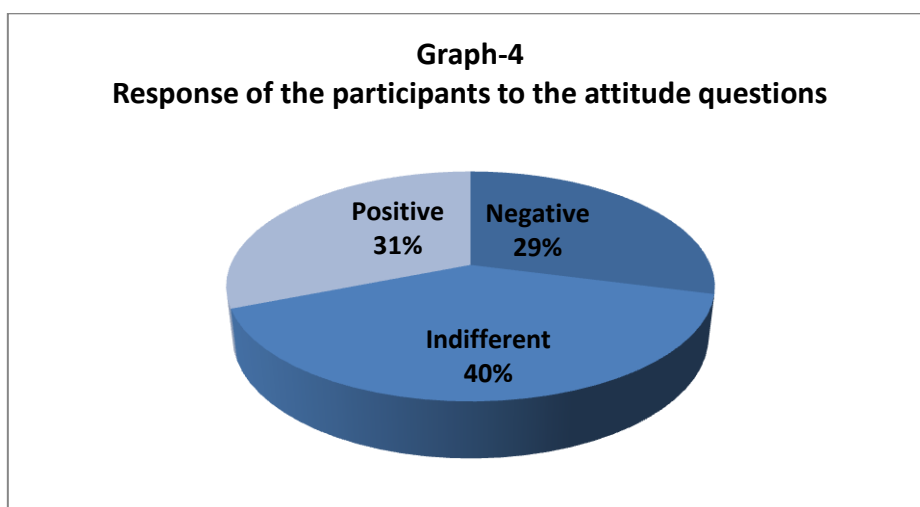
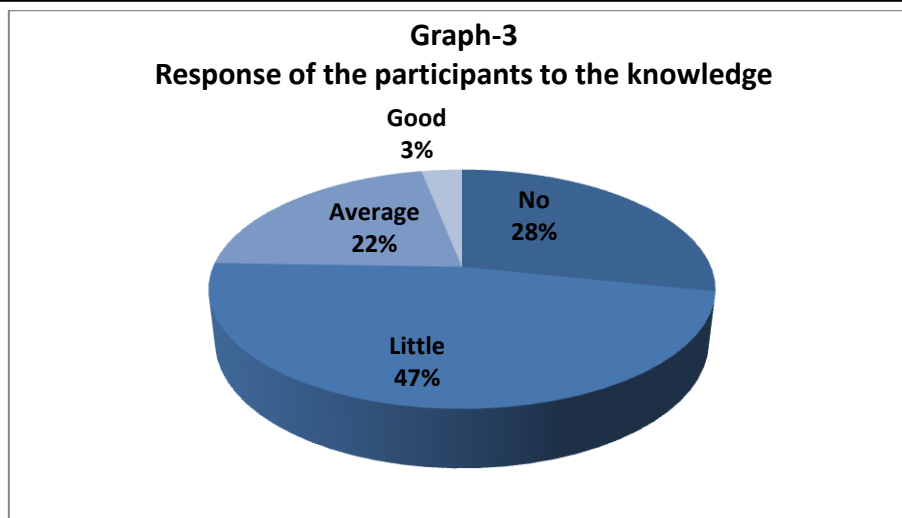


Table 4: Overall mean score of KAP

S. N.	KAP variables	Mean ± SD PIAT
1	Knowledge	1.99 ± 0.42
2	Attitude	2.02 ± 0.29
3	Practice	1.25 ± 0.25

Discussion

The study covered 48 (51.61%) rural and 45 (48.39%) urban living patients. There were 52 male and 41 female patients. Mean age of patients was 35.27 years. Mean age of rural patients was 36.58 years and mean age of urban patients was 33.88 years. In the study, 62 patients were married and 31 patients were unmarried. Mean weight of patients was 45.370 kilograms. There was rural-urban difference was statistically significant. Chi-square test applied over these values and p-value found significant ($p=0.000816$). In the present study, maximum patients interviewed were 37.63% under the age group of 21-30 years. Patients less the 20 years group were 15.03%. More than 50 years of age group patients were included 16.12%.

In our study, majority of patients i.e. 54 (58.10%) patient were belongs to lower middle class as per Kuppaswamy scale. 28% patients belongs to lower class as per Kuppaswamy scale.

Study showed that average members in the study patient's family were 6.91. In the study, families of patients have average income per capita 2394/- rupees per month. We had seen that 35.48% patients having 20-30% income deficiency due to their diseases while 32.25% patients having more than 50% income deficiency due to their illness. 29.03% patients were lives in the 'Kachcha' houses due to poverty. 68.8% patients were living in overcrowded residence.

It had seen in the study that 52.68% houses of interviewed patients was ill-ventilated. Indoor air pollution was present in 80.64% houses. 67.74% patients were using sanitary latrines today. However, 32.26% patients still practicing the open air defecation. It also seen that 34.40% patients were unvaccinated with BCG vaccine. 30.10% patients having tubercular contact in their families. We have seen in our study that 28.84% male patients were smoker.

We found that most of the patients had low level of knowledge of the major causes of respiratory disorders and medication for management of respiratory disorders. Furthermore, 47.3%

participants had low level of knowledge regarding 'yogic breathing exercises'. 46.2% participants had low level of knowledge regarding preventive measures for respiratory disorders. It was observed that patients had average knowledge about the common symptoms of respiratory diseases (45.2%) and 28% regarding preventive measures for respiratory disorders.

We found that the attitudes scores of the study participants were towards on 'indifferent' side. The difference in the findings among patients may be due to the differences in the literacy of the study patients, the training received by them and availability of information on common respiratory diseases.

We observed in attitude part of the KAP questionnaire of respiratory diseases that 45.2 % had a positive attitude toward adopting preventive measures and 41.9% had good approach to timely visit to doctor for treatment of common respiratory diseases. 63.4% patients had indifferent attitude about the inhalers use in exacerbation of respiratory symptoms. 68.8% patients had indifferent attitude about pulmonary rehabilitation. It also observed in the study that 50.5% patients had negative attitude to timely visit to doctor for treatment of common respiratory diseases. .

We have observed in our study, the practices regarding prevention and management of common respiratory diseases that only 31.18% Patients had good approach to timely visit to doctor for treatment of common respiratory diseases. and had taken first aid remedy when respiratory symptoms appeared (30.1%). Only 21.5% patients taken proper treatment as their physician advised. Practice of Yogic exercises for the relief from respiratory symptoms were very poor (7.52%). Practices of adoption of preventive measures of common respiratory diseases were also poor (19.35%). Practices of using correct modality of drug delivery at the time of acute breathlessness were also poor (24.75%).

In our study, above tables showed the scoring of the marks allotted to the answers given by

patients. More than half of patients had poor level of knowledge, indifferent attitude and poor adherence to treatment.

Hence, Overall KAP was Poor.

Conclusion

This study revealed poor knowledge, indifferent attitude and poor practices among the patients of Pulmonary Impairment after tuberculosis (PIAT). However, we were not assumed that 'low level' before the study. As we seen in our study that PIAT Patients was sufferer from tuberculosis for long time. The 'low level' of knowledge, attitude and practices is due to poverty and poor education level and various myths prevalent in Indian Society. Governments of India, various NGOs of the health sector and the grass root level health workers are carrying Sustained efforts for the up liftment of the education and socio-economic level. There is a big need for awareness program for the patients to improve their knowledge attitude and practices regarding the common respiratory diseases and their management. More efforts can be made to bring awareness among the patients and their relatives regarding the importance of use of inhalers in management of respiratory problems. We conclude that the motivation and counseling about life style modification is required for the patients suffering with PIAT.

Limitations of Study

Moreover, the study enrolled the PIAT patients only from the one hospital and in one department region. Hence, cannot be generalised to all respiratory disease patients / population of India. KAP assessment from the population surveys invariably poses the problem of social desirability, whereby study participants are reluctant to admit socially poorly acceptable KAP's to avoid giving a negative impression. This study is limited by the small sample size and the KAP data is based on a self-reported questionnaire.

Conflict of interest: None declared.

Funding: None

Acknowledgment

The authors would like to acknowledge and thank all the study participants.

References

1. www.thehindu.com › News › States › Andhra Pradesh 01/07/2015
2. WHO Global tuberculosis report 2019
3. World Health Organization. Global Tuberculosis Report 2015.20th edition. Geneva, WHO, 2015.
4. Standards for TB Care in India, Ministry of Health and Family Welfare www.tbcindia.gov.in/showfile.php?lid=306
5. WHO Global tuberculosis report 2017 www.who.int/tb/publications/global_report/en/
6. Pasipanodya et al. BMC Public Health 2010, 10:259
7. Pasipanodya JG, Miller TL, Vecino M, Munguia G, Garmon R, Bae S, Drewyer G, Weis SE: Pulmonary Impairment After Tuberculosis. Chest 2007, 131:1817-1824.
8. Pasipanodya JG, Miller TL, Vecino M, Munguia G, Bae S, Drewyer G, Weis SE: Using the St George's Respiratory Questionnaire to ascertain health quality in persons with treated pulmonary tuberculosis. Chest 2007, 132:1591-1598.
9. Menezes AMB, Hallal PC, Perz-Padilla R, Jardim JRB, Muino A, Lopez MV, Valdivia G, Montes de Oca M, Talamo C, Pertuze J, Victora CG for the Latin American Project for the Investigation of Obstructive Lung Disease (PLATINO) Team: Tuberculosis and airflow obstruction: evidence from the PLATINO study in Latin America. EurRespir J 2007, 30:1180-1185.
10. Singla Neeta, Singla Rupak, Fernandes Sheron, Behera Digamber. Post treatment sequelae of multidrug resistant

- tuberculosis patients. *Indian J Tuberc* 2009;56(4):206–12.
11. Wilcox PA, Ferguson AD. chronic obstructive airways disease following treated pulmonary TB. *Respir Med* 1989;83:195–8.
 12. Hnizdo E, Singh T, Churchyard G. Chronic Pulmonary function impairment by initial and recurrent pulmonary tuberculosis following treatment. *Thorax* 2000;55:32–8
 13. Role Of Pulmonary Rehabilitation In Cases Of Pulmonary Impairment After Tuberculosis. Antriksh Srivastava, Vinisha Chandra, Mohan Bandhu Gupta, Gajendra Vikram Singh, Santosh Kumar. *JIMI*. July 2017;11:39-45
 14. Kapoor SC. Pulmonary hypertension in pulmonary tuberculosis. *Indian J Tuberc* 1950;6:50- 64.
 15. Clinico-physiological profile of patients of pulmonary impairment after tuberculosis at a tertiary care centre. Gajendra Vikram Singh, Antriksh Srivastava, Vinisha Chandra, Santosh Kumar, Rishabh Goel. *IJRMS*. Sep. 2018;6(9)
 16. Long R, Maycher B, Dhar A, Manfreda J, Hershfield E, Anthonisen N. Pulmonary tuberculosis treated with directly observed therapy: serial changes in lung structure and function. *Chest* 1998; 113: 933–943.
 17. Hnizdo E, Singh T, Churchyard G. Chronic pulmonary function impairment caused by initial and recurrent pulmonary tuberculosis following treatment. *Thorax* 2000; 55: 32–38.
 18. Pasipanodya J G, Miller T L, Vecino M, et al. Pulmonary impairment after tuberculosis. *Chest* 2007; 131: 1817–1824.
 19. Menezes A M, Hallal P C, Perez-Padilla R, et al. Tuberculosis and airflow obstruction: evidence from the PLATINO study in Latin America. *Eur Respir J* 2007; 30: 1180–1185.
 20. Maguire G P, Anstey N M, Ardian M, et al. Pulmonary tuberculosis, impaired lung function, disability and quality of life in a high burden setting. *Int J Tuberc Lung Dis* 2009; 13: 1500–1506.
 21. Ross J, Ehrlich R I, Hnizdo E, White N, Churchyard G J. Excess lung function decline in gold miners following pulmonary tuberculosis. *Thorax* 2010; 65: 1010–1015.
 22. Myong J-P, Yoon H-K, Rhee C K, Kim H-R, Koo J-W. Risk factors for lung function impairment among the general nonsmoking Korean population. *Int J Tuberc Lung Dis* 2015; 19: 1019–1026.
 23. Ko Y, Lee Y-M, Lee H-Y, et al. Changes in lung function according to disease extent before and after pulmonary tuberculosis. *Int J Tuberc Lung Dis* 2015; 19: 589–595.
 24. Martin C J, Hallett W Y. The diffuse obstructive pulmonary syndrome in a tuberculosis sanatorium. II. Incidence and symptoms. *Ann Intern Med* 1961; 54: 1156–1164.
 25. Allwood B W, Myer L, Bateman E D. A systematic review of the association between pulmonary tuberculosis and the development of chronic airflow obstruction in adults. *Respiration* 2013; 86: 76-85.