



Comparative Study of Clinical- Bacteriological- Radiological Profile and Treatment Outcome of Smokers and Non Smokers Suffering from Pulmonary Tuberculosis

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Introduction

Tuberculosis is an infectious disease caused by Mycobacterium tuberculosis. According to WHO global TB report 2018, there were an estimated 10.0 million new TB cases worldwide, of which children's 1.0 million, males 5.8 million, females 3.2 million⁽¹⁾. The proportion of people who died from the Tuberculosis was 23% in 2000, decreased to 16% in 2017. There is a 29% fall in the absolute number of TB deaths in HIV-negative people from 1.8 million to 1.3 million from 2000 to 2017, and by 5% since 2015. Since 2000 there is a 44% fall in TB deaths among HIV-positive people, from 534 000 to 300 000 from 2000 to 2017 respectively and by 20% since 2015⁽¹⁾.

India, with a population of 1.26 billion, has the highest number of both smokers and TB patients. The convergence of these two important health hazards is likely severely affecting India's TB control programs. Hence, this study was done to determine the prevalence of smoking in newly diagnosed pulmonary tuberculosis patients and the

impact of smoking on disease outcomes in a tertiary care hospital

Aims and Objectives

This study was done to affirm the strength of an association between smoking and Pulmonary Tuberculosis in patients attending GHCCD from September 2017 to March 2019.

1. To know the strength of association between smoking and Tuberculosis.
2. To see the consequences of smoking on the treatment outcome of this disease.

Materials and Methods

Study Design: Hospital based prospective study from September 2017 to March 2019.

Study Setting: Government hospital for chest and communicable diseases, Visakhapatnam, Andhra Pradesh.

Sample Size: A total of 60 sputum positive patients enrolled in the study based on the inclusion, exclusion criteria and all the patients were given CAT1 ATT under RNTCP.

Inclusion Criteria

- Patients are willing to participate in the study.
- Adults >18 years of age with symptoms suggestive of tuberculosis. (Cough>2 weeks plus one other symptom such as night sweats, fever, unintentional weight loss).

Exclusion Criteria

- Presumptive Extra Pulmonary Tuberculosis.
- Multi-drug resistant Tuberculosis.
- Pregnant females.
- Patients who cannot produce adequate sputum sample.
- Patients are not willing to participate in the study.
- HIV/AIDS patients.

Procedure

The study was conducted among 60 successive patients aged 18 years or more who were registered cases of pulmonary TB under the Revised National TB Control Programme (RNTCP) from September 2017 to March 2019. All patients had two consecutive sputum smears examined for the presence of acid-fast bacilli (AFB) using Auramine-Rhodamine technique at the initiation of treatment and repeated as per recommendations of the RNTCP⁽⁶⁾. All patients were given CAT 1 ATT under RNTCP. Among TB patients; smokers and nonsmokers was separately evaluated. Sputum AFB smear grading was done as per WHO guidelines⁽⁶⁾. The radiological severity of the disease was assessed based on the guidelines of national TB Association of USA at presentation and end of the treatment⁽⁴⁾. Treatment outcomes were recorded as per RNTCP guidelines⁽⁶⁾. At the time of enrolment of study, all the patients will be subjected to the following investigations (sputum microscopy and chest X-ray).

Results

- 1) The study was conducted in 60 successive patients aged >18 years, who were registered cases of pulmonary Tuberculosis under

RNTCP. For all the patients CAT 1 ATT given.

- 2) Most commonly, male patients were involved (73%) followed by females (27%). Among males, most commonly involved age group was 51-65 group and among females, common group was 18-30.
- 3) Most patients presented with bacillary load 2+ (40%) followed by 1+ (26.6%) and 3+ (26.6%). Out of 60 patients, smokers were 65%, non-smokers were 35%. Most of the males were smokers (36) followed by females. Most of the patients had smoking index 100-299(46.15%) followed by <100 (30.76%) and >300(23.07).
- 4) Smoking index 100-299 was mostly seen in fifth decade of life and >300 was seen in sixth decade of life and <100 seen in sixth decade of life.
- 5) Smoking index 100-299 was most commonly seen among males and among females <100, smoking index was seen.
- 6) Bacillary load 3+ was most commonly seen with smoking index >300 followed by <100 and 100-299.
- 7) Among smokers, moderately advanced lesions most commonly seen (51.2%) followed by far advanced lesions (28.2%).
- 8) Far advanced lesions were most commonly seen with smoking index >300 followed by 100-299 and <100. Cavities were most commonly seen in smokers (75%) followed by non-smokers (25%). Sputum conversion rate was mostly seen in non-smokers (100%) followed by smokers (90%).
- 9) Sputum conversion rate was most commonly seen with smoking index <100(91.6%) followed by 100-299(94.4%) and >300 (88.8%).
- 10) Clearance of infiltrates, most commonly seen in smokers (95.2%) followed by non-smokers (89.7%).
- 11) Clearance of cavities most commonly seen in non-smokers (83.3%) followed by smokers (77.7%).

12) Success rate of treatment was most commonly seen in non-smokers (95.2%) followed by smokers (89.7%). Success rate of treatment was most commonly seen with smoking index of <100(100%), followed by 100-299 (88.8%) and >300(77.7%).

13) Lost to follow up rate was most commonly seen among smokers (10.2%) followed by non-smokers (4.7%).

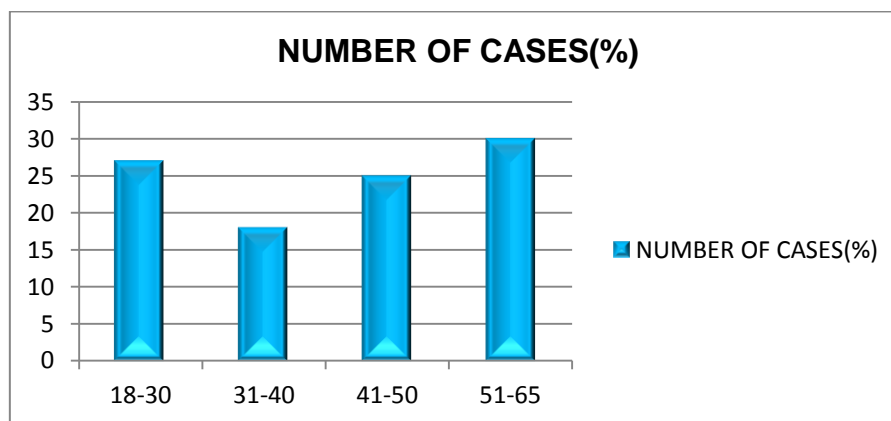
14) Lost to follow up rate was mostly seen with smoking index >300 (22.2%) followed by 100-299(11.1%).

Observations and Results:

Age-Wise Distribution of Patients

AGE(YEARS)	NUMBER OF CASES	PERCENTAGE(%)
18-30	16	27
31-40	11	18
41-50	15	25
51-65	18	30
TOTAL	60	100

Age Wise Distribution of Cases



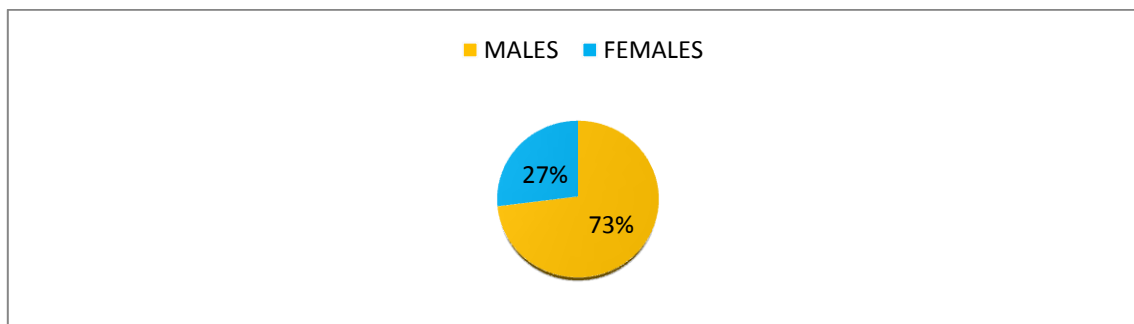
The highest numbers were recorded in 3rd, 5th and 6th decade of life. The maximum incidence of 18 (30%) cases belongs to 6th decade of life, followed

by 16 cases (27%) among 3rd decade and 15 cases (25%) among 5th decade of life.

Sex Distribution

SEX	NUMBER	PERCENTAGE
MALES	44	73
FEMALES	16	27
TOTAL	60	100

Sex Distribution



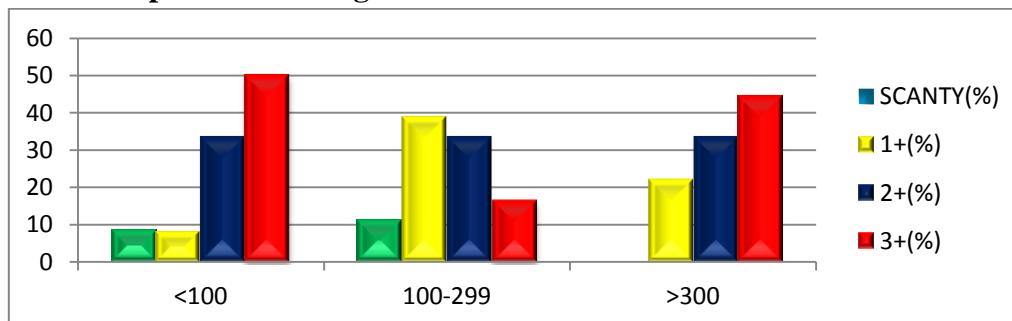
The study group consists of 60 patients, out of which 44(73%) were males, and 16(27%) were

females. There was male preponderance over females.

Bacillary Load with Respect to Smoking Index at Presentation

SMOKING INDEX	SCANTY(%)	1+(%)	2+(%)	3+(%)
<100	8.3	8.3	33.3	50.0
100-299	11.1	38.8	33.3	16.6
>300	0	22.2	33.3	44.4

Bacillary Load with Respect to Smoking Index at Presentation



Bacillary load 3+ was seen most commonly with smoking index <100(50%) followed by >300(44.4%) (Table:13, Graph:13).

Radiological Severity in Smokers and Non Smokers at Presentation

CHEST X RAY FINDING	SMOKERS	NON SMOKERS
MINIMAL	8(20.5%)	16(76.1%)
MODERATLY ADVANCED	20(51.2%)	3(14.2%)
FAR ADVANCED	11(28.2%)	2(9.5%)
TOTAL	39	21

P value<0.0001

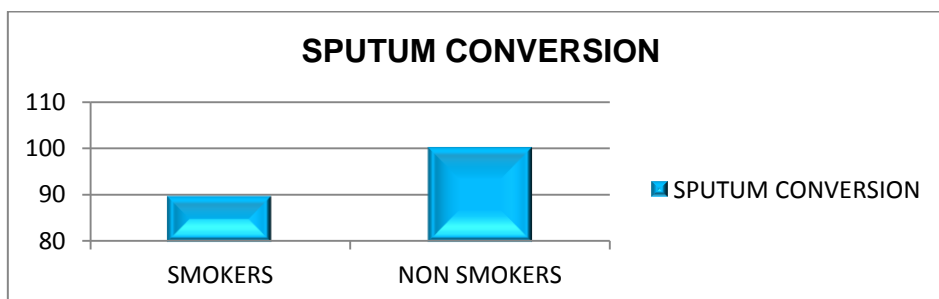
Out of the 39 smokers, most common lesion s were moderately advanced (51.2%) followed by far advanced (28.2%) (p value<0.0001).

Sputum Conversion at the end of Intensive Phase

	SPUTUM CONVERSION TO NEGATIVE	PERCENTAGE(%)
SMOKRS	35/39	90
NON SMOKERS	21/21	100

P Value=0.0008.

Sputum Conversion at the end of Intensive Phase

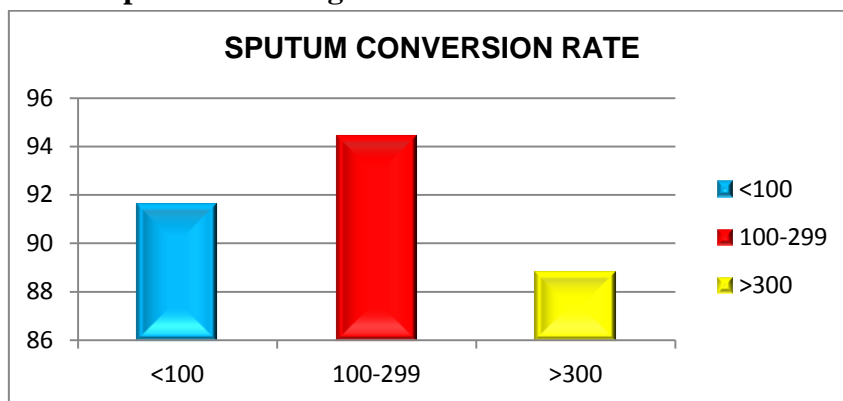


Sputum conversion in smokers is 90% and in non-smokers 100% (p value=0.0008)

Sputum Conversion With Respect To Smoking Index At The End Of Intensive Phase

SMOKING INDEX	SPUTUM CONVERSION TO NEGATIVE	PERCENTAGE(%)
<100	11/12	91.6
100-300	17/18	94.4
>300	8/9	88.8

Sputum Conversion with respect to Smoking Index at the end of Intensive Phase

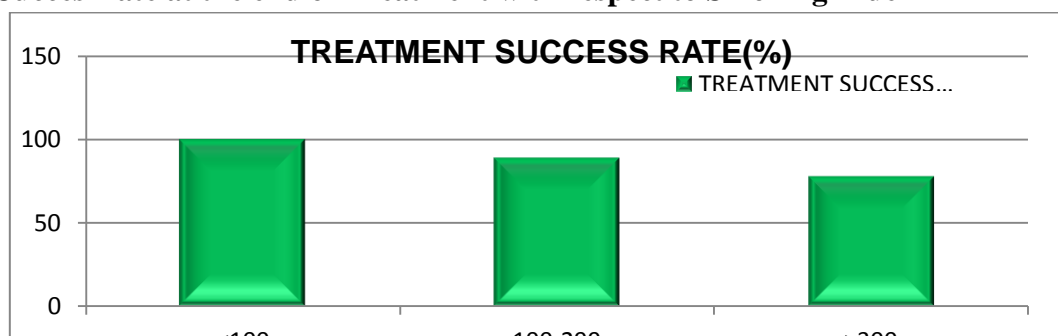


Sputum conversion was most commonly seen in smoking index 100-299(94.4%) followed by <100(91.6%).

Treatment Success Rate at the end of Treatment with respect to Smoking Index

SMOKING INDEX	TREATMENT SUCCES RATE	PERCENTAGE(%)
<100	12/12	100
100-299	16/18	88.8
>300	7/8	77.7

Treatment Success Rate at the end of Treatment with respect to Smoking Index



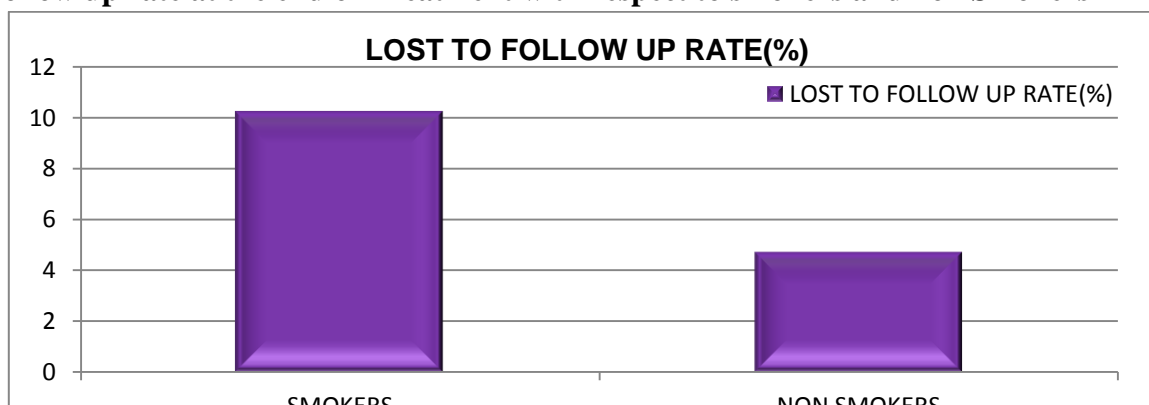
Treatment success rate was mostly seen with smoking index 100-299(88.8%) followed by >300(77.7%).

Lost to follow up rate at the end of Treatment with Respect to Smokers and non Smokers:

	LOST TO FOLLOW-UP RATE	PERCENTAGE(%)
SMOKERS	4/39	10.2
NON SMOKERS	1/21	4.7

P Value=0.164

Lost to follow up rate at the end of Treatment with respect to smokers and non Smokers

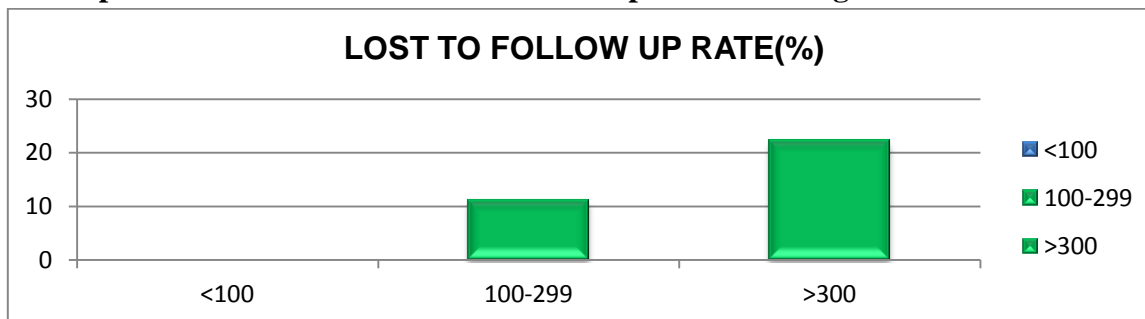


Lost to follow up rate in smokers was 10.2% followed by non-smokers 4.7% (p value=0.164).

Lost to follow up rate at the end of Treatment with respect to Smoking Index

SMOKING INDEX	LOST TO FOLLOW-UP RATE	PERCENTAGE(%)
<100	0	0
100-299	2/18	11.1
>300	2/9	22.2

Lost to follow up rate at the end of Treatment with respect to Smoking Index



Lost to follow up rate was mostly seen with smoking index >300 (22.2%) followed by 100-299 (11.1%).

Discussion

The present study was conducted among the patients attending to the Department of Pulmonary Medicine, Andhra medical college, Government hospital for chest and communicable diseases, Visakhapatnam. The study was conducted from September 2017 to March 2019, among 60 successive patients who were registered cases of pulmonary TB under the Revised National TB Control Programme (RNTCP) aged more than 18 years. TB prevalence in Indian epidemiological data shows that the age prevalence is between 15-50 years⁽⁷⁾.

1. A study by Deepti Rathee et al titled “Comparative study of clinical- bacteriological radiological profile and treatment outcome of smokers and non-smokers suffering from pulmonary tuberculosis.” As smoking index increased from <100 to 100–299 and >300, sputum smear grading of 3+ increased from 12.5% to 68.18% and 66.66 % (P< 0.05). In smokers, moderate disease was seen in 52.4%, an advanced disease in 26.2% and minimal disease in 21.4% (P < 0.01) and among non-smokers, advanced disease in 4.2% and minimal disease in 79.2%. Treatment success rate, compared to non-smokers and former smokers (93.8% and 90.9%, respectively, P = 0.001), smokers had significantly lower treatment success rate (69%) due to a higher default rate among smokers (28.5%)

than non-smokers (6.3%) and former smokers (9.1%)⁽⁸⁾.

2. A study by Agarwal A, Agrawal VK titled “Impact of Tobacco Smoke on Tuberculosis:

A “Case Control Study”: A total of 120 subjects were enrolled in which 65 cases and 55 were controls. Total new cases during the period of study were 687, of which smokers were 275, out of which 65(23.63%) were tubercular (Pulmonary& Extra-pulmonary), sputum positive 52(80%) and sputum negative 13 (20%) extra-pulmonary and among smokers, there is a high prevalence of Pulmonary tuberculosis which is statistically significant (<0.001). Among the cases in the study group, 95.38% were males and statistically significant, in control group, 34.28% were males, predominantly middle age group affected (mean age/sd 46.42+/-12.08) and in control group, predominantly early age affected (mean age/sd 36+/-12.2).In the study group, light smokers were 65.69% more affected than heavy smokers 24.61%, but among heavy smokers group, sputum positivity was high. 57.9% of smokers had 3+ sputum and in control, 24% had (P<0.01). Among smokers, the symptomatic study showed that 93.9% had cough, dyspnoea in 93.9% of the patients with tuberculosis (p<0.001) and fever, chest pain, anorexia also more prominent but they were not statistically significant. Radiologically among cases, fibrosis in 98.07% and cavitary lesions in 98.07% appear significantly high (p<0.02)

and compared to controls (45.71%), history of repeated anti tubercular therapy was also high in cases (64.61%) ($p < 0.05$). Hence among smokers, re-infection as well as relapse, is high⁽⁹⁾.

3. A Study by Altet- Gomez *et al* titled “Clinical and epidemiological aspects of smoking and tuberculosis: a study of 13038 cases”: Males accounted for 67.6% of the subjects (8818/13038), and 44.5% (5804/13038) were aged between 25 and 44 years. The percentage of smokers was 35% (95%CI 34.1–35.8). Among smokers males were 42.1% and females were 20.0%. The TB +smoking group had a higher proportion of men ($P < 0.001$) and subjects under 65 years of age ($P < 0.001$). Cavitory lesions in 34.1% of smokers compared with 19.2% of non-smokers, and positive smear in 56.2% of smokers compared with 39.3% of non-smokers. Among the 8903 patients with PTB, cavitory lesions on X-ray were seen in 3185 (35.8%); of these, smokers 1555 (48.8%) and non-smokers were 1630 (51.2%). The estimated OR for cavitory PTB among the smokers was 2.2 (95%CI 2.0–2.4; $P < 0.001$). In an addition, 5892 (66.2%) had sputum smears with AFB that were clearly evident on direct examination. Of these, smokers were 2559 (43.4%) and non-smokers were 3333 (56.5%). The estimated OR for smear positive PTB in the smokers was 2.0 (95%CI 1.8–2.3; $P < 0.001$)⁽¹⁰⁾.

Conclusion

Smoking is an independent risk factor for poor treatment outcome of Tuberculosis. Smoking cessation programme need to be targated at tuberculosis patients – both by national tuberculosis control programmes and clinicians specializing in tuberculosis. The effectiveness of such programmes in improving the tuberculosis treatment outcomes and in reducing smoking among tuberculosis patients also needs to be assessed. Interventions against Tuberculosis can increase public awareness of the dangers of smoking, action against smoking will reduce the impact of Tuberculosis in the community. Public awareness needs to be encouraged to counter the continued attrition of

smoking and TB. The association between smoking and Tuberculosis appears evident, smoking should be considered as an important risk factor for development of Pulmonary Tuberculosis and its complications.

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