



EFFECTS OF ALCOHOL AND TOBACCO ON TREATMENT OUTCOMES OF THE NEWLY DIAGNOSED TUBERCULOSIS CASES IN KAMRUP (M) DISTRICT ASSAM: A LONGITUDINAL STUDY.

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ABSTRACT **Background:** Tuberculosis (TB) is a communicable disease that is a major cause of ill health and one of the leading causes of death worldwide. **Objectives:** To determine the effects of alcohol and tobacco on treatment outcomes of newly diagnosed tuberculosis patients. **Methodology:** Hospital based longitudinal study carried out among the newly diagnosed tuberculosis patients treated with anti-tubercular drugs in different Tuberculosis Units of Kamrup (M), Assam. During the initial 3 months of the study period, participants were enrolled. They were then followed up and their treatment outcomes were noted at the end of 6 months from the TB register in, only for those patients with complete information. **Results:** Tuberculosis was found to be more prevalent among the productive age group. Un-successful outcome was more among the elderly. Alcohol and smoking found to be significantly associated ($p < 0.05$). Un-successful outcome was more among alcohol users and tobacco users. **Conclusion:** As the disease found to be more among the productive age group, proper awareness should be done. Also active implementation of cessation activities for the TB patients should be done, where they should also be made to understand about harmful effects of alcohol and tobacco.

KEYWORDS : Tuberculosis outcomes, alcohol, smoking

Introduction:

Tuberculosis is one of the dreaded endemic diseases globally. It is one of the major causes of morbidity and mortality. Millions of new cases are discovered each year. Despite all the attempts to control it, tuberculosis still continues to be a serious global public health issue¹. Tuberculosis (TB) is a communicable disease that is a major cause of ill health and one of the leading causes of death worldwide. Disease is spread when people who are sick with TB expel bacteria into the air (e.g. by coughing, sneezing). The disease typically affects the lungs but can affect other sites. Most people (about 90%) who develop the disease are adults, with more cases among men than women. About a quarter of the world's population is infected with Mycobacterium tuberculosis.²

Alcohol use has been identified as a major risk factor for both developing TB disease and having worse outcomes^{3,4}. Those who consume alcohol may have worse TB treatment outcomes due to behavioral mechanisms, including worse medication adherence and greater loss to follow-up (LTFU)^{5,6} or biologic mechanisms, including the impact of alcohol on innate and adaptive immune responses, lung function and barrier protection,⁷ hepatotoxicity,⁸ and TB and human immunodeficiency virus (HIV) drug absorption and metabolism.^{9,10} Compared to non-smokers, smokers have a two-fold increased risk of contracting TB, developing active TB illnesses, experiencing recurrent TB, and TB deaths. It also increases the risk of latent TB infection, treatment delays, treatment lost to follow up, poor outcomes, and disease transmission. Smoking cessation is an effective way to reduce treatment failure and drug resistance. In the North-eastern region apart from tobacco smoking a large section of people are also habituated to smokeless tobacco products, making them more vulnerable to tuberculosis, hence affecting the tuberculosis outcomes.¹¹

Very limited studies have been done in this part of Assam, so a study to determine the effects of alcohol and tobacco on treatment outcomes of newly diagnosed tuberculosis patients has been carried out.

Objective: To determine the effects of alcohol and tobacco on treatment outcomes of the newly diagnosed tuberculosis cases in Kamrup (M) district Assam

Materials and Methods:

Study Design: Hospital based longitudinal study

Study Period: The study was carried from August 2021 to July 2022.

Study Population: All newly diagnosed tuberculosis patients treated

with anti-tubercular drugs in different Tuberculosis Units of Kamrup (M), Assam.

Inclusion criteria: All the newly diagnosed tuberculosis patients who were ≥ 18 years of age and willing to take treatment in Kamrup metro and participate in the study.

Exclusion criteria: Newly diagnosed patients who were < 18 years, those ≥ 18 years but not willing to participate, and pregnant ladies. Those with incomplete information on treatment outcomes in TB register.

Sample size and technique: All the newly diagnosed patients in Kamrup (M) who are on treatment for tuberculosis during the initial 3 months of our study period were enrolled in the study. During these 3 months, 652 patients were diagnosed in Kamrup (M). Out of 652 patients, 564 patients were newly diagnosed. From these 564 patients, 47 patients were < 18 years, 18 patients did not give consent to participate in the study, and 7 were pregnant ladies. Total 492 patients were followed up for 6 months (treatment duration for newly diagnosed patients) and at the end of the treatment period, those patients with notified outcome in TB register, formed the necessary sample size. At the end of 6 months, 87 patients (transfer out, treatment outcome not mentioned) were excluded. Thus, after following the inclusion and exclusion criteria, and leaving out the transfer out cases, a sample size of 405 participants was set. Informed consent was taken from study participants. Structured schedule was used for the interview which was pretested. All the newly diagnosed patients who fulfilled the inclusion and exclusion criteria were interviewed. Information regarding socio-demographic status and personal habits was obtained which were further verified with TB register. Treatment outcome status was noted at the end from the TB register in District Tuberculosis Hospital, only for those patients with complete information.

OPERATIONAL DEFINITIONS:

Treatment Successful: Includes both cured and treatment completed cases.

Treatment Un-successful: Includes treatment failure, those lost to follow up and those who died during the treatment regimen.

Alcohol user: Patients were considered as alcohol user if they were consuming alcohol while on treatment or during the past one year. Patients who did not fulfil the above mentioned criteria were termed as alcohol non users.

Tobacco user: Patients were considered as tobacco user if they were consuming tobacco products (cigarette, beedi, smokeless tobacco) while on treatment or during the past one year. Patients who did not fulfil the above mentioned criteria were termed as tobacco non users.

Ethical Clearance: Obtained from Institution Ethics Committee.

Data Analysis: Data was collected and compiled in Microsoft Office Excel and analyzed by using Instat Graph Pad.

Results:

Table 1: Distribution of participants according to socio-demographic status

VARIABLES	FREQUENCY (405)	PERCENTAGE (100)
AGE		
≤20	23	5.7
21-30	101	24.9
31-40	117	28.9
41-50	65	16.1
51-60	60	14.8
>60	39	9.6
GENDER		
MALE	265	65.4
FEMALE	140	34.6
EDUCATIONAL STATUS		
ILLITERATE	56	13.8
PRIMARY SCHOOL	67	16.5
MIDDLE SCHOOL	74	18.3
HIGH SCHOOL	53	13.1
HIGHER SECONDARY	94	23.2
GRADUATE AND ABOVE	61	15.1
OCCUPATION		
UN-EMPLOYED	77	19
UN-SKILLED	88	21.7
SEMI-SKILLED	117	28.9
SKILLED	97	24
PROFESSIONAL	26	6.4

TABLE 2: Distribution of participants according to alcohol and tobacco use

USER	FREQUENCY (405)	PERCENTAGE (100)
ALCOHOL		
YES	228	56.3
NO	177	43.7
TOBACCO		
YES	281	69.4
NO	124	30.6

TABLE 3: Distribution of participants according to treatment outcomes

TREATMENT OUTCOMES	N=405	
	FREQUENCY	PERCENTAGE
SUCCESSFUL OUTCOMES	348	85.9
UN-SUCCESSFUL OUTCOMES	57	14.1
TOTAL	405	100

TABLE 4: Relationship of age of participants with treatment outcomes

AGE	OUTCOMES		TOTAL N=405	STATISTICAL TEST
	SUCCESSFUL	UN-SUCCESSFUL		
≤20	22(95.7)	01(4.3)	23(100)	$\chi^2=7.739$ df=1 p<0.05
21-30	90(89.1)	11(10.9)	101(100)	
31-40	103(88)	14(12)	117(100)	
41-50	54(83.1)	11(16.9)	65(100)	
51-60	51(85)	09(15)	60(100)	

>60	28(71.8)	11(28.2)	39(100)
TOTAL	348(85.9)	57(14.1)	405(100)

TABLE 5: Relationship of gender of participants with treatment outcomes

GENDER	OUTCOMES		TOTAL N=405	STATISTICAL TEST
	SUCCESSFUL	UN-SUCCESSFUL		
MALE	225(84.9)	40(15.1)	265(100)	$\chi^2=0.4384$ df=1 p>0.05
FEMALE	123(87.9)	17(12.1)	140(100)	
TOTAL	348(85.9)	57(14.1)	405(100)	

TABLE 6: Relationship of occupation of participants with treatment outcomes

OCCUPATION	OUTCOMES		TOTAL N=405	STATISTICAL TEST
	SUCCESSFUL	UN-SUCCESSFUL		
UNEMPLOYED	68(88.3)	09(11.7)	77(100)	$\chi^2=0.7219$ df=1 p>0.05
UNSKILLED	79(89.8)	09(10.2)	88(100)	
SEMI-SKILLED	92(78.6)	25(21.4)	117(100)	
SKILLED	90(92.8)	07(7.2)	97(100)	
PROFESSIONAL	19(73.1)	07(26.9)	26(100)	
TOTAL	348(85.9)	57(14.1)	405(100)	

TABLE 7: Relationship of educational status of participants with treatment outcomes

EDUCATIONAL STATUS	OUTCOMES		TOTAL N=405	STATISTICAL TEST
	SUCCESSFUL	UN-SUCCESSFUL		
ILLITERATE	48(85.7)	08(14.3)	56(100)	$\chi^2=3.855$ df=5 p>0.05
PRIMARY SCHOOL	56(83.6)	11(16.4)	67(100)	
MIDDLE SCHOOL	66(89.2)	08(10.8)	74(100)	
HIGH SCHOOL	42(79.2)	11(20.8)	53(100)	
HIGHER SECONDARY	84(89.4)	10(10.6)	94(100)	
GRADUATE AND ABOVE	52(85.2)	09(14.8)	61(100)	
TOTAL	348(85.9)	57(14.1)	405(100)	

TABLE 8: Relationship of tobacco use with tuberculosis outcomes

ALCOHOL USERS	OUTCOMES		TOTAL N=405	STATISTICAL TEST
	SUCCESSFUL	UN-SUCCESSFUL		
YES	183(80.3)	45(19.7)	228(100)	$\chi^2=12.783$ df=1 p<0.05
NO	165(93.2)	12(6.8)	177(100)	
TOTAL	348(85.9)	57(14.1)	405(100)	

TABLE 9: Relationship of tobacco use with tuberculosis outcomes

TOBACCO USERS	OUTCOMES		TOTAL N=405	STATISTICAL TEST
	SUCCESSFUL	UN-SUCCESSFUL		
YES	230(82%)	51(18%)	281(100)	$\chi^2=11.528$ df=1 p<0.05
NO	118(95.2%)	06(4.8%)	124(100)	
TOTAL	348(85.9%)	57(14.1%)	405(100)	

*Figures in brackets indicate row-wise percentage

Table 1 shows distribution of participants according to their age. Majority of the study participants (28.9%) were in the age group of 31-40 years followed by 21-30 years (24.9%). Out of 405 study participants, 65.4% were male and 34.6% were female. Among the study participants, 23.2% studied up to higher secondary, 18.3% up to middle school, 16.5% up to primary school and 13.8% were illiterate. Majority of participants were semi-skilled workers followed by unskilled workers. **Table 2** shows distribution of study participants,

56.3% ever used alcohol and remaining 43.7% did not take alcohol. Also 69.4% were tobacco users (smoke and smoke-less form) and 30.6% did not take any form of tobacco. Table 3 shows that successful outcome was seen among 85.9% of total study participants, whereas un-successful outcome was seen among 14.1% study participants. Table 4 shows relationship of age of participants with tuberculosis outcomes. 95.7% of study participants whose age is ≤ 20 years had successful outcomes, which was highest when compared with other age groups. Elderly (>60 years) had lowest successful outcome (71.8%). This association was found to be significant.

Table 5 shows relationship of gender of participants with tuberculosis outcomes. Table 6 shows relationship of occupation of study participants with tuberculosis outcomes. Table 7 shows relationship of educational status of study participants with tuberculosis outcomes. Statistically no significant association was found with gender, occupation and educational status.

Table 8 shows relationship of tuberculosis outcomes of participants with their alcohol consumption. Among alcohol users, successful outcome was found to be 80.3% which was low when compared to non-alcohol users (93.2%). Table 9 shows relationship of tuberculosis outcomes of study participants with their tobacco usage. Among the study participants, successful outcome was found in 82% tobacco users. This percentage was found to be 95.2% among those who did not take tobacco. Statistically significant association was found with alcohol and tobacco usage/

Discussion:

The present longitudinal study was carried out among the newly diagnosed tuberculosis patients in Kamrup (M) district, Assam to study the effect of alcohol and tobacco on treatment outcomes. In our study, patients were mainly in the productive age group which was consistent with other studies^{12,13}. Majority of study participants were male which was also consistent with other studies^{14,15,16}. In our study, 13.8% of study participants were illiterate, which was in contrast with a study conducted by Nagpal M, Devgun P where illiteracy was found to be 32%¹⁷. Among the study participants 28.9% were semi-skilled workers followed by un-skilled workers (21.7%) and skilled workers (24%). Kumar, Ashwini et.al conducted a study in Udipi Taluk, Karnataka, where similar findings were found in that study, where un-skilled workers (48.5%) and semi-skilled workers (12.4%) were mainly affected.¹⁸ Significant association was found between age of study participants and tuberculosis outcomes. Ananthkrishnan R et.al conducted a study in South India which showed that TB treatment outcomes were poor among older TB patients.¹⁹ Sengul A et.al conducted a study and found that the odds ratio for unsuccessful outcome was 2.5-fold higher in patients 55 years of age and older, and 5-fold higher in patients 65 years of age and older.²⁰ In our study, alcohol and tobacco was found to be significantly associated with treatment outcomes. Washington R et.al conducted a cohort study in South-India and found that alcohol use had significantly higher odds of death and un-favourable outcomes.²¹ Baruah R et.al in their study in Dibrugarh also found that the odds of having unsuccessful treatment outcome was higher among those who had alcohol consumption as a risk factor.²² de Vargas KR et.al conducted a prospective cohort study in Brazil in 2021 and found that active smokers had less chance for cure and more abandonment than non-active smokers.²³ Sreenivasulu T, Jahnavi K conducted a cross-sectional study and found that non cure rate was high among smokers i.e. 40% compared to only 11.5% among those who never smoked. This difference was found to be statistically significant.²⁴

Limitation:

As the present study was a single centered hospital based study, and due to COVID-19 pandemic, all the patients attending the different TU's could not be interviewed at the same time. Few patients were contacted over telephone. Bearing this in mind, the results of the present study are to be viewed within the perspective of the said limitation.

Conclusion:

Considering relatively higher proportion of cases in the productive age group, proper awareness should be done among the people. Modifiable risk factors like alcohol consumption and tobacco use were significantly associated with tuberculosis outcomes. Active implementation of cessation activities for the TB patients should be done, where they should also be made to understand about harmful effects of alcohol and tobacco.

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Conflict of Interest: Nil

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