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Original Research Article

Effect of tobacco cessation on adults with pulmonary tuberculosis: a hospital based interventional study in Ahmedabad

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ABSTRACT

Background: An association between smoking and poor tuberculosis (TB) treatment outcomes has been globally established. Various smoking cessation interventions have been proven worldwide to decrease smoking behavior. There is a need for evidence to assess if the interventions increase the chance of successful treatment outcome among TB patients. The objective of this study was to determine the effect of tobacco cessation intervention on cessation and treatment outcome of TB patients.
Methods: An interventional study was done on smear positive pulmonary tuberculosis patients enrolled in second quarter (April-June) and third quarter (July-September) of 2019 at DMTC, civil hospital, Asarwa, Ahmedabad. After obtaining basic socio demographic data by interview, the patients were inquired about their consumption of tobacco and those consuming tobacco were randomly divided in two groups. The health education was given to only intervention group and both groups were followed up to completion of their treatment period and outcome was noted. Data was entered into a Microsoft Excel spread sheet and analyzed.
Results: Tobacco consumption among TB patients was seen in 67 (25.37%) patients. At the end of the treatment, 13 (39.4%) patients in the intervention arm had quit tobacco as against 8 (23.5%) in the control arm. Treatment outcome in terms of cure rate was more in the intervention arm (51.5%) as compared to the control arm (26.5%) and the difference was found to be significant.
Conclusions: The role of brief cessation advice as a measure of intervention was found to be effective in cessation of tobacco consumption.

Keywords: Intervention, Tobacco cessation, Tuberculosis

INTRODUCTION

Tuberculosis (TB) is a communicable disease which is a major cause of ill health, one of the top 10 causes of deaths worldwide and a leading cause of death from a single infectious agent (ranking above HIV/AIDS).[1] India has the largest number of TB cases in the world with an incidence rate of 217/100,000 per year for 2015. TB mainly affects people in their most productive years of life with around 70% patients falling within the age group of 15-54 years.[2]

India is the third largest producer and second largest consumer of tobacco in the world.According to Global Adult Tobacco Survey (GATS) 16-17, 42.4% of men, 14.2% of women and 28.6% (266.8 million) of all adults currently use tobacco (smoked and/or smokeless tobacco).[3] Among those who die prematurely, almost one

in every 28 deaths in the age group 30-44 years and one in 12 in the age group 45-59 years are attributable to tobacco consumption.[4]

Exposure to tobacco (both active and passive) smoke is associated with TB infection, disease and mortality. Various studies have concluded that smoking is associated with high prevalence of TB.[5,6] As an established risk factor of TB, tobacco smoking has increased over the past three decades, especially in developing countries.[7] It is also found that tobacco consumption in the form of smoking is attributed to 16.7% of unsuccessful outcomes.[8] Some evidences strongly suggest that those smokers who quit decreases both the risk of becoming infected with TB and the risk of dying from the disease.[9,10] Therefore, early identification of smoking behaviour and cessation are important for improving TB treatment and reducing the transmission. Moreover, introduction of tobacco cessation services is mostly feasible and results in quit rates of smoking up to 77%, which is considered to be associated with some improvements in quality of life and better TB treatment outcomes.[11]

Patients with TB who are tobacco users and wish to stop its use, need and should receive counselling and assistance in stopping tobacco use. With this background, the study was done to determine the effect of tobacco cessation on outcome of TB patients.

The objective of the study was to determine the effect of tobacco cessation intervention on cessation and treatment outcome of TB patients.

METHODS

The study was conducted on smear positive pulmonary Tuberculosis patients enrolled in second quarter (April-June) and third quarter (July-September) of 2019 at Designated Microscopy and Treatment Center (DMTC), civil hospital, Asarwa, Ahmedabad. Total 340 TB patients were registered during the time period.

All those study participants who gave verbal consent were interviewed by personal visit to their DOTS providing centre and they were asked regarding socio-demographic profile, type of TB, treatment, use of tobacco in detail etc. using a semi-structured questionnaire. After obtaining basic socio demographic data, the patients were inquired about their consumption of tobacco (both smoking and smokeless) and duration of consumption. Patients who gave the history of tobacco consumption (n=67) were randomly divided in two groups. Randomization was done by lottery method. The health education was given to intervention group of the tobacco users by giving brief advice regarding harmful effect of tobacco on health with charts and pictures and by using 5 A's approach (ask, advise, assess, assist, arrange follow up). The information flyer of National Tobacco Quitline Flyer was also used for counselling about benefits of quitting. Further follow up was done to collect the information about their consumption of tobacco and cessation. All of them were followed up to completion of their treatment period and outcome of their treatment was taken into consideration. Outcome of treatment was considered as per RNTCP Guideline. Data regarding outcome was also cross checked with the NIKSHAY website. On few of the patients, follow up regarding outcome could not be done even on telephone because of their non-availability due to COVID-19 pandemic. But their baseline characteristics could be evaluated.

The participants, the investigator who delivered the intervention and the outcome assessor were not blind to the allocation status. Since the data collection, delivery of intervention, and the measurement of outcome was done by single investigator, the potential for investigator bias has been minimized.

The data was entered and analyzed using Microsoft Excel. Both descriptive statistics (mean and percentages) and inferential statistics (chi-square test, z-test, and t-test) were employed for data analysis and comparison. To carry out the study, prior ethical permission was taken from the institutional ethics committee, B. J. Medical College and Civil Hospital, Ahmedabad and City TB office, AMC.

Definitions, terms and scales used in this study

Smoking behaviour

Tobacco quit status of the tobacco users can be said to be achieved when a person has abstained and not used any tobacco products in the last 12 weeks, 6 months and 1 year. Since the treatment of DOTS spans over 6 months, the milestone for tobacco quitting under TB programme can be 12 weeks.[12] Smoking cessation was recorded as positive if patient had not smoked at all in the last 12 weeks and negative if patient smoked in the last 12 weeks and did not attempt to quit smoking since their last sputum examination visit (quit attempt was defined patient who tried to quit and succeeded for at least 24 hours).

Tobacco users

Current daily smokers were defined as those who were currently smoking cigarettes, bidis or hookah daily. Current daily smokeless tobacco users were defined as those who were currently using chewable tobacco products, gutka, naswar, khaini or zardapaan daily.[13,14]

Socio-economic classification

Socioeconomic class was calculated using Modified BG Prasad's Classification for the year 2020, taking the consumer price index as 330 for the month of January, 2020.

Nicotine dependence: Fagerstrom nicotine dependence scale

This is a standard instrument used for assessing the intensity of physical dependence. It consists of six items and has a score range from 0 to 10.

In this study FTND-smoking and FTND-ST were used to assess the dependence of smokers and subjects using smokeless tobacco. For individuals who were using both forms of tobacco, both scales were administered and the highest score was taken as final score.[15,16]

Method of data collection

Total 264 patients were included in the study which were registered from April 2019 to September 2019 (after considering inclusion and exclusion criteria). 197 patients did not consume tobacco; 67 patients were consuming tobacco. The patients were randomly divided into two groups intervention group (n=33) and control group (n=34). Brief advice for cessation was given to the intervention group. Details about quitting tobacco and outcome of TB treatment were taken into consideration for the patients who completed 6 months treatment (except for died and loss to follow up patients).

RESULTS

In the study, out of total patients, three fourth (77.30%) of the patients were males and one fourth (22.30%) were females. The study revealed male predominance with male:female ratio of 3.4:1. Overall mean age was 37.81±14.82 years. Two third (65.53%) of the patients were from the reproductive age group. More than one third (38.5%) of the patients were graduate and above while only 7% were illiterate. Majority (30.70%) of the patients were doing jobs either in private or government companies followed by 21.40% who were doing business. Majority (67%) of the TB patients were married and 27.50% were not married at the time of study. Majority (86.76%) of the patients were from either SE class I or II (Table 1).

Table 1: Distribution of TB patients according to their socio demographic characteristics (n=264).

Variables		Frequency	Percentage
Age group (in years)	<25	57	21.59
	25-44	116	43.94
	45-64	76	28.79
	≥65	15	5.68
Gender	Male	204	77.30
	Female	60	22.70
Education	Illiterate	19	7.00
	Primary and secondary	47	17.50
	Higher secondary and diploma	97	37.00
	Graduate and above	101	38.50
Occupation	Job	81	30.70
	Business	56	21.40
	Unemployed	8	3.20
	Retired	14	5.30
	Agricultural worker/laborer	25	9.50
	Housewife	39	14.70
	Others	41	15.20
Marital status	Married	177	67.00
	Unmarried	72	27.50
	Others (widow/widower/divorced)	15	5.50
Social-Economic class	I	92	34.87
	II	137	51.89
	III	15	5.68
	IV	20	7.56

Tobacco consumption among TB patients was seen in 67 (25.37%) of all 264 patients. Among those who were having tobacco consumption, 62.68% were consuming smokeless form of tobacco consumption and 15% were consuming tobacco in smoking form. Around 22% were consuming both forms of tobacco.

Baseline characteristics such as age, gender did not differ significantly between patients in intervention and comparison arm. Patients in the interventional arm

initiated tobacco consumption at an early age. But mean age of initiation of tobacco did not differ significantly in both arms. However, the mean duration of consumption differed significantly in interventional and comparison arm. In both the groups, there was statistically no significant difference in the consumption of smokeless or smoking form of tobacco and quit attempts. The distribution of nicotine dependence and FTND score were not significantly differed between the two groups (Table 2).

Table 2: Baseline characteristics of participants consuming tobacco in interventional and comparison group (n=67).

Variables	Intervention group (n=33)	Comparison group (n=34)	P value
Mean age (years)	41.63±13.55	42.97±14.97	0.350*
Gender			
Male n (%)	31 (93.93)	32 (94.2)	0.975**
Female n (%)	2 (6.07)	2 (9.38)	
Tobacco consumption habit / history			
Mean age at initiation of tobacco consumption (in years)	16.88±3.60	19.41±5.02	0.071*
Mean duration of consumption (in years)	10.28±6.38	14.21±8.00	0.0128*
Mean no. ofbidis/day among smokers	18.63±8.97	18.23±8.89	0.427*
Mean number Packs of khainis/day among smokeless users	3.07±1.52	3.57±1.79	0.409*
Previous number of attempts to quit	2.00±2.00	2.38±2.16	0.224*
Mean FTND score	2.75±2.21	2.32±2.03	0.199*
Nicotine dependence (%)			
High (7-10)	3 (9.09)	2 (5.88)	0.797**
Medium (4-6)	6 (18.18)	5 (14.71)	
Low (<4)	24 (72.73)	27 (79.41)	

*z-test ** chi square test

Table 3: Comparison of quit rate and outcome at the end of treatment completion among participants of interventional and comparison group.

Variables	Intervention group (n=33)	Comparison group (n=34)	Total	Z test value
Tobacco consumption at the end of the treatment				
Quit	13	8	21	Z value =2.35 ($p<0.05$)
Not quit	16	19	35	
Non traceable	4	7	11	
Total	33	34	67	
Outcome				
Cured	17	9	26	Z value =2.10 ($p<0.05$)
Failure	8	6	14	
Death	5	5	10	
Loss to follow-up	3	14	17	
Total	33	34	67	

At the end of the treatment, 13 (39.4%) patients in the intervention arm had quit tobacco as against 8 (23.5%) in the control arm. And in intervention group, 16 (48.5%) patients had not quit tobacco as compared with 19 (55.8%) in control group. A detail about tobacco consumption at the end of study period in 3 patients (intervention group) and 7 patients (control group) was not available. There is significant difference in the quit attempts between two groups. Treatment outcome was defined as cured (n=26), treatment failed (failure/on treatment/MDR) (n=14), died (n=10), loss to follow up (n=17). Treatment outcome in terms of cure rate was more in the intervention arm (51.5%) as compared to the control arm (26.5%) and the difference was found to be significant (Table 3).

DISCUSSION

The present study was conducted on 264 TB patients of Ahmedabad city registered on one DMTC, Asarwa. Involvement of productive age group in TB can negatively affect the socio-economic condition of the society which is mainly dependent on people of productive age group. A report by WHO also showed that

75% of people with tuberculosis are in the economically productive age group.[17]

In our study, 77.30% participants were male and 22.30% were female. Similar findings were reported by Kaur et al done in Vadodara district, Gujarat which had 69% male and 31% female in the study.[18] The reason for number of males being more could be their more exposure to outer world and more risk due to work or other reasons. The other reason could be their health seeking behaviour.

More study participants in our study were educated up to graduation as compared to only 7% of illiterates. A cohort study done on TB patients by Thomas et al showed that 17% of the participants had not received any formal education.[19] Less illiterate TB patients in our study could be due to high literacy rate (89.62%) in the Ahmedabad city.[20]

GATS survey shows that in India, 28.6% people use tobacco in some form. In Gujarat, the prevalence is 25.1%.[3] We found that 67 (25.37%) of all TB patients were having addiction of any type of tobacco.

At the end of the treatment, 39.4% patients in the intervention arm had quit tobacco as against 23.5% in the control arm. However, a study done in Gujarat by Kaur et al showed that in it, 67.3% patients had quit tobacco from which, 18.2% had relapsed and 14.5% were lost to follow up.[18] Another study by north India by Goel et al showed that, 80% of the patients from the interventional arm and 57.5% from the control arm had quit smoking at the end of the treatment.[21] Increase in rate of quitting in other studies could be due to the fact that in these studies, the intervention was given more than one time as compared to our study. Plus the intervention was given in them by respective DOTS providers to the patients. The DOTS providers personally know the patient and intervention by them can be seen as a concern for them instead of being intrusive which can lead to better understanding between them and they can be easily convinced to quit.

According to India TB Report 2019, in Gujarat, the success rate of TB patients receiving treatment has been found to be 82%.[22] In this current study, success rate in interventional group was higher than in the comparison group. In an interventional study from north India by Goel et al, no difference in the success rate between both arms was found.[21] The difference in cure rate in our study suggests that tobacco cessation can lead to better outcome of TB.

This study was a single-center study, so that the results of it cannot be generalized. Due to change in registered contact numbers of some patients, follow up of few patients was not possible. The confirmation about quitting tobacco was not validated by tests like urine cotinine or carbon monoxide breath analysis. The status about quitting was based on self-statement by the participants.

CONCLUSION

The role of brief cessation advice as a measure of intervention was found to be effective in cessation of tobacco consumption as quit rate was more in the interventional group. The better cure rate in the interventional group suggests that tobacco cessation measures can play an important role in better treatment outcome of TB patients.

To improve the favourable treatment outcome of TB patients, tobacco cessation in terms of brief advice can be incorporated in the ongoing TB programme. It would be feasible as no extra cost or human resources would be required for it. To improve the quit rate of tobacco, reinforcement of the advice for behaviour change can be done. It will be more effective and feasible if the motivation and counselling for cessation is given more than once by their DOTS providers by sensitizing them on importance of tobacco cessation.

As consumption of smokeless tobacco is higher than smoking in Gujarat, further research would be required to document the role of cessation of smokeless tobacco in improving the outcome of TB patients.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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