ABSTRACT

Background: There is an enormous health burden caused by the co-prevalence of tuberculosis (TB) and tobacco use in India. This intervention study was undertaken in district Vadodara, Gujarat, India to promote tobacco cessation by integrating ‘brief advice’ for tobacco cessation in TB patients who were tobacco users and registered for treatment under TB control programme, based on the tested strategies advocated by World Health Organization (WHO) and the International Union against Tuberculosis and Lung Diseases (The Union).

Materials and Methods: Brief advice for tobacco cessation based on five A’s, advocated by the WHO and the UNION was incorporated into the on-going TB Control programme in India in the year 2010. The tools were developed for education, training and capturing data. All the registered TB patients receiving directly observed treatment short-course (DOTS) who used tobacco in any form were offered brief advice during routine interaction for treatment.

Results: A total of 46.3% of TB patients, predominantly males (89.6% males and 10.3% females) were current users of tobacco; 39.1% used smokeless tobacco, 35.9% were smokers and 25% were dual users, that is, smoked as well as used smokeless tobacco. At the end of treatment, of the 67.3% patients who were offered brief advice, quit tobacco use, 18.2% re-lapsed while 14.5% were lost to follow-up.

Conclusion: A significant numbers of TB patients use tobacco with adverse impact on TB control programmes. Our study shows that it is feasible to introduce ‘brief advice’ strategy as a cost effective intervention for tobacco cessation among TB patients with careful monitoring.

Key words: Brief advice, cessation, India, tuberculosis, tobacco

INTRODUCTION

Tuberculosis (TB) and tobacco smoking are currently two formidable public health concerns and independently pose a considerable threat to global health.[1‑3] The current estimates put the annual global mortality from the two epidemics at over 6 million.[2,3] It is remarkable that TB and tobacco use are co-prevalent in many developing nations that are doubly burdened by the collision of the two epidemics.[1‑4]

TB is among the most common causes of morbidity and mortality in the world especially in Asia and Africa. In 2006, 9.2 million new TB cases and 1.7 million deaths due to TB were reported globally.[5]
India is the highest TB burden country accounting for one-fifth (21%) of the global incidence. India is 17th among 22 High Burden Countries in terms of TB incidence rate. TB primarily affects people in their most productive years of life with almost 70% patients falling within the age group of 15-54 years and more than 50% of cases occurring before 34 years of age. Also, the disease is more common among the poor and marginalized sections of the community.[6]

TB accounts for 17.6% of deaths from communicable diseases and for 3.5% of all causes of mortality.[7] World Health Organization (WHO) estimated TB mortality in India as 280 000 (23/100 000) population in 2009. The Revised National Tuberculosis Control Programme (RNTCP), based on the internationally recommended directly observed treatment short-course (DOTS) strategy co-ordinates TB diagnostic and treatment services across the country through a decentralised primary healthcare system and more than 1.5 million patients are put on treatment every year.[8]

India is also the second largest consumer of tobacco products in the world with 35% of adults (15 years and above) consuming tobacco.[9] Overall tobacco use among males is 48% and among females is 20%. In the age group, 30 years and above, the proportion of deaths attributable to tobacco is almost 12% for men and 1% for women. Among those who die pre-maturely, almost one in every 28 deaths among those aged 30-44 years and one in 12 among those aged 45-59 years are attributable to tobacco use.[10]

There is ample evidence to demonstrate the adverse association between the global TB and tobacco epidemics. Active and passive exposure to tobacco smoke is associated with TB infection, disease and mortality. Various studies have concluded that smoking is associated with high prevalence of TB. [11,12] Smoking was the cause of half the male TB deaths in India, and of a quarter of all male deaths in middle age (plus smaller fractions of the deaths at other ages). At current death rates, about a quarter of cigarette or bidi smokers would be killed by tobacco at ages 25-69 years, those killed at these ages losing about 20 years of life expectancy.[13] In other words, one out of every five deaths due to TB could have been prevented if the patient was not a smoker.[13-15] The TB control programmes must involve those engaged in treatment in and outside the clinical setting.[16]

The convergence of the epidemics of smoking and TB, and their association, if causal, represents a modifiable risk factor, and a useful preventive adjunct to curative chemotherapy in further reducing the incidence of TB in India. [17] Therefore in India, where both smoking and TB are common conditions, preventing initiation of smoking and promoting quitting of smoking are important TB-preventive measures. Patients with TB who are tobacco users and wish to stop its use, need and should receive counselling and assistance in stopping tobacco use. Health professionals working in TB care can set up cessation counselling without elaborate or costly training; they can do this systematically within TB treatment services, and it should become as routinely performed as any of the other standard practices in patient management.[18]

Moreover, during a typical course of treatment TB patients are in regular contact with health professionals for at least 6 months. Patients are considered to be more receptive to health education messages and willing to modify their health behaviour when they are ill.[19]

This paper looks at the possibility and outcome of integrating ‘brief advice’ for tobacco cessation in tuberculosis patients who are registered for treatment under TB control programme and are tobacco users.

**MATERIALS AND METHODS**

In the year 2010, Tobacco Control Division and Central TB Division in the Directorate General of Health Services, Ministry of Health and Family Welfare, India, discussed and decided to co-ordinate the potential of introducing tobacco cessation within RNTCP on a pilot basis. Two districts were chosen to undertake the project, Vadodara in Gujarat and Kamrup in Assam, where both RNTCP and National Tobacco Control Programme (NTCP) are under implementation. The project discontinued in the Kamrup district due to un-avoidable circumstances and hence this paper considered the project interventions in the Vadodara district of Gujarat only.

The RNTCP has well established infrastructure from national level to the health centre at the grass root level, with comprehensive training material developed for all categories of staff and established tools for monitoring, supervision and evaluation of various components of the programme. The NTCP covers 42 districts all over the country and provides for tobacco cessation services at the district level.[20,21]

The Central Tobacco Control Cell developed training material for doctors and health workers. The tools used in the study included a Tobacco Cessation Intervention (TCI) Card, which was also developed to record information regarding tobacco use, exposure to second hand smoke (SHS), administration of brief advice and cessation status at the end of treatment. A patient information brochure containing information on TB–tobacco association and tips to quit tobacco use was prepared for educating TB patients. The TCI cards, brochures and training material were translated into Gujarati language. At the onset of the project, the State TB Cell of Gujarat organized a 2-day training of trainer’s workshop for state and district level programme officers under RNTCP and NTCP with technical support from the Ministry of Health and Family Welfare and the UNION. These trainers in turn trained
109 doctors, 35 RNTCP staff and 1292 primary healthcare staff (total 1436) in basic counselling skills for brief advice for tobacco cessation both in rural and urban areas of the district, covering all DOTS providers in the Vadodara district between July and September 2010. Brief routine advice or brief advice to stop the use of tobacco by healthcare professionals is a behaviour intervention advocated for treatment of tobacco dependence. The brief advice can be offered by the medical staff in charge of managing TB patients in primary healthcare services.\textsuperscript{[16]}

Brief Advice on tobacco cessation takes less than 3 minutes and consists of five A's:

- Asking if the patient uses tobacco in any form
- Advice on quitting tobacco
- Accessing readiness to quitting tobacco use
- Assisting with counselling and appropriate treatment
- Arranging for follow up.

All confirmed TB patients registered for DOTS in Vadodara district from October 2010 to June 2011 were included in the study. In addition to all TB-related information on TB treatment care; the tobacco use, both smoking and smokeless by the TB patients, types of tobacco products used, details of brief advice and the final outcome on the status of quitting smoking or tobacco use at the end of treatment was recorded in the TCI card, which was attached to each TB treatment card.

All patients who were current smokers and users of smokeless tobacco were offered brief advice on tobacco cessation by the DOTS provider and the same advice was repeated during each interaction with the TB patients during the treatment period. The tobacco users were assisted with counselling to quit tobacco use, emphasizing the association of TB and implications of continuing tobacco use on the disease and treatment outcomes. No pharmacological treatment was advised.

All the patients receiving DOTS were also given the patient information brochure to educate them on the harms of tobacco use, its association between their disease and treatment outcome and advantages of quitting tobacco.

The status at the end of TB treatment was taken as the outcome of intervention by ‘brief advice’. If the patients reported not using tobacco at the end of treatment period, it was taken as ‘quit’ status. If the patient stopped using tobacco during treatment at any point of time but was using tobacco at the end of TB treatment, it was taken as re-lapse. The patients who did not report their tobacco use status or the same was not recorded by the DOTS provider in the respective TCI card were considered lost to follow up.

The cost incurred on trainings, development of training material, data sheets and pamphlets was about US $7000 for the entire study duration and was borne by the RNTCP regular funds. No extra resources were provided for the project.

### RESULTS

A total of 2879 TB patients, 1986 males (69%) and 893 females (31%) registered for DOTS treatment during the study period-urban (51.5%) and rural (48.4%). Category wise, 68.9% patients were new cases of TB and 31% were previously treated.

Overall 81.7% patients suffered from pulmonary TB and rest 18.3% had extra-pulmonary TB. Of those who suffered from pulmonary TB, 71.2% were males and 28.8% were females. The extra-pulmonary group had 59% males and 41% females.

A total of 46.3% of TB patients were current users of tobacco (1333 out of 2879), 52.8% did not use any tobacco at the time of the study. Among the current tobacco users, 89.6% were males and 10.3% were females; 40.8% tobacco users belonged to urban areas and 52.2% were from the rural areas. In keeping with the general trend of tobacco use, the number of TB patients who used smokeless tobacco exceeded that of smokers. While 35.9% of the TB patients were smokers, 39.1% used smokeless tobacco. In fact almost one-fourth of them (25%) were dual users, that is, they smoked as well as used smokeless tobacco. Among the smokers, bidis were used predominantly (86.8%), followed by cigarettes (7.95%), others (3.77%) and hukka (water pipe, 1.46%). The smokeless tobacco users used gutkha (64.6%), followed by Paan with tobacco (betel quid, 18.75%), Khaini (15.6%) and others (0.9%).

Tobacco user TB patients were explained about link of use of tobacco and causation of TB. When asked about their willingness to quit tobacco use at the time of registering for anti-TB treatment, 61.9% males and 54.3% females expressed their willingness to quit.

Age wise distribution of those TB patients who were willing to quit tobacco use is shown in Figure 1.

All registered TB patients who used any form of tobacco (smoking and smokeless) patients were offered brief advice every time they came in contact with the DOTS provider.

The average number of times TB patients were offered brief advice before they quit tobacco use is shown in Figure 2.

At the end of 6 months, 67.3% patients who were offered brief advice quit tobacco, while 18.2% re-lapsed and 14.5% were lost to follow up.

Table 1 gives the age wise distribution of patients who quit, re-lapsed or were lost to follow up.
Highest number of patients who quit was in the age group 31-40 years while highest number who re-lapsed was in the age group 21-30 years.

Figure 3 shows age wise and gender wise distribution of patients who were tobacco users and quit tobacco use following 'brief advice' and remained quit at the end of treatment.

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>% Remained quit</th>
<th>% Re-lapsed</th>
<th>% Lost to follow up</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-20</td>
<td>64.0</td>
<td>20.0</td>
<td>16.0</td>
</tr>
<tr>
<td>21-30</td>
<td>61.1</td>
<td>22.1</td>
<td>16.8</td>
</tr>
<tr>
<td>31-40</td>
<td>78.4</td>
<td>18.6</td>
<td>2.9</td>
</tr>
<tr>
<td>41-50</td>
<td>71.2</td>
<td>15.3</td>
<td>13.5</td>
</tr>
<tr>
<td>51-60</td>
<td>64.5</td>
<td>16.1</td>
<td>19.4</td>
</tr>
<tr>
<td>&gt;61</td>
<td>53.5</td>
<td>16.3</td>
<td>30.2</td>
</tr>
<tr>
<td>Total</td>
<td>67.3</td>
<td>18.2</td>
<td>14.5</td>
</tr>
</tbody>
</table>

(N=1333)

In all the age groups, the proportion of females who quit tobacco at the end of 6 months of treatment was higher compared with men, except in the age groups 41-50 years and above 61 years age group.

**DISCUSSION**

It is estimated that smoking will cause about 10 million adult deaths from all causes by 2030 and most of the increased tobacco-related deaths will take place in Asia, Africa and South America.\(^{[22]}\)

Both smoking and TB are targeted by major international prevention and control efforts, and tobacco use in developing countries, where TB is most burdensome, is increasing. However, there has been little research on smoking cessation within TB treatment programmes. Outcome data on targeted smoking cessation interventions in countries where such interventions are available and

![Figure 1: Age-wise distribution of TB patients who were willing to quit tobacco use](image1)

![Figure 2: Average number of times TB patients were offered advice before they quit tobacco use](image2)
feasible provide policy directions on tobacco control for all low and middle-income countries.\textsuperscript{[23]}

Basu \textit{et al.},\textsuperscript{[24]} recently concluded that in spite of evidence that tobacco control may be highly relevant to the future control of TB, such control has not been integrated into most TB control programmes. Just as international TB control bodies have generated critical targets for TB control with specific measures to determine progress in TB case detection and treatment efforts, tobacco control should similarly be integrated with TB, with specific efforts to engage smoking as a critical risk factor for TB infection and mortality.\textsuperscript{[24]}

Even the existing evidence on the advantages of TCIs for TB patients and advocacy by the WHO and the UNION have not led to countries integrating brief advice for tobacco cessation in TB control programmes.

The potential salutary benefits of connecting smoking cessation to DOTS on improving TB therapeutic outcomes through an integrated approach including future lung health of TB patients who quit smoking have been reported.\textsuperscript{[25]}

It is also documented that the DOTS strategy offers access to smokers and guarantees regular patient–provider interaction.\textsuperscript{[23]} Physicians and DOTS providers should be actively involved in smoking cessation activities. Regular and repeated medical advices on smoking behaviours are recommended to be included in DOTS practice.\textsuperscript{[26]}

Promoting smoking cessation in TB patients can also increase patient’s compliance to treatment, improve their inter-personal and social communications, decrease their stress and control their risky behaviours.\textsuperscript{[27]}

Thus, there is ample evidence to suggest the larger advantages of offering brief advice to TB patients to improve the treatment outcome and decrease mortality from TB. The encouraging results of the present study provide a good model to extrapolate in TB control programme not only in India but also in other countries facing the challenge of high burden to tobacco and TB.

Moreover, as the use of smokeless tobacco is high in India, the opportunity was used to provide brief advice not only to TB patients who were smokers but also to those using smokeless tobacco. The same is evident from the results of the case study.

However, the feasibility of intervention used in this study must be confirmed by further research such as randomised controlled trials to test methods in various settings, and evaluation study to determine effects after widespread application of such practices, as recommended in earlier such studies.\textsuperscript{[28]}

\textbf{CONCLUSION}

Tobacco cessation must become an integral part of all TB control programmes.\textsuperscript{[29]}

Likewise, the recognition of association between TB and tobacco epidemics makes it imperative to carefully consider exposure to tobacco cessation in efforts to reduce
not only the risks of TB and overall mortality resulting from TB but also the decline in health cost burden. It is time that these cost effective interventions are integrated into routine and ongoing national TB control programmes. Training of DOTS providers in 'Brief advice' for tobacco cessation can easily be incorporated in the existing trainings under RNTCP.

An important aspect of the present case study is that no extra physical and financial resources were required for the intervention as the infrastructure of existing programmes was used optimally with remarkable co-ordination and collaboration of TB and tobacco control programmes at the national and state level.

**Limitations of the study**
The confirmation regarding quitting of tobacco use was subjective assessment based on the self-statement by the patients. It was not validated by performing tests such as urine cotinine or carbon monoxide analysis of breath.

**REFERENCES**


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