



High quit rate among smokers with tuberculosis in a modified smoking cessation programme in Dhaka, Bangladesh

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Setting: BRAC, a non-governmental organisation, implemented a modified smoking cessation programme for tuberculosis (TB) patients based on International Union Against Tuberculosis and Lung Disease (The Union) guidelines in 17 peri-urban centres of Dhaka, Bangladesh.

Objective: To determine whether a modified version of The Union's smoking cessation intervention was effective in promoting cessation among TB patients and determinants associated with quitting smoking.

Design: Cohort study of routinely collected data.

Results: A total of 3134 TB patients were registered from May 2011 to April 2012. Of these, 615 (20%) were current smokers, with a mean age of 38 years (± 13.8). On treatment completion, 562 patients were analysed, with 53 (9%) lost to follow-up or dead, while 82% of smokers had quit. Patients with extra-pulmonary TB were less likely to quit than those with pulmonary TB. Patients with high-intensity dependence were less likely to quit than those with low-intensity dependence.

Conclusion: This study suggests that a simplified smoking cessation intervention can be effective in promoting smoking cessation among TB patients in Bangladesh. This is encouraging for other low-resource settings; the Bangladesh National Tuberculosis Control Programme should consider nationwide scaling up and integration of this smoking cessation plan.

Tobacco smoking increases the risks of developing tuberculosis (TB), of poor treatment adherence and of relapse.¹ TB patients with already damaged lungs are at increased risk of suffering permanent and crippling damage and should be encouraged to stop smoking. Moreover, if they continue to smoke they may develop recurrent TB. Previous studies have shown that the introduction of tobacco cessation services is feasible and results in smoking quit rates of up to 77%, associated with substantial improvements in quality of life and better TB treatment outcomes.² The World Health Organization (WHO) and the International Union Against Tuberculosis and Lung Disease (The Union) thus recommend the promotion of smoking cessation as an integral part of TB patient care.³

In Bangladesh, TB is a major health problem and tobacco use is also common, with 50% of men and 2% of women reporting current smoking.⁴ TB patients include a higher proportion of smokers than the general population (86% vs. 24%).⁵

Previously known as the Bangladesh Rural Advancement Committee, BRAC is a non-governmental

organisation in Bangladesh that began work in 1972 by providing relief after the 1971 war of independence. BRAC offers a wide range of social services, including health care, and it has been implementing a TB control programme since 1984. It currently provides support to the Bangladesh National Tuberculosis Control Programme (NTP) in 297 subdistricts of 42 districts.

Since May 2011, BRAC has also been implementing a pilot smoking cessation intervention programme based on The Union's smoking cessation guide³ in 17 BRAC-supported peri-urban TB control service facilities in Dhaka. The Union's smoking cessation guide includes the ABC approach (A = ask, B = brief advice, C = cessation support), whereby at each visit A) all patients are asked about their and their family members' smoking status, B) all patients are given brief advice on how to quit smoking and make their homes smoke-free, and C) cessation support consisting of stepwise advice and sometimes medications are provided to help smokers quit and make their homes smoke-free.

Unfortunately, due to the lack of adequate human resources, funds and time, BRAC was not able to adopt the full Union ABC approach. In the BRAC version, cessation support included only limited counselling, and not the full stepwise version recommended by The Union, and no medications were given to help quit smoking. There has been no evaluation of the effectiveness of this modified programme in reducing smoking among TB patients in Dhaka; such an evaluation could have wider implications, as many resource-limited settings may be similar to ours and may have to adopt a modified smoking cessation package such as this one.

The aims of the present study were to determine whether a modified Union smoking cessation intervention in Bangladesh was effective in promoting smoking cessation among TB patients and determinants associated with smoking cessation.

METHODS

Design

Cohort study using routinely collected data from the BRAC Programme Management Information System.

Setting

Dhaka has a metropolitan population of over 15 million.⁶ Prevalence of all forms of TB in Bangladesh is 411 per 100 000 population per year.⁷ BRAC has been implementing TB control in Dhaka through its 17 peri-urban TB service facilities, which cover a population of

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2.8 million under NTP guidance. Of these, 10 have a sputum microscopy centre for TB diagnosis. Individuals diagnosed with TB receive directly observed treatment (DOT) from community health volunteers, usually at home, under the guidance of BRAC field-level staff and a government or BRAC medical officer throughout the 6-month duration of anti-tuberculosis treatment. Patients with a history of previous anti-tuberculosis treatment are given the 8-month regimen.⁸ BRAC has been implementing a smoking cessation intervention through these TB service facilities.

Smoking cessation programme

The BRAC smoking cessation intervention was based, in part, on The Union's ABC guideline with the support of the Bangladesh NTP. However, due to limited resources, the full cessation support package was not included. Twenty TB control staff (programme organisers) were trained in the ABC method, including tobacco control, the harmfulness of smoking, second-hand smoke and its impact on TB, counselling methods and documentation.

At the time of starting anti-tuberculosis treatment, trained staff asked registered TB patients whether they smoked, and recorded their smoking status. Patients then received 5–10 min of brief advice to quit smoking to improve their health and the effectiveness of their anti-tuberculosis treatment at health facility level. Advice included the harmful effects of tobacco on health, the relationship of tobacco to TB, the socio-economic effects of tobacco use, benefits of quitting and the harmful effects of passive smoking. The advice also included how to make their homes smoke-free and avoid second-hand smoke. In addition, they also received limited cessation support, which helps patients to plan to tell the family that they are quitting and ask for understanding and support, and to remove all cigarettes and smoking accessories from their homes.

Patients were followed up at field level every week during the intensive phase of TB treatment and twice a month during the continuation phase. The community volunteers (*shasthya shebika*) who administered DOT were also trained in tobacco control and cessation. They provided brief advice and encouraged patients to quit smoking at the time of intake of the TB drugs, and also followed up patients to find out whether they had quit smoking.

The patients were evaluated by health workers at the end of months 2 and 5 and at the end of anti-tuberculosis treatment (usually at month 6 or 8) to assess whether they had quit smoking. At each of these evaluations, patients were considered to have quit smoking if they reported that they had not smoked tobacco in the past 15 days. Their statement was verified against statements from family members, whenever possible.

Participants

All TB patients registered for treatment in the 17 peri-urban TB centres operated by BRAC from May 2011 to April 2012 were screened for smoking.

Variables

The following variables were collected from BRAC files: demographic details (age, sex), disease classification (pulmonary positive/negative, extra-pulmonary), type of patient (new/relapse/failure/treatment after default/other), smoking pattern (intensity of dependence) and smoking outcome (quit smoking/current smoker/relapsed smoker/died/lost to follow-up) using a structured proforma. Intensity of dependence and smoking cessation outcome are defined in Table 1.

Analysis and statistics

Collected data were double-entered and analysed using EpiData version 3.1 (EpiData Association, Odense, Denmark). Variables were cross-tabulated and summarised using proportions. Patients were stratified into different groups based on their demographics, TB disease and smoking characteristics, and their association with quitting smoking was assessed using risk ratios and 95% confidence intervals.

Ethics

Ethics approval was obtained from The Union Ethics Advisory Group; in-country ethics approval was obtained from the Ethical Committee of the Bangladesh Medical Research Council.

RESULTS

Of 3134 TB patients registered from May 2011 to April 2012, 615 (20%) were current smokers. Smokers were predominantly male (99%), with a mean age of 38 years (range 16–77). At the end of anti-tuberculosis treatment, 53 (9%) patients were lost to follow-up or died; thus, the final evaluation was made on 562 patients (Table 2). Overall, 82% ($n = 464$) of smokers had quit and the quit rate increased progressively from the first follow-up to the end of anti-tuberculosis treatment.

The association between demographic and clinical characteristics with quitting smoking is given in

TABLE 1 Intensity of dependence and smoking cessation outcomes

Variable	Definition
Intensity of dependence	High-intensity nicotine dependence: smoking within the first 30 min after waking Low-intensity nicotine dependence: smoking >30 min after waking
Quit smoking	A smoker who had not smoked in the last 2 weeks, even a puff, before the last follow-up
Current smoker	A smoker patient who had smoked in the last 2 weeks, even a puff, and had not made any attempt to quit before the last follow-up
Relapsed smoker	A smoker who had tried to quit but had relapsed in the last 2 weeks before the last follow-up and had made at least one quit attempt
Died	A smoker who did not attend the visit and was confirmed as having died
Lost to follow-up	A smoker who did not attend the visit and whose status was unknown

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TABLE 2 Proportion of TB patients who quit smoking at different months of anti-tuberculosis treatment in a smoking cessation intervention programme in Bangladesh, May 2011–April 2012

	Smokers on anti-tuberculosis treatment* <i>n</i>	Smokers who quit <i>n</i> (%)
Start of treatment	615	0
Month 2	589	387 (66)
Month 5	569	441 (77)
Month 6 or more	562	464 (82)

*Excluding those who had died and were lost to follow-up at that time.
TB = tuberculosis.

Table 3. Patients with extra-pulmonary TB were less likely to quit smoking than pulmonary TB patients. Similarly, patients with a high intensity of dependence were less likely to quit than patients with low-intensity dependence.

DISCUSSION

This is one of the first studies to report on the feasibility and effectiveness of implementing a modified version of the Union tobacco cessation intervention, and the only one conducted in Bangladesh to date. The study showed that of the 20% ($n = 615$) of registered TB patients who were current smokers, 82% ($n = 464$) had quit by the end of anti-tuberculosis treatment.

The quit rates achieved in our setting were comparable to or higher than what had been achieved in other settings. In Sudan where patients received only counselling, the quit rate was 66%.⁹ In Malaysia, patients achieved a 78% quit rate, but used nicotine

TABLE 3 Association between demographic and clinical characteristics and smoking cessation among TB patients in a smoking cessation intervention programme, Bangladesh, May 2011–April 2012

Variable	Total <i>n</i>	Patients who had quit smoking by the end of treatment <i>n</i> (%)	RR (95%CI)
Total sample	562	464 (82)	—
Sex			
Male	559	461 (82)	—
Female	3	3 (100)	
Age group, years			
>35	254	211 (83)	0.97 (0.66–1.41)
≤35	308	253 (82)	Reference
Disease classification			
Extra-pulmonary TB	53	32 (60)	0.46 (0.28–0.74)*
Pulmonary			
smear-negative TB	50	42 (80)	1.04 (0.5–2.12)
Pulmonary smear-positive TB	459	390 (85)	Reference
Type of TB			
New	526	436 (83)	1.46 (0.74–2.87)
Previously treated	31	23 (74)	Reference
Unknown	5	5 (100)	—
Intensity of dependence			
High	139	101 (73)	0.46 (0.31–0.66)*
Low	410	359 (87)	Reference
Unknown	5	4 (80)	

* $p < 0.05$.

TB = tuberculosis; RR = risk ratio; CI = confidence interval.

replacement therapy (NRT) in addition to individualised cognitive behavioural therapy.¹⁰ The high quit rate achieved in our setting is important because we implemented a simpler, modified version of the Union intervention guide.³ The key interventions provided in our setting were: 1) asking about tobacco smoking; 2) providing advice on the harmful effects of tobacco and the benefits of quitting smoking; and 3) providing ongoing limited cessation support by giving practical help with planning to quit smoking. However, we did not provide the 'stepwise support' or therapeutic options, such as NRT or medications, that form an integral part of the WHO recommendations and those suggested in The Union's guide if available or affordable. That such a favourable quit rate could be achieved relatively simply suggests that it could be applied elsewhere in other resource-limited settings.

A major strength of the study is that it was implemented under programmatic conditions and hence reflects ground realities in similar contexts. Furthermore, 91% of smokers were followed until the end of anti-tuberculosis treatment. Quit data were entered regularly when patients arrived for their sputum checks or follow-up of TB treatment at 2, 5 and 6 or 8 months of treatment, and these data were confirmed by the central office on a monthly basis.

Possible reasons as to why such high quit rates could be achieved in our setting were that 1) the interventions were not only provided at the health facility, but were also administered on a daily basis at the community level by health volunteers; 2) in nearly three quarters of the patients, the intensity of tobacco dependence was low and only a relatively small proportion were high-intensity patients; and 3) it is well known that TB patients (due to their illness) are more receptive to advice on smoking cessation.

While a large proportion of patients quit, nearly one in five did not. It is not clear why the quitting interventions did not work for this group. However, we were able to identify that patients with higher levels of dependence and those with extra-pulmonary TB were relatively less likely to quit. The reasons why they did not quit was not ascertained in the present study. To further enhance the quit rates in these patients, it may be necessary to provide enhanced therapeutic options such as NRT.

There are several limitations to this study. First, like other studies that involve a review of records, the data were limited by what had been recorded in the programme records. However, our study included regular verifications and attempts were made to complete missing data. Second, this was implemented as a pilot study and may have generated an exceptionally high level of enthusiasm for counselling that led to higher quit rates. Such enthusiasm may not be sustained over the long term if introduced more widely. Third, whether or not the patient had quit smoking was determined on the basis of self-reporting. No other objective tests, such as the nicotine breath test, were available to confirm the information provided. For a more accurate measurement, future studies may consider including these objective tests. Fourth, as the amount and frequency of cessation intervention received by the patients was not adequately measured in our study, we were not able to measure 'intervention dose-response' associations. Future studies may consider the development and incorporation of an 'intervention index' that allows a more precise measurement of the 'dose' of intervention.

In conclusion, this study suggests that a simplified smoking cessation intervention based on the programme recommended by The Union remains effective in promoting smoking cessation among TB patients in Bangladesh. This is encouraging for other low-resource settings, and the Bangladesh NTP should consider nationwide scale-up and integration of this smoking cessation plan with TB control.

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Contexte : BRAC, une organisation non-gouvernementale, a mis en œuvre un programme modifié d'arrêt du tabagisme pour les patients tuberculeux (TB) en se basant sur les directives de l'Union Internationale contre la Tuberculose et les Maladies Respiratoires (L'Union) dans 17 centres péri-urbains de Dhaka, Bangladesh.

Objectif : Déterminer dans quelle mesure une version modifiée de l'intervention d'arrêt du tabagisme de L'Union favorise l'arrêt chez les patients TB ainsi que les déterminants associés à l'arrêt du tabagisme.

Schéma : Etude de cohorte sur base de données recueillies en routine.

Résultats : Entre mai 2011 et avril 2012, on a enregistré au total 3134 patients TB. Parmi eux, 615 (20%) étaient des fumeurs actuels dont l'âge moyen était de 38 ans ($\pm 13,8$). A la fin du traitement, on a analysé 562 de ces patients, 53 (9%) ayant été perdus de vue ou

étant décédés ; 82% des fumeurs avaient arrêté. Les patients atteints d'une TB extra-pulmonaire sont moins susceptibles d'arrêter par comparaison avec ceux atteints d'une TB pulmonaire. Les patients dont le taux de dépendance est élevé sont moins susceptibles d'arrêter que ceux dont cette dépendance est plus faible.

Conclusion : Cette étude suggère qu'une intervention simplifiée de l'arrêt du tabagisme peut être efficace pour favoriser l'arrêt du tabagisme chez les patients TB au Bangladesh. Ceci est encourageant pour d'autres contextes à faibles ressources. Le Programme National de lutte contre la Tuberculose du Bangladesh devrait envisager l'extension et l'intégration au niveau national de ce plan d'arrêt du tabagisme.

Marco de referencia: La BRAC, una organización no-gubernamental, introdujo en 17 centros de salud periurbanos de Dhaka, en Bangladesh, un programa modificado de abandono del tabaquismo dirigido a los pacientes con diagnóstico de tuberculosis (TB), basado en las directrices de la Unión Internacional contra la Tuberculosis y las Enfermedades Respiratorias (La Unión).

Objetivo: Evaluar si una versión modificada de la intervención de La Unión, encaminada al abandono del tabaquismo, era eficaz en los pacientes con diagnóstico de TB y definir los factores determinantes asociados con el éxito de la intervención.

Métodos: Fue este un estudio de cohortes a partir de los datos recogidos de manera sistemática.

Resultados: Entre mayo del 2011 y abril del 2012 se registraron 3134 pacientes con diagnóstico de TB, de los cuales 615 fumaban (20%) y tenían una edad promedio de 38 años ($\pm 13,8$ años). Al completar el tratamiento, se analizaron 562 pacientes; se presentaron

53 casos de pérdida durante el seguimiento o muerte (9%). El 82% de los fumadores había abandonado el tabaquismo. La probabilidad de abandonar el hábito fue menor en los pacientes con TB extrapulmonar que en los pacientes con localización pulmonar. Igualmente, fue menos probable que abandonaran el tabaquismo los pacientes con una fuerte dependencia que los pacientes con una dependencia débil.

Conclusión: Las observaciones del presente estudio indican que una intervención sencilla encaminada al abandono del hábito de fumar y dirigida los pacientes con diagnóstico de TB en Bangladesh puede ser eficaz. Estos resultados constituyen un estímulo para otros entornos con escasos recursos y el Programa Nacional de Control de la Tuberculosis debería considerar la posibilidad de ampliar el alcance de la aplicación de este plan de abandono del tabaquismo e integrarlo a escala nacional.