

Smoking behavior among former tuberculosis patients in Indonesia: intervention is needed

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SUMMARY

SETTING: Five lung clinics in Jogjakarta Province, Indonesia.

OBJECTIVE: To document smoking patterns among tuberculosis (TB) patients before diagnosis and following treatment, to identify smoking-related messages given by health professionals and DOTS providers and to identify predictors of smoking relapse.

DESIGN: A cross-sectional survey of 239 male TB patients completed DOTS-based treatment during 2005–2006. Subjects were interviewed at home using a semi-structured questionnaire. Female patients were excluded, as very few smoke.

RESULTS: Most TB patients quit smoking when under treatment, but over one third relapsed at 6 months post-treatment. About 30% were never asked about their smoking behavior or advised about quitting. Of relapsed

smokers, 60% received only general health messages and not TB-specific smoking messages. DOTS providers are not currently involved in cessation activities. The perception that any level of smoking is harmless for ex-TB patients was a significant predictor for smoking relapse.

CONCLUSION: Physicians and DOTS providers should be actively involved in smoking cessation activities among TB and ex-TB patients. Based on these data, the Quit Tobacco Indonesia Project is mounting a pilot intervention to train DOTS providers, who are mostly family members of patients, to deliver smoking cessation messages and reinforce the cessation advice provided by physicians during and following TB treatment.

KEY WORDS: smoking; tuberculosis; cessation; health professional; Indonesia

INDONESIA has the third highest number of tuberculosis (TB) cases in the world, after India and China.¹ Although the prevalence of TB has decreased significantly in the last three decades,² it remains the third leading cause of death (10%) in Indonesia.³ The estimated morbidity and mortality rates for TB in Indonesia were respectively 262 and 41 cases per 100 000 population in 2005.¹ The Indonesian government is committed to reducing the TB burden, and in 1994 a DOTS TB management protocol was implemented. At present, 98% of the Indonesian population is living in areas where health services have adopted DOTS.¹

Indonesia also has one of the highest rates of smoking in the world. Over 69% of adult men and 3% of women smoke,⁴ and the percentage of male smokers has risen by 10% in the past decade.⁵ The dangers of smoking are not well recognized in Indonesia. Many people believe that smoking 10 cigarettes a day is not harmful if the smoker uses a brand of cigarettes considered 'suitable' for his body. Some brands of clove cigarettes are even thought to be beneficial for those

with respiratory illness,⁶ although research has shown that smoking clove cigarettes is at least as harmful as other types of cigarettes.⁷

There is now sufficient evidence to link smoking to both the cause of TB and TB relapse.^{8–11} Smokers are at once at greater risk of getting TB (odds ratio [OR] 1.8 for light smokers, OR 3.7 for heavy smokers)¹⁰ and dying from TB (OR 4.5).⁸ It is significant that ex-patients are more than three times more likely to relapse if they smoke following short-course TB treatment.⁹ Few data exist on tobacco use among TB patients in Indonesia during the maintenance phase of treatment and following treatment or on patient perceptions of the risk of smoking.

Few data also exist on the messages received by TB patients from health care professionals and care givers. Recent studies have documented the importance of physician advice in promoting smoking cessation in the general population¹² and in TB patients.¹³ It is not known whether health practitioners in Indonesia provide messages to TB patients about smoking during

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or after treatment or how TB patients interpret and respond to messages, nor do we know whether DOTS providers and family members encourage TB patients to quit smoking.

The present study 1) documents smoking patterns among TB patients before diagnosis, during treatment and post treatment; 2) identifies messages that health professionals and DOTS providers give to patients about smoking; and 3) identifies factors associated with smoking relapse among TB patients.

METHODS

Study design

A cross-sectional survey was conducted among ex-TB patients in Jogjakarta Province, Indonesia.

Study area and population

A total of 390 male TB patients who completed the DOTS-based treatment regimen during January 2005–September 2006 were identified from the patient registers of five lung clinics in Jogjakarta. Of the 390 patients originally identified, 148 could not be contacted (25 died, 104 could not be traced and 19 failed after three visits). Of the 242 people contacted, 239 former patients agreed to be interviewed and three refused. Although those recruited into the study were older than those who could not be contacted (mean age 46 vs. 39 years), we believe their smoking patterns to be quite similar on the basis of our ongoing ethnographic research into smoking-related behavior.⁶ Female patients were excluded from the study, as few Javanese women smoke.

Data collection

Patients were interviewed once in their homes. Trained interviewers involved in the Quit Tobacco Indonesia (QTI) Project⁶ employed a semi-structured questionnaire to assess the smoking history of former patients, perceptions of safe smoking levels before and following TB, perceptions of the relationship between smoking and TB infection/relapse, exposure to cessation messages from health professionals and quit attempts (Appendix). Information on the age, education, marital status and social class of informants was also collected.

Interviews took approximately 30 min to complete, and all informants consented to a confidential interview. Informants were also encouraged to discuss any difficulties they had experienced when quitting smoking in the past and to raise questions about tobacco use and health. An inventory of these queries was assembled for inclusion in a prospective TB and DOTS provider intervention being developed by the QTI.⁶

This study received ethical approval from the Ethical Committee in Faculty of Medicine, Gadjah Mada University, Jogjakarta, Indonesia.

Statistical analysis

Data were managed using EpiData (EpiData Association, Odense, Denmark) and analyzed using STATA Intercool 8.2 (Stata Corp, College Station, TX, USA). Smoking patterns between different age groups were assessed using χ^2 . Multivariable logistic regression was performed to determine whether any combination of the above-mentioned variables was associated with smoking relapse. A *P* of 0.05 was used to signify statistical significance.

RESULTS

Assessment of smoking status

Of the 239 male ex-TB patients interviewed, 218 (91.2%) were ever smokers who had ever smoked even a puff of a cigarette. Information on the smoking status of these 218 patients at six data points was obtained: 6 months before TB diagnosis, at the time of TB diagnosis, during months 1–3 and months 4–6 of treatment, and 3 and 6 months after treatment. Of the ever smokers interviewed, 84 had completed treatment 12 months previously and we also inquired about their smoking habits during the last 6 months and the last 30 days. Patients were categorized into three types of smokers at each time reference point: 1) persistent smoker if they had never quit smoking from the time of diagnosis to the reference point in question; 2) quitter if they quit smoking from the previous reference point to the focal reference point; and 3) relapsed smoker if they resumed smoking after having quit for a period of time captured by any of the previous reference points.

Almost two thirds of ever smokers smoked daily for 6 months before their illness. Smokers consumed on average 12 cigarettes per day. When diagnosed with TB, the majority of daily smokers quit smoking and only 11% ($n = 8$) remained daily smokers while on TB treatment (Table 1). The focus of our remaining analysis is on those patients who quit smoking for good ($n = 121$) and those who quit and relapsed ($n = 89$) at any of the reference points mentioned above.

It is of note that at the end of 6 months of DOTS treatment, only 6.9% of those who quit smoking during TB treatment had relapsed to become daily smokers, but at 6 months after treatment 29.9% had resumed smoking daily and another 9.6% smoked occasionally. Only 58.8% of those who had quit during treatment continue to abstain from smoking 6 months after completing treatment. TB patients aged <44 years were more likely to quit smoking during TB treatment, but there were no statistically significant differences related to smoking relapse after TB treatment among younger and older patients. Nearly a third (32.5%) of the subsample of 84 TB patients who had finished DOTS treatment over 12 months previously reported that they had resumed daily smoking in the last 30 days when interviewed.

Table 1 Smoking patterns of male ever smokers among former tuberculosis patients at different time points

Time points	Age group, years	n	Persistent smoker n (%)	Relapsed smoker n (%)	Quitter n (%)	χ^2	P value
6 months before illness	17–44	112	72 (64.3)	—	40 (35.7)	11.07	<0.001
	45–85	106	90 (84.9)	—	16 (15.1)		
At the time of diagnosis	17–44	112	11 (9.2)	—	101 (90.8)	1.84	0.15
	45–85	106	18 (17.0)	—	88 (83.0)		
At months 1–3 of treatment	17–44	112	2 (1.8)	2 (1.8)	108 (96.4)	8.81	0.01
	45–85	106	6 (5.7)	10 (9.4)	90 (84.9)		
At months 4–6 of treatment	17–44	112	2 (1.8)	9 (8.0)	101 (90.2)	7.79	0.03
	45–85	105	6 (5.7)	19 (18.1)	80 (76.2)		
3 months after treatment	17–44	106	2 (1.9)	24 (22.6)	80 (75.5)	5.25	0.07
	45–85	94	4 (4.3)	33 (35.1)	57 (60.6)		
6 months after treatment	17–44	97	2 (2.1)	31 (31.9)	64 (66.0)	5.20	0.07
	45–85	80	1 (1.2)	39 (48.8)	40 (50.0)		

Relapsed smokers were significantly younger and started to smoke their first cigarette earlier than quitters. The distribution of marital status, education level and socio-economic status was similar in both groups (Table 2), and we observed no difference in the mean number of cigarettes consumed by both groups at 6 months before diagnosis.

Patient perceptions about smoking and TB

More relapsed patients than quitters perceived that smoking causes TB ($P < 0.01$) (Table 3). About 56% of relapsed smokers and 94% of quitters answered zero when asked about the 'safe' level of smoking for ex-TB patients. More relapsed smokers thought that former TB patients could smoke at some level (mean level of 5 cigarettes excluding zero). Contradictory to their perception of harm, 32.5% of those who had finished DOTS treatment over 12 months previously had relapsed and had consumed a mean of 5.4 cigarettes per day in the last 30 days.

Quit smoking advice and cessation message

We queried whether any health professionals (e.g., doctor, nurse, laboratory staff, pharmacist or radiol-

ogist) had asked TB patients about their smoking behavior and advised them to quit smoking during any of their TB-related clinical visits (for sputum testing, diagnosis or treatment). Patients were also asked who their DOTS provider was and whether they had ever discussed smoking with them or been advised to quit.

Most ex-TB patients reported that they had been advised to quit smoking by a doctor (69.2%) at some point during their treatment, but few had received such advice from a nurse, although they had more contact with nurses (30.3%). Nearly all smoking advice was provided at the time of diagnosis and consisted of a single sentence noted in passing. Twenty-six per cent of former TB patients could not recall ever being asked if they smoked or being advised not to smoke during any clinical encounter. There were no differences between relapsed smokers and quitters in terms of percentages of those who did and did not receive advice from doctors to quit smoking (Table 4). A content analysis of smoking-related messages provided by doctors to relapsed smokers found that only 40% of TB patients received disease-specific messages about the need to stop smoking. The other 60% received only a general message not to smoke. Disease-specific messages commonly described the need to quit smoking as a means to enable the lungs to heal or become strong.

Table 2 Demographic characteristics of different types of male ever smokers among former tuberculosis patients

Characteristics	Relapsed n (%)	Quitter n (%)	OR (95%CI)	P value
Age group, years				
17–44	52 (58.4)	48 (39.7)	2.14	0.008
45–85	37 (41.6)	73 (60.3)	(1.25–3.73)	
Education level				
<7 years	29 (33.0)	51 (42.9)	0.66	0.149
≥7 years	59 (67.0)	68 (57.1)	(0.37–1.16)	
Marital status				
Unmarried/divorced/ widowed/separated	26 (29.2)	22 (18.2)	1.86	0.062
Married/cohabiting	63 (70.8)	99 (81.8)	(0.97–3.56)	
Socio-economic status				
Low	60 (68.2)	74 (63.2)	1.25	0.463
Middle/upper	28 (31.8)	43 (36.8)	(0.69–2.24)	

OR = odds ratio; CI = confidence interval.

Table 3 Perceptions about smoking and tuberculosis of male ever smokers among former tuberculosis patients

	Relapsed n (%)	Quitter n (%)	OR (95%CI)	P value
Perception that smoking causes TB				
Yes	55 (62.5)	52 (43.0)	2.21 (1.26–3.88)	0.006
No	33 (37.5)	69 (57.0)		
Perception that smoking causes TB relapse				
No	27 (30.3)	28 (23.3)	1.43 (0.77–2.66)	0.257
Yes	62 (69.7)	92 (76.7)		
Perception that ex-TB patients are allowed to smoke				
Yes	37 (41.6)	5 (4.2)	16.37 (6.08–44.03)	<0.001
No	52 (58.4)	115 (95.8)		

OR = odds ratio; CI = confidence interval; TB = tuberculosis.

Table 4 Source and type of smoking cessation messages reported by male ever smokers among former tuberculosis patients

Cessation advice	Relapsed <i>n</i> (%)	Quitter <i>n</i> (%)	OR (95%CI)	<i>P</i> value
From doctor				
Yes	61 (68.5)	83 (69.8)	0.95	0.852
No	28 (31.5)	36 (30.2)	(0.52–1.71)	
From nurses				
Yes	36 (40.5)	27 (22.7)	2.31	0.006
No	53 (59.5)	92 (77.3)	(1.27–4.23)	
From DOTS counseling staff				
Yes	20 (22.5)	21 (17.7)	1.35	0.388
No	69 (77.5)	98 (82.3)	(0.68–2.68)	
From DOTS provider				
Yes	23 (25.8)	27 (22.3)	1.21	0.553
No	66 (74.2)	94 (77.7)	(0.64–2.30)	
Type of message given by doctor				
General message	51 (59.3)	37 (41.1)	2.09	0.016
Related to TB	35 (40.7)	53 (58.9)	(1.14–3.81)	

OR = odds ratio; CI = confidence interval; TB = tuberculosis.

There were no statistically significant differences in the thematic content of cessation messages received by relapsed smokers and quitters (Table 4).

DOTS providers for TB patients were most commonly family members (87.8%): parents (16.8%), spouses (50.3%) and children (20.8%). Only 15% ($n = 28$) of DOTS providers smoked. A binary logistic regression analysis found that a DOTS provider's own smoking status was not significantly associated with the patient's relapse status, but our sample was quite small. Notably, only 34.7% of ex-patients reported ever discussing smoking and its possible relationship to TB or TB treatment with their DOTS provider, and only 11% of DOTS providers specifically delivered one or more of the following messages to patients: smoking aggravates TB, reduces the effectiveness of TB treatment or causes relapse. Most DOTS providers who encouraged TB patients not to smoke merely stated that those who are ill should not smoke.

Factors associated with smoking relapse

While the majority of TB patients (75%) endorsed the idea that smoking is harmful for them post treat-

Table 5 Predictive factors of smoking relapse among male former tuberculosis patients

Predictive factors	Multivariable analysis OR (95%CI)
Age <45 years	1.84 (0.91–3.71)
Perception that ex-TB patients are allowed to smoke	15.64 (5.10–47.96)
Received cessation message from doctor	0.60 (0.26–1.39)
Received cessation message from nurse	2.42 (1.09–5.36)
Received only general message about smoking	1.92 (0.93–3.93)

OR = odds ratio; CI = confidence interval; TB = tuberculosis.

ment, our relapse data suggest that this perception did not strongly influence behavior when this question was directly asked in our survey. Former TB patients who are relapse smokers are highly influenced by the perception that ex-TB patients are allowed to smoke (Table 5). Although statistically insignificant as an independent factor, receiving a cessation message from one's doctor was associated with a lower likelihood of smoking relapse (OR 0.60). Receiving a disease-specific message, although statistically insignificant, appears to lessen the risk of relapse by half compared to those who received only a general message.

DISCUSSION

A few key findings of this study of smoking among ex-TB patients in Indonesia can be highlighted. First, even though the vast majority of TB patients quit smoking when they were diagnosed with TB, over one third of the patients had relapsed 6 months after treatment. This is noteworthy, given that smoking has been reported to be an independent predictor of TB relapse (OR 3.1, 95% confidence interval [CI] 1.6–6.0) in a prospective study in India,⁹ and an important cause of death from TB.⁸

It is imperative that health professionals provide smoking cessation messages to TB patients during clinical encounters.¹⁴ The present study found that 30% of ex-patients reported that they had never been asked about their smoking behavior or advised to quit smoking. Of those who were advised to quit, half of the messages received were general health messages and not TB-specific. During qualitative interviews we found that some former patients interpreted general messages to mean that they should not smoke when sick or until their lungs became strong again.⁶ Patient counseling needs to increase patient awareness of the harmful effects of tobacco on general health and for the well-being of TB patients in particular.¹³ Finally, DOTS providers are not currently encouraged to give TB patients smoking cessation messages. The DOTS-based TB program in Indonesia puts emphasis on empowering family members to support the TB treatment process. Information about the disease and its treatment itself are discussed with both patients and their family members, and in most cases a family member who agrees to help the patient during treatment consents to becoming the DOTS provider. Given that most cases of relapse occur post treatment and that most DOTS providers are family members, teaching DOTS providers to encourage smoking cessation should become an important provider support activity that continues for life. While smoking cessation is mentioned in passing during DOTS provider training, its importance is not registered. This needs to be rectified through cessation support training and materials.

An important limitation of this study is the potential of recall bias when asking ex-TB patients about

smoking levels. Our intention was to assess general levels of smoking at different points of time. Even though imprecise, the data suggest an important trend. Most cases gave up smoking at the time of their illness and while taking medicine, but as soon as health was regained, nearly a third of former TB patients relapsed. Some of these former patients resumed smoking at the same levels as they did prior to illness, while others smoked at lower levels, mistakenly thinking that smoking at such levels is relatively safe.

CONCLUSIONS

This study highlights the importance of actively involving physicians, nurses and DOTS providers in promoting smoking cessation for TB and former TB patients. Each party needs to provide a clear, specific and consistent message that any kind of cigarette is dangerous at any level both during and following TB treatment, for life. The QTI Project is therefore mounting a pilot study to train DOTS providers how to talk to TB patients about tobacco use after an initial message has been given to the patients by doctors that smoking will impede their ability to be cured from TB, become healthy and prevent TB relapse. An important reason for training DOTS providers suggested by this study is that TB patients by and large quit smoking while under treatment, but relapse soon afterward and at a time when they have minimal contact with health care providers. Smoking cessation messages need to continue after TB treatment to help maintain the person's quit status. DOTS providers are primarily family members and are in a good position to reinforce the doctor's TB cessation messages and to help those who relapse to quit once again.

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APPENDIX

The following are questions used to assess perceptions of the harmfulness of smoking for tuberculosis patients and ex-tuberculosis patients:

- Do you think there is any relation between smoking and TB?
- Do you think there is any relation between smoking and TB relapse?
- Do you think it is okay for an ex-TB patient to smoke at any level after they have completed treatment?
- How many cigarettes is it safe for a healthy person to smoke in a day?
- How many cigarettes is it safe for a TB patient to smoke in a day when they feel well enough to smoke but are still on medication?
- How many cigarettes in a day is it safe for ex-TB patients who have completed 6 months of treatment to smoke?
- If an ex-TB patient is going to smoke, are any particular types of cigarettes safer for them to smoke?

RÉSUMÉ

CONTEXTE : Cinq polycliniques pulmonaires dans la Province de Jogjakarta, Indonésie.

OBJECTIFS : Documenter les types de fume chez les patients de la tuberculose (TB) avant le diagnostic et après le traitement, identifier les messages concernant le tabagisme donnés par les professionnels de la santé et les pourvoyeurs du DOTS et identifier les facteurs prédictifs de la rechute du tabagisme.

SCHEMA : Etude transversale de 239 patients TB de sexe masculin qui ont achevé le traitement DOTS pendant la période 2005–2006. On a interviewé les sujets à leur domicile en utilisant un questionnaire semi-structuré. On a exclu les patients de sexe féminin car peu d'entre elles fumaient.

RÉSULTATS : La plupart des patients TB ont cessé de fumer au cours de leur traitement, mais plus d'un tiers d'entre eux ont rechuté 6 mois après le traitement. Environ 30% n'avaient jamais été interrogés au sujet de leur comportement tabagique et n'avaient jamais reçu le con-

seil d'arrêt. Parmi les fumeurs en rechute, 60% ont reçu uniquement des messages généraux de santé et aucun message concernant le tabac et ses relations spécifiques avec la TB. Actuellement les pourvoyeurs de DOTS ne sont pas impliqués dans les activités d'arrêt du tabagisme. L'impression qu'un tabagisme de n'importe quel niveau ne comporte aucun risque pour les anciens patients TB s'est avérée un facteur prédictif significatif de la rechute du tabagisme.

CONCLUSION : Les médecins et les pourvoyeurs de DOTS devraient être impliqués activement dans l'arrêt du tabagisme chez les patients et les anciens patients TB. En se basant sur ces données, le projet Quit Tobacco Indonesia élabore une intervention-pilote pour former les pourvoyeurs de DOTS, qui sont le plus souvent des membres de la famille du patient, à donner des messages d'arrêt du tabagisme et à renforcer l'avis d'arrêt du médecin pendant et après le traitement de la TB.

RESUMEN

MARCO DE REFERENCIA : Cinco consultorios de neumología en la provincia de Jogjakarta, Indonesia.

OBJETIVOS : Estudiar el hábito tabáquico de pacientes con tuberculosis (TB) antes del diagnóstico y después del tratamiento, investigar los mensajes relacionados con el tabaquismo transmitidos por los profesionales de la salud y los proveedores de DOTS y determinar los factores de predicción de recaída en el tabaquismo.

MÉTODO : Fue este un estudio transversal de 239 hombres que completaron DOTS entre 2005 y 2006. Se entrevistó a los pacientes en su domicilio mediante un cuestionario semiestructurado. No se incluyeron las mujeres en el estudio, pues muy pocas fumaban.

RESULTADOS : La mayoría de los pacientes con TB dejó de fumar durante el tratamiento, pero más de un tercio había vuelto a fumar 6 meses después de haber terminado el tratamiento. A cerca de 30% de pacientes no se interrogó sobre el hábito tabáquico ni se aconsejó su abandono. De los fumadores que recayeron, 60% había re-

cibido solo mensajes generales de salud y no mensajes sobre tabaquismo, específicos para pacientes con TB. En la actualidad, los proveedores de DOTS no están vinculados con las campañas de abandono del tabaquismo. Un importante factor de predicción de recaída en el hábito de fumar fue la percepción por estos pacientes de la inocuidad de cualquier grado de tabaquismo.

CONCLUSIÓN : Los médicos y los proveedores de DOTS deben tomar parte activa en el abandono del tabaquismo de los pacientes en tratamiento o con antecedente de tratamiento antituberculoso. Con base en estos hallazgos, el proyecto Quit Tobacco Indonesia está organizando una campaña experimental de capacitación de proveedores de DOTS, quienes en su mayoría son miembros de la familia de pacientes, a fin de que transmitan mensajes sobre el abandono del tabaquismo y refuercen los consejos al respecto formulados por el médico durante el tratamiento antituberculoso y después del mismo.