RESEARCH PAPER

Bringing smoking cessation to diabetes clinics in Indonesia

NAWI NG[*,†], MARK NICHTER[‡,||], RETNA SIWI PADMAWATI[§], YAYI SURYO PRABANDARI[*], MYRA MURAMOTO[||] and MIMI NICHTER[‡]

[*]*Department of Public Health, Faculty of Medicine, Gadjah Mada University, Yogyakarta, Indonesia*
[†]*Department of Public Health and Clinical Medicine, Umeå Center for Global Health Research, Umeå University, Umeå, Sweden*
[‡]*Department of Anthropology, University of Arizona, AZ, USA*
[§]*Centre for Bioethics and Medical Humanities, Faculty of Medicine, Gadjah Mada University, Yogyakarta, Indonesia*
[||]*Department of Family and Community Medicine, College of Medicine, University of Arizona, AZ, USA*

Objectives: To assess the feasibility of delivering brief and disease-centred smoking cessation interventions to patients with diabetes mellitus in clinical settings.
Methods: We conducted a feasibility study involving two interactive smoking cessation interventions: doctor's advice and visual representation of how tobacco affects diabetes (DA) and DA plus direct referral to a cessation clinic (CC). Follow-up was at 3 and 6 months post intervention. Primary outcome was 7-day-point prevalence abstinence. The study involved male patients recruited from two referral diabetes clinics in Yogyakarta Province, Indonesia during January 2008 to May 2009. Of the 71 patients who smoked during the last month, 33 were randomized to the DA group and 38 to the CC group.
Results: At 6 months follow-up, DA and CC groups had abstinence rates of 30% and 37%, respectively. Of those continuing to smoke, most reported an attempt to quit or reduce smoking (70% in DA and 88% in CC groups). Patients in both groups had increased understanding of smoking-related harm and increased motivation to quit smoking.
Conclusions: This study demonstrates the feasibility of disease-centred doctors' messages about smoking cessation for patients with diabetes, supported by the presence of a CC motivating clinicians to routinely give patients cessation messages.

Keywords: Diabetes mellitus, Health professionals, Indonesia, Smoking cessation

INTRODUCTION

The increasing prevalence of type 2 diabetes mellitus (diabetes) is a growing public health concern. The global burden of diabetes is projected to double from 171 million in 2000 to 366 million in 2030, with 22% of predicted diabetes cases in India, 12% in China, 8% in the US and 6% in Indonesia. By 2030, the diabetes burden is projected to increase by almost 2.5 times in Asia, sub-Saharan Africa, Latin America and Middle Eastern Crescent countries. In low- and middle-income countries, diabetes affects a larger proportion of those aged between 45 and 64 years compared to high-income countries where it affects mainly people over age 64 years.[1] Current Indonesian health system orientation towards non-communicable disease prevention and control programmes is generally weak and the system is not

Reprint requests to: Mark Nichter.
Email: mnichter@u.arizona.edu

prepared to tackle the epidemic of chronic diseases, including diabetes, unless preventive actions towards controlling chronic disease risk factors are being considered and taken seriously. Smoking cessation counselling has not been adopted as an essential clinical activity in many healthcare settings in Indonesia.

Epidemiological studies have shown that active smoking increases the risk of diabetes morbidity and mortality.[2–4] Smoking also increases the risk of fatal coronary heart disease,[5,6] a risk which is far greater for diabetes patients.[7] A meta-analysis of 25 prospective studies confirmed that active smokers have a 44% higher risk of type 2 diabetes (OR $= 1.44$, 95% CI $= 1.31–1.58$) compared to non-smokers and that this effect becomes stronger among heavy smokers compared to light smokers or former smokers.[2] Smoking among diabetes patients increases the risk of diabetes complications including premature death from cardiovascular diseases, progression of microalbuminuria and impairment of renal function and neuropathy.[8]

The strong evidence of a dose–response association between cigarette smoking and diabetes morbidity and mortality makes smoking cessation a priority in diabetes patient management. The International Diabetes Federation (IDF) has recommended that the smoking status of all patients be assessed and that cessation advice be offered as part of routine patient care.[9] Little is known about how often these recommendations have been adopted in routine clinical practice in low- and middle-income countries where the burden of smoking and diabetes is enormous. A previous study conducted by the authors in Indonesia found that few patients are told to quit smoking by their doctors and those that are commonly interpret such advice as general health advice and not specific to their diabetes.[10]

Indonesia has an extremely high percentage of male smokers and has unfavourably opted not to sign and ratify the Framework Convention on Tobacco Control. In 2007, it was estimated that 57% of Indonesian men aged 10 years and above smoked currently, while the prevalence was 4.5% among women.[11] At age 13–15, 28.4% of boys already smoke.[12] Also noteworthy, smoking is prevalent in all socio-economic groups.[13] Our research in Yogyakarta Province, Indonesia, found that 32% of diabetes patients being treated at government clinics continue to smoke and do not associate smoking with risk for diabetes or diabetes complication.[10] Our research also found that only 65% of diabetes patients had ever been asked about smoking by their doctors. Smoking cessation is not commonly encouraged by healthcare providers of any type in Indonesia and is not presently a routine part of diabetes counselling.[10,14] Interviews with busy doctors caring for patients with diabetes revealed that smoking cessation advice was seen as additional, not essential, advice for patients and that cessation materials were not found in their clinics. Interviews with patients made it clear that cessation advice and counselling needed to be disease specific, culturally sensitive, and focused on common questions that patients had about tobacco, but rarely articulated to busy doctors.[15]

This paper presents the results of a study we designed to test the feasibility and receptiveness of two interactive clinic-based smoking cessation interventions. The first involved disease-centred doctors' advice (DA) and the other DA plus referral to a smoking cessation clinic (CC) that employed a culturally sensitive approach to counselling. The study objectives were to evaluate the impact of these two interactive cessation interventions on (1) quit-attempt rates, (2) shifts in patient consciousness that smoking led to diabetes complications, and (3) whether the presence of the CC motivated doctors to deliver cessation messages in a clinic setting where smoking-cessation activity was previously low.

METHODS

Study Setting and Study Population

The study was conducted between January 2008 and May 2009 at two diabetes clinics in two main hospitals in Yogyakarta Province. The participating clinics were referral clinics in their respective districts, each treating between 500 and 1000 patients annually. Doctors who worked in the clinics expressed huge interest in this intervention study. Inclusion criteria were: (1) male over 18 years old, (2) type II diabetes, (3) reported smoking during the last 30 days and (4) informed consent for study participation. The research protocol was reviewed and approved by the Ethical Committee of Gadjah Mada University, Yogyakarta, Indonesia.

Study Design

This pilot study employed a randomized clinical trial design allocating patients into two groups: (1) doctor's disease-centred brief cessation advice (DA) plus information about the availability of an in-house cessation clinic, and (2) DA plus active referral to the cessation clinic (CC). Target sample size was 60 participants.

Participant Recruitment and Study Procedures

Patients attending outpatient clinics were asked by research staff about their smoking status and screened for other eligibility criteria. Eligible patients were informed about the study, and invited to provide informed consent and enroll in the study. Research staff conducted baseline interviews with all enrolled patients. Baseline information included the participants' smoking behaviour, previous quit attempts, perception of the harm of smoking for diabetes patients, and the participant's attitude towards their smoking and smoking cessation. Immediately after completion of baseline data collection, patients were randomized into DA and CC groups and their medical records were flagged with different colour stickers to indicate group assignment. Six doctors from the diabetes clinics participated in this study. Initial planning meetings and discussions were held between the research team and the doctors, and doctors participated actively in refining the intervention protocol. Doctors were trained to ask all patients about tobacco use in each clinical encounter, to note group assignment, and to deliver the appropriate scripted referral message for either the DA or CC group. Throughout the study period, regular discussion between doctor and research team was held to ensure that the intervention protocol was being rigorously followed.

Description of Interventions

Prior to this study, the development of culturally appropriate educational materials on diabetes and smoking was an important component of Project Quit Tobacco Indonesia (QTI) formative research.[16] The educational materials used in the study focused on common questions asked by patients about the relationship of diabetes and smoking, and identified culturally appropriate ways of dealing with common complaints about craving and withdrawal symptoms.[10] We provided doctors with educational materials graphically depicting diabetes complications related to tobacco use and visual illustrations of the way tobacco reduced circulation causing these complications. Patients had expressed a desire to know the mechanism involved in vascular restriction. The visual aid provided to doctors, and found in printed educational materials, contained five illustrations of diabetes complications which our formative research identified as having an impact on diabetes smokers: gangrene, coronary heart disease, impotence, gingivitis and blindness. Flip charts of graphic illustrations of complications were originally supplied to doctors, but these were replaced by less time consuming single page illustrations preferred by doctors.

The DA intervention consisted of the doctor delivering a brief, scripted quit

message to male diabetes patients after reconfirming that they were smokers at some level. The doctor's message specifically linked smoking to the five disease complications featured in pictures they showed to patients. Patients were then given printed educational materials and contact information about the availability of an in-house free CC in the hospital. The DA intervention was designed around a modified form of the 5As model for treating tobacco use and dependence developed by the US Department of Health and Human Services.[17] The 5As model of brief intervention required doctors to: (1) ask patients about tobacco use; (2) advise patients to quit smoking; (3) assess a patient's willingness to make a quit attempt; (4) assist the patient in the quit attempt; and (5) arrange follow-up with the patient. Recognizing the time constraints faced by physicians, we modified the physician's role in the 5As to include just three steps: ask, advise and refer.[17]

For the CC intervention, the doctor gave the same brief, scripted cessation message while showing the visual aid, followed by a written prescription directly referring the patient to the CC as part of their treatment plan. We wished to test whether a direct referral by the doctor led patients to go to the CC more often than a less proactive message that just informed them of the availability of a clinic.

Patients were informed about the clinic or referred, but those who chose not to go were not scolded for not attending, but encouraged to make use of the services during future consultations. Those who visited the clinic were offered single-session individual cessation counselling by a cessation counselor using all 5As. Counsellors further went over education materials with patients focusing on common questions often asked about the relationship between smoking and diabetes, and behavioural strategies and social support of handling cravings and withdrawal symptoms.[10,16] The counselor discussed each patient's smoking behaviour, assessed quitting motivations and barriers, and

discussed the availability of additional individual counselling sessions to assist patients in quitting smoking if and when patients were ready to think more about it. To reinforce the cessation messages offered by doctors and counsellors, smoking cessation posters specifically designed for diabetes were displayed in prominent high-traffic areas in the clinic and pharmacy waiting rooms. All diabetes patients who went to the clinic received a printed warning from the pharmacy that smoking was contra-indicated for diabetes patients each time they picked up their medication.

Follow-up assessments were conducted at 1 week, 3 months and 6 months after the intervention. Research staff conducted home visits for 1-week follow-ups. Three- and 6-month visits occurred mostly at the diabetes clinic, in conjunction with a clinic appointment. Follow-up interviews assessed use of CC, current smoking behaviour, quit attempts, and knowledge gained from educational materials provided by the doctor or cessation counsellor. Patients who were still smoking were asked if they had motivation to quit smoking in the next 6 months. Qualitative interviews were conducted with doctors during and following the study, and observations of clinic interactions and response to educational materials and posters were made throughout the study by social scientist members of the research team.

Quantitative Outcome Measures

The primary outcome measure was 7-day point prevalence abstinence, assessed at 1 week, 3 months and 6 months following the initial intervention. Secondary outcome measures included: patient initial and follow-up visits to the CC, quit attempts, efforts to reduce smoking, motivation and confidence related to quitting or maintaining abstinence, patient's responses to the CC and education materials, and patient's sharing of diabetes and smoking intervention materials with others outside the clinical setting.

Qualitative Outcome Measures

Doctors were interviewed by social scientist members of the research team at the end of the study to find out whether the existence of the CC had altered the importance they gave to routinely asking and advising about tobacco use advice following the study. They were also asked if they wished for the clinic to remain in the hospital at the close of the study and if they were willing to train clinic staff to provide cessation services and run the clinic in the future.

Statistical Analysis

Data were analysed using an intention-to-treat approach for all participants in the DA and CC groups.[18] In the intent to treat analysis, we adopted the most conservative approach for the primary outcomes, where patients for whom follow-up data were missing were treated as currently smoking. Repeated measures logistic regression was used to model the outcome measures as the dependent variables for the evaluation of intervention and time interaction effects. Data analyses were performed using Stata Version 10.

RESULTS

We used Glasgow's RE-AIM framework (http://www.re-aim.org/index.html) in presenting our results, and we therefore structure our results in the following sections: reach, efficacy, adoption, implementation and maintenance.

Reach

Diabetes patients ($n = 493$) were screened for study eligibility in the two clinics participating in this study between January 2008 and May 2009. See the consort Fig. for participant flow throughout the study. The majority (417/493, 85%) of screened patients reported that they did not smoke in the last 30 days, and hence were not included in the study. Only 5 out of 493 patients declined the invitation to participate in this study. There were no significant differences between the groups of DA and CC patients with respect to history of other chronic diseases, age at starting smoking, number of cigarettes smoked, smoking status in the last 6 months prior to the study and previous quitting attempts ($p > 0.1$) (Table 1).

Efficacy

Overall, the 7-day abstinence prevalence was higher in both groups at 6 months after intervention compared to the baseline. The CCs were attended by the patients with or without direct referral. The interventions also improved patients' perception of smoking and diabetes, and their motivation to quit smoking.

Abstinence Rates and Quitting Attempts

At 6 months follow-up, DA and CC intervention groups had point prevalence abstinence of 30.3% and 36.8%, respectively. Of those continuing to smoke at 6-month follow-up, the majority of both DA and CC group participants reported an attempt to quit or reduce smoking (69.6% and 87.5%, respectively). Repeated logistic regression analysis revealed a significant increase in abstinence prevalence in both groups over time, compared to baseline ($p < 0.001$). Among the diabetes patients who still smoked during the last 7 days, the proportions of those who reported any attempt to reduce or quit smoking also increased significantly in both groups over time ($p < 0.03$). The analysis, however, identified no significant intervention and time interaction effect, indicating no larger changes in abstinence prevalence or quitting attempts attributable to intervention group assignment. No difference was anticipated in this small sample given that most patients visited the CC only once (Table 2).

Attending the Clinic

Direct referral as compared to simply informing a patient about the presence of a CC influenced proportion of CC consultation significantly. In the CC group, 87% of patients visited the CC for counselling after
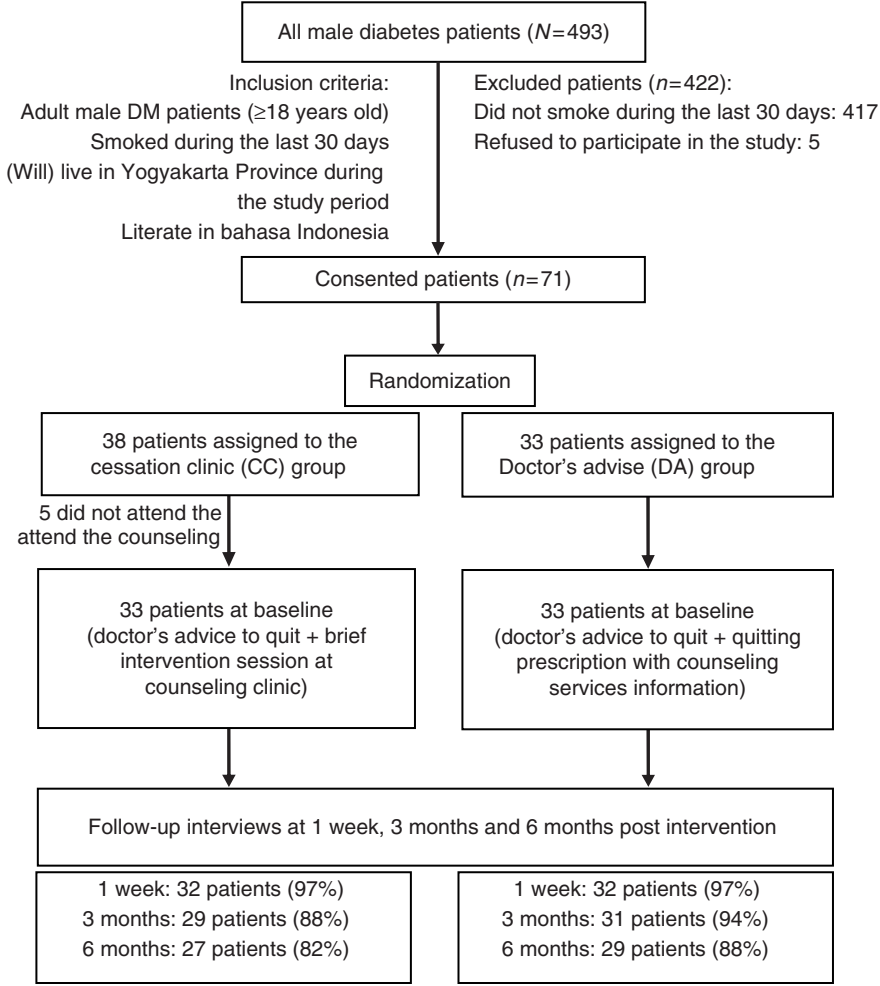
FIG.   Recruitment and follow-up of patients.

direct referral, whereas without any direct referral, about 30% of patients in the DA group made such a visit. At the sixth month we interviewed all patients who still continued to smoke. Notably, 75% of CC patients who had visited the CC and were still smoking stated that they would consider visiting the clinic again when they were ready to quit smoking.

Patient's Perceptions of Smoking and Diabetes and Motivation to Quit

At 6-month follow-up, we asked informants about the number of cigarettes perceived as safe to smoke by diabetes patients. A much higher percentage of both groups had a clearer sense of the harm posed by smoking to diabetes patients and the number of cigarettes they thought might be relatively harmless to smoke dropped from 3.7 cigarettes to 1.1 cigarettes in the CC group, as compared to a drop from 4 cigarettes to 2.6 cigarettes in the DA group. Notably, compared to baseline, the proportion of diabetes patients who agreed that a diabetes patient should not smoke and who perceived that smoking aggravates diabetes was significantly larger in both

TABLE 1.   *Baseline characteristics of study population by treatment group*

Characteristics[a]	Doctor advice/DA ($n = 33$)	Cessation clinic/CC ($n = 38$)
Mean age (SE)[b]	58.2 (1.7)	54.9 (1.3)
Highest education level (%)		
Primary	9.1	15.8
Secondary/Tertiary	63.6	39.5
University/College	27.3	44.7
Marital status		
Married	90.9	94.7
Not married/Widowed	9.1	5.3
Socio-economic class (%)		
Very poor/Low middle	35.5	35.1
Middle/High middle	64.5	64.9
History of other chronic diseases (%)	9.1	10.5
Mean age at starting smoking (SE)	18.4 (1.6)	20.5 (2.1)
Mean number of cigarettes smoked per day before DM diagnosis (SE)	10.6 (1.3)	11.1 (1.9)
Smoked daily in the last 6 months prior to the study (%)	87.9	79.0
Quit attempts prior to the study since DM diagnosis (%)	39.4	44.7

[a]No statistical difference was observed between the two groups ($p > 0.1$).
[b]SE=standard error for mean.

TABLE 2.   *Abstinence rates and quit attempts by intervention group*

Variables	Doctor advice/DA ($n = 33$)	Cessation clinic/CC ($n = 38$)	Group and time interaction z (*p*-value)
Attendance at cessation clinic			
Initial visit	10	33	
At least one follow-up visit	0	1	
7-day point prevalence abstinence			
At baseline (%)	0/33 (0)	4/38 (10.5)	1.46 (0.14)
1 week after intervention (%)	5/33 (15.2)	10/38 (26.3)	
3 months after intervention (%)	9/33 (27.3)	11/38 (29.0)	
6 months after intervention (%)	10/33 (30.3)	14/38 (36.8)	
Number of patients who tried to quit or reduce their tobacco among those who smoked in the last 7 days			
At baseline (%)	18/33 (54.6)	22/34 (64.7)	−0.81 (0.42)
1 week after intervention (%)	20/28 (71.4)	25/28 (89.3)	
3 months after intervention (%)	16/24 (66.7)	23/27 (85.2)	
6 months after intervention (%)	16/23 (69.6)	21/24 (87.5)	

groups at 6 months after intervention. Patients in both groups had increased motivation to quit smoking. A sub-analysis among diabetes patients who still smoked during the last 7 days showed that 96% of patients in the CC group and 74% in the DA group said that they were contemplating quitting or reducing smoking in the next 6 months (Table 3).

Adoption, Implementation and Maintenance

Patients' Response to Educational Materials
Qualitative research revealed that the educational materials handed out to patients by doctors and counsellors were well received by patients. Nearly all subjects reported reading the educational materials, and over

TABLE 3.   *Participants' perception of smoking-related harm and motivation to quit smoking*

Variables	Doctor advice/DA ($n = 33$)	Cessation clinic/CC ($n = 38$)	Statistics
Mean number of cigarettes per day perceived safe			*Independent t-test (p-value)*
For healthy people (SE[a])			
At baseline	6.0 (1.1)	4.3 (0.9)	−1.25 (0.21)
6 months after intervention	4.5 (1.1)	1.5 (0.5)	−2.61 (0.01)
For a diabetes patient (SE)			
At baseline	4.0 (1.0)	3.7 (0.8)	−0.2 (0.84)
6 months after intervention	2.6 (0.8)	1.1 (0.4)	−1.7 (0.09)
Perception of diabetes and cigarettes			*Group and time interaction z (p-value)*
% who agreed that a diabetes patient should not smoke			
At baseline	32.3	47.2	−0.13 (0.89)
6 months after intervention	60.6	76.3	
% who agreed that smoking aggravates diabetes			
At baseline	31.3	25.0	0.62 (0.53)
6 months after intervention	60.6	63.2	
Number of patients who expressed motivation to quit in the next 6 months, among those who smoked in the last 7 days			
At baseline (%)	21/31 (67.7)	25/33 (75.8)	−1.31 (0.19)
6 months after intervention (%)	17/23 (73.9)	22/23 (95.7)	

[a]SE = standard error for mean.

65% reported showing the educational materials to family members/friends.

Doctors' and Hospital Administrators' Response to the Smoking Cessation Clinic

Interviews with the six doctors participating in the study indicated that their clinical practices changed significantly over the course of the study, with all doctors self-reporting that they increasingly asked about smoking and advised patients to quit in their practice. These doctors also modelled the 3As to medical students attending clinics as part of their education. The visual aids were positively evaluated as facilitating the 3As and enabling them to point out the dangers of smoking to patients in an efficient and timely manner. Having a sufficient supply of educational materials on hand to give to patients, and a referral clinic where they could direct patients were identified as important factors in motivating them to engage in sustained brief smoking cessation efforts. Doctors expressed high interest in training clinic staff to provide cessation service and run the clinic in the future.

The hospital administrators also expressed strong support to the CC, and decided to continue to train staff, including nurses and health counsellors, in providing cessation counselling. The CCs have been kept going, and have been promoted as one of their superior services to patients.

DISCUSSION

The dangers of smoking for diabetes patients are not well understood in Indonesia. Indeed, our baseline data revealed that over 60% of the subjects in our study believed that smoking does not aggravate diabetes and/or that there is no association between smoking and diabetes. These results are

hardly surprising given that less than one-fourth of general physicians in Indonesia report asking and advising diabetes patients to quit smoking.[14]

The present study is a fledgling attempt to introduce smoking cessation to diabetes clinics in Indonesia. Our findings suggest that a brief disease-centred cessation message from the doctor, given in conjunction with use of disease-complication visual aids, has a significant impact on diabetes patients. Nearly one-third of our subjects quit smoking in the 6 months following doctors delivering messages alone. Being referred to a counselling clinic for a follow-up session supports doctors' brief disease-centred messages, but did not appear to significantly increase quit rates in our small pilot study. It is quite surprising to observe that one-third of patients in the DA group attended the counselling clinic without any direct referral. The doctor's message and information given to the DA group may indeed influence behaviour. Our 7-day abstinence prevalence increased up to 30.3–36.8% in both intervention groups at 6 months post intervention. Tobacco cessation is a process that takes time and is characterized by serial quit attempts and relapses for many smokers.[19] Notably, 70% or more of those who still smoked in the 7 days prior to the interview had tried to reduce cigarette consumption or to quit within 6 months post intervention.

Patients who attended a counseling session by and large found it informative. The educational materials were well accepted, and a large proportion of the respondents shared the materials with their friends or family members. Patients also saw doctors talking to them about smoking as appropriate, not invasive and not unwelcome. The patients, however, did not look to the clinic as a valuable source of ongoing support until they made a personal decision to quit. Many of those who did quit, and had attended the clinic once, noted that both the doctor's advice and the counsellor's advice had weighed into their decision to quit smoking immediately and without constructing a quit plan. This finding is in keeping with work on spontaneous quitting related to illness, fear and perceptions of risk.[20]

We also learnt the importance of putting up posters in the waiting room, doctor's room and counselling clinic as well as providing messages that smoking is counter indicated with drugs. The use of these multi-channel communications draws attention to the importance of quitting, especially for diabetes patients.

Strengths and Limitations of the Study

The aim of the study was to test the feasibility of introducing tobacco cessation in diabetes clinics in Indonesia through both disease-centred doctor messages and the presence of a visible smoking cessation clinic. Our observation is that doctors took smoking cessation more seriously as a result of the presence of a CC, and the clinic served to further validate the importance of smoking cessation for diabetes patients. Without cessation intervention, about 32% of diabetes patients who smoked before being diagnosed with diabetes continued to smoke following their diagnosis, and to some extent, they smoked at the same level as they did before their diabetes diagnosis.[10] At the conclusion of the project, participating hospitals opted to train staff and keep the clinics going. The study also documented broader patient interest in cessation unrecognized by the hospitals involved. During the study period, the cessation clinic received over 100 walk-in patients having other health problems whose interest was piqued by educational materials and smoking cessation posters placed in the clinics.

Even though social desirability bias might be present, we have tried to minimize the potential of this bias by providing careful training to the research assistants in conducting interviews. Questions asked in the follow-up were also carefully worded without any leading questions; for example, instead of asking how patient's smoking behaviour has changed since the intervention started,

we asked about patient's smoking habit in the last 7 days.

Two limitations of the study may be noted. First, baseline interviews with all subjects prior to seeing a doctor included questions about smoking history. These interviews were interpreted by some as an intervention (ask and assess). Second, we did not have a sample large enough to examine differences in quit rates between doctor-delivered and counsellor-delivered cessation efforts, nor a study duration long enough to see if and when patients returned to the CC in the future.

Implications for Clinical Practice

Although a small pilot study, this is one of the first tobacco-cessation interventions specifically developed for diabetes patients in low- and middle-income countries. Clinic-based smoking cessation is clearly warranted in Indonesia given the rising burden of diabetes among a large population of male smokers. The question is how best to deliver a cessation message to this patient population in a clear and consistent manner, and how best to provide support when they are ready to begin the process of quitting. Additionally, this study has pointed to the importance of introducing CCs in hospitals not just to reach patients, but to motivate doctors to stay engaged in the smoking-cessation process.

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