CAN INITIAL PERCEPTIONS ABOUT QUITTING PREDICT SMOKING CESSATION AMONG MALAYSIAN SMOKERS?

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Abstract. Perceived risks and benefits of quitting smoking may be important factors in successful treatment. This study examined the association between initial perceived risks and benefits of quitting smoking and outcomes during a two month smoking cessation attempt. Participants (n=185) were treatment-seeking smokers attending two smoking cessation clinics in Klang Valley, Malaysia. They received structured behavioral therapy and free Nicotine Replacement Therapy (NRT). Prior to treatment, a 12 item Perceived Risks and Benefits Questionnaire (PRBQ) was administered. This was used to assess the smoker's initial perceptions during their quit attempt. Participants were re-contacted at the end of two months to determine their smoking status. The results show participants intending to quit demonstrated a greater understanding of the benefits of quitting smoking than the risks of quitting. Those with a higher education level had a greater understanding of the benefits of quitting (p=0.02). PRBQ items, such as perceived risks of quitting (*ie* weight gain, negative affect, social ostracism, loss of enjoyment and craving) were not associated with abstinence at two months. However, those who perceived a benefit of higher physical attraction post-cessation were less likely to have stopped smoking at two months (OR 0.18; 95%CI 0.08-0.45). Other perceived benefits at baseline, such as health, general well-being, self-esteem, finances and social approval, were not associated with smoking cessation at two months. The results suggest that in our study population, smokers' baseline perceptions of the benefits of cessation of smoking prior to therapy are not associated with quit results at two months. Counseling patients regarding the advantages and disadvantages of quitting may have changed their perceptions during quitting process and should be further explored in future studies.

Keywords: perceived risk and benefit, smoking cessation, behavior therapy, nicotine replacement therapy, Malaysian

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INTRODUCTION

Several conceptual models have suggested many factors influence smoking cessation (Strecher and Rosenstock, 1997). These models postulate that in order for

smoking cessation to occur, an individual must first perceive personal vulnerability to its negative outcomes (Rosenstock, 1974). They must understand the outcome is severe, and quitting will reduce the likelihood of their personal susceptibility (Weinstein, 1988).

While some studies have explored the characteristics of smokers regarding the perceived risks and benefits of quitting on smoking initiation and intensity (Lyna *et al*, 2002), few studies have examined the perceived risks versus benefits of smoking cessation. It is also unclear how these beliefs affect their cessation outcomes. For example, a study in the US found the perceived benefits were positively related to motivation, while the perceived risks were negatively related to it. Perceived risks have also been shown to be negatively related to the outcome of treatment (McKee *et al*, 2005). Another study (Weinberger *et al*, 2008), examined the effect of perceived risks on treatment outcome concluded participants with greater knowledge of perceived risks found it more difficult to quit and not restart.

In this study we aimed to answer two questions: what are the characteristics of Malaysian smokers in relation to their perceived risks and benefits of quitting smoking and is there an association between initial perceived risks and benefits of smoking cessation and smoking cessation at two months?

MATERIALS AND METHODS

Participant recruitment

We carried out a prospective study, recruiting participants and administering a written questionnaire at baseline and following them up for eight weeks. The study was conducted from November 2009 to April 2010. Participants were smoking staff of two public universities in Klang Valley, who were interested in quitting smoking.

Letters of invitations were sent to the heads of all departments at each university one month prior to the program. All staff received e-mails inviting them to participate. The sessions were conducted during office hours.

In order to be eligible for the study, participants had to be daily cigarette smokers (during the previous 12 months) and want to quit smoking. They had to be able to communicate in either Bahasa Malaysia (the national language) or English and agree to use Nicotine Replacement Therapy (NRT). Subjects were excluded if they had a recent myocardial infarction, life-threatening arrhythmia, severe or worsening angina or had an allergy to any component of the medication. The study was approved by the Medical Ethics Committees of both Universities.

Clinic site preparation and program

We set up a temporary smoking cessation clinic at each university. The session was given by a medical doctor and an assistant. It covered both behavioral therapy and pharmacotherapy. Participants attended clinics by appointment.

During the clinic appointment, participants received general information regarding the study. After giving informed consent in writing, they were each given a Perceived Risk and Benefit Questionnaire (PRBQ), and sociodemographic and smoking history questionnaires. All participants were shown a Power Point presentation in a small group of 4-5 individuals. The educational session covered: 1) epidemiology and pathophysiology of smoking; 2) risks and impact of first and second hand smoking on self, family and the environment and; 3) the benefits

of smoking cessation. Participants were taught how to set a quit date and how to use NRT. Participants were given NRT gum for 1 month. At two months, participants were contacted by telephone to determine their smoking status.

Measures

Baseline characteristics and smoking status assessment. Basic demographic characteristics included age, education level marital status, and occupation. A smoking history questionnaire was developed for this study and included age started smoking, the amount smoked before quitting and number of previous attempts to quit. Smoking cessation was assessed via a telephone call at two months. Systematic reviews of smoking cessation studies confirmed for low intensity interventions, biochemical validation is not necessary (Patrick *et al*, 1994).

Perceived risks and benefits of quitting (PRBQ). The PRBQ Questionnaire assessed patients' perceptions regarding perceived risks and benefits of quitting smoking. It is a modified, shorter version of the original PRBQ Questionnaire consisting of 22 items (McKee *et al*, 2005). These items were grouped into six categories of benefit (health, well being, finances, self-esteem, social approval and physical appeal/attraction) and six categories of risk (increase in negative affect, weight gain, reduced ability to concentrate, social ostracism, loss of enjoyment and craving). A Likert scale of 1 to 5 was used, with 1 being "no chance", 2 being "unlikely, 3 being "moderate chance", 4 "likely" and 5 "certain to happen".

Prior to administration of the questionnaire, all materials were translated into Bahasa Malaysia and field tested for appropriate translation and vocabulary. The average item scores were used as a scale score for PRBQ.

Statistical methods

The results were analyzed using SPSS version 15.0. (SPSS, College Station, TX). Patients' demographic characteristics were presented using frequency counts, means and ranges. We evaluated differences in perceived risks and benefits using a chi-square test for categorical variables and a *t*-test or ANNOVA for continuous variables with sociodemographic characteristics and smoking history. We conducted univariate analysis and stepwise logistic regression of all these variables to find significant PRBQ predictors of quitting success.

We defined point prevalence quit rate as not smoking during the past seven days at the two month telephone interview. Smoking status at the initial visit was confirmed by CO ppm measurement (using a Bradford CO analyzer) of ≥ 6 ppm. Results at two months were reported without any biochemical validation. We used intention to treat analysis in assessing quit rates. In this analysis, subjects who could not be contacted (refused, changed their phone number, or intentionally gave the wrong telephone number) were considered to have continued smoking. Subjects who used NRT daily for at least two weeks, as evidenced by a smoking cessation diary were defined as adherent to NRT. Subjects who refused or took NRT for less than two weeks were considered not adherent to NRT.

RESULTS

Subjects characteristics

There were 138 and 47 respondents from University A and University B, respectively. Participants reported they started smoking at an average age of

17 years old (Range 9-42). The average number of cigarettes smoked per day was 14 cigarettes (Range 2-40). Mean CO measurement at the first visit was 15.5 ppm. The backgrounds and smoking characteristics of participants [*ie*, education status, ethnic group (Malay and Non-Malay), occupational status, marital status, previous quit attempts and adherence to NRT], at the two universities were not significantly different from each other (p>0.05) (Table 1).

Success rates

At the end of 8 weeks 27% (n=50) of participants stated they had given up smoking. Using an intention to treat approach, 10 participants, whose smoking status were unknown by 2 months (defaulted or could not be contacted via telephone), were considered as continuing to smoke.

Forty-one point one percent were noncompliant with NRT either due to side effects or they failed to follow-up. The success rates of those adherent to NRT was 2.34 times that of those non-adherent to NRT at two months; this was statistically significant (Odds ratio 2.34; 95% CI 1.35-3.32).

Total perceived risks and benefits of quitting smoking by sociodemographic and smoking history variables

We compared the PRBQ scores against the sociodemographic and smoking history characteristics. Smokers aged >51 years, were less likely to perceive the benefit of smoking cessation, compared to younger smokers, although this difference was not significant (p=0.07). Higher education was associated with higher perceived risks and benefits of quitting (p=0.02). There was no significant difference in any of the other sociodemographic characteristics or smoking histories (Table 2).

Table 1
Subject demographic and smoking characteristics.

Demographic and smoking characteristics	*n* (%)
Age group (years)	
18-29	77 (41.6)
30-40	43 (23.2)
41-50	43 (23.2)
≥ 51	22 (11.9)
Ethnic group	
Malay	176 (95.1)
Non-Malay	9 (4.9)
Education level	
Primary school	5 (2.7)
Secondary school	106 (57.9)
Diploma and above	72 (39.3)
Occupational	
Support group	171 (93.4)
Professional	14 (6.6)
Marital status	
Single	69 (37.3)
Married	113 (61.1)
Divorced	3 (1.6)
Smoking history	
Number of cigarettes/day	
< 10	27 (14.6)
≥ 10	158 (85.4)
Age started smoking (years)	
8-12	18 (9.7)
13-18	121 (65.4)
≥ 19	46 (24.9)
Previous quit attempts	
0	27 (14.6)
≥ 1	158 (85.4)
NRT used	
Non-adherent	109 (41.1)
Adherent	76 (58.9)

Perceived risks and benefits associated with abstinence

Those who successfully quit at two months were compared with those who still smoked using an independent sample

Table 2
Sociodemographic and smoking history variables by Perceived Risk and Benefit Qusetionnaire.

Demographic and smoking characteristics	Total perceived risk (mean)	*F*	*p*-value	Total perceived benefit risk (mean)	*F*	*p*-value
Age group (years)						
18-29	3.42	0.61	0.61	4.26	4.16	0.07[a]
30-40	3.28			4.35		
41-50	3.38			4.17		
≥ 51	3.46			3.79		
Ethnic group						
Malay	3.39	0.25	0.87	4.21	1.00	0.77
Non-Malay	3.35			4.13		
Education level						
Primary school	3.17	0.60	0.55	3.40	3.88	0.02[b]
Secondary school	3.38			4.18		
Diploma and above	3.43			4.27		
Occupational						
Support group	3.38	0.04	0.84	4.21	0.06	0.81
Professionals	3.35			4.16		
Marital status						
Single	3.39	0.28	0.76	4.20	0.27	0.76
Married	3.39			4.20		
Divorced	3.08			4.53		
Age group (years)						
18-29	3.42	0.61	0.61	4.26	4.16	0.07[a]
30-40	3.28			4.35		
41-50	3.38			4.17		
≥ 51	3.46			3.79		
Ethnic group						
Malay	3.39	0.25	0.87	4.21	1.00	0.77
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[a] $p<0.05$; [b] $p<0.01$

t-tests. Quitters had lower scores on physical appeal (t=-0.236, p<0.05), especially on "I will smell cleaner". Although, quitters scored higher means on perceived risk of weight gain, perceived benefit of higher self esteem, and social approval, the difference was not significant (p>0.05) (Table 3).

Multivariate analysis of 21 variables of predictors for cessation at two months included 13 perceived risks and benefits variables and 8 sociodemographic and social history variables. Of those variables, 4 significant PRBQ variables were included in the final model. They were health benefits, general well being, physical appeal and self esteem. After controlling for age, number of cigarettes smoked per day, work category and NRT adherence, there was only one PRBQ variable found to predict abstinence at two months. A higher physical appeal score strongly predicted lack of smoking cessation at two months (Wald=13.59; p<0.001) (Table 4).

DISCUSSION

Similar to other studies (Lyna *et al*, 2002; Kotz *et al*, 2009), smokers in this study were aware of the health risks associated with continuing smoking, as evidenced at a score of >3.00 on the risks and benefits of quitting. The majority of smokers were also aware that the benefits of quitting outweighed the risks of quitting. This is similar to a study among cardiovascular patients (Wiggers *et al*, 2005). Their study suggested patients who wanted to quit smoking felt their life was better after quitting than it would have been if they continued to smoke.

Our findings suggest a higher education status was related to greater awareness of the negative effects of smoking. A local household survey involving 11,000 people regarding knowledge and attitudes of smokers older than 18 years found a greater knowledge among more educated smokers (Lim *et al*, 2009). Although Malaysia has spent a considerable amount of money to carry out several nationwide anti-smoking campaigns, including mass media education, smoking cessation clinics and telephone quitlines (Aljunid, 2006), the prevalence of smokers in Malaysia only decreased from 23.5% to 21.5% over 10 years. A possible explanation is our efforts may not have reached the lower socioeconomic class and less educated smokers. Hence, the "one size fits all" approach may have been ineffective and inappropriate. To reach these groups, intervention materials need to meet appropriate literacy levels and complex information should be conveyed in a manner easily understood.

In contrast to studies conducted by McKee *et al* (2005) and Weinberger *et al* (2008) we found only one significant predictor of unsuccessful quitting after controlling for confounders. A higher initial perceived benefit of physical attraction among our population was found to be inversely related to quitting. This suggests non-quitters perceived physical attraction is a more important reason for them to quit compared to quitters before engaging in a quit attempt. Another reason behind this could be due to differences in perception, cultural backgrounds, ethnicity and norms, which are unique to our Malaysian population.

There were several limitations in our study. First, some subjects in our study did not comply with NRT. There were also many who were not able to maintain their smoking cessation status for up to two months. A second limitation was smoking status at two months was self-reported. Although, checking the CO level could confirm smoking cessation most smokers

Table 3
Univariate analysis: mean scale score of PRBQ by abstinence category.

Scale	Quit by 2 months *N*=50 Mean (SD)	Did not quit by 2 months *N*=133 Mean (SD)	Mean diff (95% CI)
Perceived risks from quitting			
Weight gain			
a. I will eat more	3.56 (1.03)	3.50 (1.13)	0.64 (-0.30, 0.82)
b. I will gain weight	3.52 (0.99)	3.46 (1.18)	0.06 (-0.31, 0.43)
Negative affect			
a. I will lower my chances of getting heart problems	3.09 (1.21)	3.15 (1.14)	-0.09 (-0.47, 0.29)
b. I will feel less calm	3.18 (1.14)	3.22 (1.16)	-0.03 (-0.41, 0.34)
Concentration			
a. I will have problems concentrating	3.04 (1.15)	3.34 (1.03)	-0.30 (-0.65, 0.05)
Social ostracism			
a. I will be more in control of my life	3.72 (1.26)	3.83 (1.05)	-0.11 (-0.47, 0.25)
Loss of enjoyment			
a. I will miss the taste of cigarettes	3.22 (1.32)	3.36 (1.20)	-0.13 (-0.54, 0.27)
b. I will miss the pleasure I get from cigarettes	3.02 (1.12)	3.26 (1.17)	-0.23 (-0.61, 0.14)
Craving			
a. I will experience intense cravings for a cigarette	3.27 (1.18)	3.39 (1.09)	-0.12 (-0.49, 0.25)
b. I will have strong urges for a cigarette	3.10 (1.19)	3.22 (1.10)	-0.11 (-0.49, 0.25)
Perceived benefit of quitting			
Health			
a. I will lower my chances of developing heart problems	3.94 (1.33)	3.74 (1.23)	0.20 (-0.21, 0.61)
Well-being			
a. I will live longer	4.02 (0.98)	4.02 (0.89)	0.01 (-0.29, 0.30)
b. I will breath easier	4.36 (0.92)	4.36 (0.97)	0.01 (-0.26, 0.27)
Self-esteem			
a. I will be more in control of my life	3.98 (0.93)	3.93 (0.81)	0.04 (-0.23, 0.32)
b. I will prove I can stop smoking	4.33 (1.06)	4.35 (0.81)	-0.02(-0.32, 0.26)
Finances			
a. I will be able to save money	4.10 (1.19)	4.41 (1.03)	-0.31 (-0.66, 0.04)
Physical appeal			
a. My breath will be fresher	4.40 (1.06)	4.56 (0.66)	-0.15 (-0.41, 0.10)
b. I will smell cleaner	4.20 (1.02)	4.57 (0.68)	-0.36 (-0.62, -0.10)
Social approval			
a. I will have the respect of my friends	4.06 (1.09)	3.95 (0.91)	0.11 (-0.20, 0.42)

Table 4
Predictors of quitting by 2 months.

	B	Wald	OR (95% CI)	*p*
Health benefits	0.28	2.37	1.32 (0.93-1.89)	0.12
General wellbeing	0.67	2.25	1.95 (0.81-4.69)	0.13
Physical appeal	-1.69	13.59	0.18 (0.08-0.45)	<0.001
Self esteem	0.59	2.60	1.80 (0.88-3.70)	0.11

OR, Odds ratio; 95% CI, 95% Confidence interval
Adjusted odds ratio controlled by number of cigarettes per day, age group, work categories and NRT adherence

had difficulty obtaining permission from their superiors to come to the clinic for this verification. A third limitation of our study was its duration of only two months. It would be useful to examine this relationship over an extended period of time.

Despite these limitations, our study had a number of strengths, including a diverse study population of smokers from various educational backgrounds. There were no significant differences between participants from the two universities in terms of socio-demographic characteristics and outcomes. The same medical officer and similar materials given at both universities reduced provider bias. The small group Power Point sessions were also a two way communication session where smokers exchanged ideas and worries about quitting. These sessions were presented in such a way as to enable even the least educated to comprehend the messages conveyed.

In conclusion, older smokers (≥ 51 years) were less likely to perceive the benefits of smoking cessation compared to younger smokers. The higher the education level, the greater the understanding of the risks and benefits of quitting (p=0.02). Initial beliefs about risks of quitting were not good predictors of smoking cessation.

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