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Smoking cessation intervention: Can diabetic patients' change their motivation to quit and nicotine dependence?

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Abstract

Introduction: Considering smoking tobacco is a bad habit that drive smokers to nicotine dependence; that argue an urgent need to evaluate factors keep them smoke and how a smoking cessation intervention can affect these factors and minimize their effect. As well as intervention impact on their nicotine dependence and motivation to quit.

Methods: This was a randomised controlled trial involving patients with diabetes who smoked tobacco and attended the out-patient diabetes clinic at Hospital Pulau Pinang in Malaysia.

Results: Among 126 participants followed over the study period, Malays represent about 41% of the participants. No significant difference between the patients in the two groups with respect to their nicotine dependence. However repeated measures test showed a significant difference over the study period but not with respect to the groups (intervention and control) Fagerström test $F(2,220) = 3.663$. Significant main effects were found among participants in the different groups with respect to their motivation to quit $F(1,110) = 3.975$.

Conclusion: changing patients behaviour may need consistent and comprehensive intervention for longer time.

Key words: Diabetes, factors keep smoking, motivation to quit, nicotine dependence and smoking cessation intervention.

INTRODUCTION

Smoking tobacco is an avoidable leading cause for mortality and is the most important modifiable cause of premature death, [1]. In recent years, there has been an alarming increase in the prevalence of diabetes mellitus worldwide as well as in Malaysia. As all know, diabetes mellitus is a costly chronic progressive disease that leads to the development of chronic micro- and macrovascular complications over time [2]. Many studies reported the relationship between tobacco smoking and poor glycaemic control [3-5]. Studies have documented unequivocal evidence of the negative effects of smoking tobacco on the human body, including heart disease and stroke, in patients with or without diabetes [6]. However, tobacco smoking is an independent risk factor for the development of macrovascular complications [7]. Smokers had twice the risk for developing diabetes than those who did not smoke [8]. Despite the parallel association between the tobacco smoking dose effect and mortality [9], it is never too late to stop smoking tobacco. Quitting tobacco smoking reduces the mortality risk in patients with diabetes within several years after quitting [10-12]. Therefore, in diabetes care, tobacco cessation is very important to facilitate glycaemic control and to reduce or delay the development of diabetic complications [13, 14]. For all that, reducing factors (from their point of view) affecting smokers is important to design more effective tobacco cessation strategies for diabetic patients. This study evaluate the impact of smoking cessation intervention on patients motivation to quit and their nicotine dependence; as well as its impact on smokers perception related to factors affecting their cessation.

METHODS

Study design and eligibility criteria

This study was a randomised controlled trial (RCT) involving patients with diabetes who smoked tobacco and who attended the out-patient diabetes clinic at Hospital Pulau Pinang in Malaysia. Participants were randomly assigned to one of two study groups: control group who received routine diabetes care counselling and the intervention group who received diabetes-specific tobacco cessation counselling.

Study period

The study was conducted between March 2012 and August 2013. Patients were asked to complete questionnaires at baseline (pre-intervention) and at their last visit (post-intervention).

Sample size and sampling method

The sample size needed for the RCT study was calculated using the equation below [15]:

$$m = C \times \frac{\pi_1(1 - \pi_1) + \pi_2(1 - \pi_2)}{(\pi_1 - \pi_2)^2}$$

The minimum estimated sample size of each group was (~48) patients. The sample size per group was increased by 30%, resulting in 67 patients. This study enrolled 70 tobacco smoking diabetic patients per group to compensate for patients lost to follow-up and non-respondents.

Randomisation

Random number table was used to create randomisation in this study.

Intervention (Tobacco Cessation Program for Diabetic Patients)

The tobacco cessation protocol consisted of performing popular protocol known as the 5A's strategy, the intervention in this study was delivered by physicians. Study participants in the two groups completed face-to-face questionnaires to check changes in the factors affecting smoking cessation, their motivation to quit and their nicotine dependence pre- and post-intervention. All participants signed an informed consent form upon participation in the study.

Measurement tools

A well developed and valid questionnaire was used to the evaluate changes in the factors affecting smoking cessation from smokers point of view pre and post intervention [16]. The Richmond Test Questionnaire was used to measure their motivation to quit pre and post intervention [17]; and Fagerström Test Questionnaire (FTQ) was used to measure participants nicotine dependence pre and post intervention [18].

Data analyses

The collected data were analysed using SPSS (version 18.0) software package (SPSS Inc., Chicago, IL). Descriptive and inferential statistics were used wherever appropriate. To determine the differences between the intervention and control groups with respect to outcome measures, nicotine dependence, motivation to quit, and factors affect quitting were assessed using the independent t-test, Mann-Whitney U test, Pearson's chi-square test and Fisher's exact test as appropriate. To assess the differences mixed ANOVA was chosen [19, 20]. P-value ≤ 0.05 was considered statistically significant.

Ethical approval

Approval to conduct this study was granted by the Medical Research Ethics Committee of the Ministry of Health, Malaysia and the Clinical Research Centre at Hospital Pulau Pinang, Malaysia (NMRR-11-477-9538).

RESULTS

An equal number of participants were enrolled in each group (Intervention group N=63, Control group N=63). Male participants represented the vast majority of participants. Approximately 41% of the participants were Malays, and 35% were Chinese. Surprisingly, more than half of the study participants did not know their diabetes type. The vast majority (94.4%) of participants started smoking tobacco prior to developing diabetes.

Table 1: Demographic characteristics of the studied population

Item Description	Frequency	Percentage
Age	47.6 ± 13.6 years	
Diabetes duration	9.1 ± 7.3 years	
Tobacco smoking duration	24.2 ± 11.9 years	
Race		
• Malay	51	40.5
• Chinese	44	34.9
• Indian	30	23.8
• Others	1	0.8
Gender		
• Female	6	4.8
• Male	120	95.2
Marital status		
• Married	96	76.2
• Single	24	19
• Divorced/widowed	6	4.8
Diabetes type		
• Type I	13	10.3
• Type II	35	27.8
• I don't know	78	61.9
Start smoke in relation to diabetes		
• Before disease onset	119	94.4
• After disease onset	7	5.6

There was no significant difference between the patients in the two groups with respect to their nicotine dependence over the study period; however, all of the patients exhibited low nicotine dependence as measured by Fagerström scale. Also, no significant difference was noted among patients in the two groups in their motivation to quit smoking tobacco during the first two visits. However, there was a significant difference in their motivation between patients in the two groups during their third visit (post-intervention).

No significant differences were noted between the groups with respect to factors motivating the patients to quit, factors promoting the continuation of smoking tobacco, and factors that make them relapse after quitting Table 3 pre intervention and Table 4 post intervention.

If we compare between Table 3 and 4, we can find that participants didn't change their mind about smoking is a habit. On the other hand, most of the participants change their answers in their third visit on factors that motivate them to quit and factors promoting relapse after quitting, they find that none of the choices can affect them.

Fagerström test showed a significant difference in the repeated measures test but not with respect to the groups (intervention and control) Fagerström test $F(2,220) = 3.663$ (Table 5). However, significant main effects were found in the participants in the different groups with respect to their motivation to quit $F(1,110) = 3.975$ (Table 6)

Table 2: Patient dependence on nicotine and patient motivation to quit smoking tobacco throughout the study period

Item	Intervention Group Mean ± SD	Control Group Mean ± SD	P Value
Fagerström test			
First visit (baseline)	3.6±2.2	3±2.1	0.129**
Second visit	3.2±2.3	2.7±2	0.313**
Third visit	3.2±2.4	2.6±2.1	0.213**
Richmond test			
First visit (baseline)	5.1±2.4	5.6±1.9	0.262**
Second visit	4.7±1.9	5.2±2.1	0.188**
Third visit	4.5±2.3	5.5±2.3	0.017 (S)*

*P values were calculated using the independent t-test and were significant (S) at < 0.05.

**P values were calculated using the Mann-Whitney U test and were significant (S) at < 0.05.

Table 3: Factors affecting quitting pre-intervention

Items	Intervention N (%)	Control N (%)	P Value
Factors motivating tobacco cessation			0.249*
• Health issues	33 (52.4)	33 (52.4)	
• Family advice	8 (12.7)	9 (14.3)	
• Physician advice	0 (0)	3 (4.8)	
• Financial	3 (4.8)	2 (3.2)	
• Desire to Quit	6 (9.6)	6 (9.6)	
• Religious	1 (1.6)	1 (1.6)	
• Other	1 (1.6)	1 (1.6)	
• Not applicable	11 (17.5)	8 (12.7)	
Factors promoting relapse after quitting			0.563*
• Other smokers	21 (33.3)	22 (34.9)	
• Alcohol	1 (1.6)	0 (0)	
• Depression	7 (11.1)	12 (19)	
• No family support	1 (1.6)	1 (1.6)	
• Weight gain	1 (1.6)	1 (1.6)	
• Addiction	1 (1.6)	2 (3.2)	
• Habit	8 (12.7)	11 (17.4)	
• Stress	12 (19)	6 (9.5)	
• Not applicable	12 (19)	8 (12.7)	
Factors promoting the continuation of smoking tobacco			0.339*
• Habit	35 (55.6)	47 (74.6)	
• Feel happy	4 (6.3)	4 (6.3)	
• Don't know	3 (4.8)	2 (3.2)	
• Addiction	1 (1.6)	1 (1.6)	
• Stress	14 (22.3)	8 (12.7)	
• Relaxing	6 (9.5)	1 (1.6)	

*P values were calculated using Pearson's chi-square test and were significant (S) at < 0.05.

**P values were calculated using Fisher's exact test and were significant (S) at < 0.05.

Table 4: Factors affecting quitting post-intervention

Items	Intervention N (%)	Control N (%)	P Value
Factors motivating tobacco cessation			0.214*
• Health issues	16 (25.4)	19 (30.2)	
• Family advice	0 (0)	3 (4.8)	
• Physician advice	0 (0)	1 (1.6)	
• Financial	0 (0)	0 (0)	
• Desire to quit	2 (3.2)	4 (6.4)	
• Religious	0 (0)	0 (0)	
• Other	0 (0)	2 (3.2)	
• Not applicable	45 (71.4)	34 (54)	
Factors promoting relapse after quitting			0.506*
• Other smokers	5 (7.9)	9 (14.3)	
• Alcohol	0 (0)	0 (0)	
• Depression	2 (3.2)	2 (3.2)	
• No family support	1 (1.6)	3 (4.8)	
• Weight gain	0 (0)	2 (3.2)	
• Addiction	0 (0)	0 (0)	
• Habit	5 (7.9)	7 (11.1)	
• Stress	4 (6.3)	3 (4.8)	
• Not applicable	46 (73)	37 (58.7)	
Factors promoting the continuation of smoking tobacco			0.471*
• Habit	35 (55.6)	39 (61.9)	
• Feel happy	4 (6.3)	10 (16)	
• Don't know	7 (11.1)	1 (1.6)	
• Addiction	0 (0)	0 (0)	
• Stress	15 (23.9)	9 (14.4)	
• Relaxing	2 (3.2)	4 (6.3)	

*P values were calculated using Pearson's chi-square test and were significant (S) at < 0.05.

**P values were calculated using Fisher's exact test and were significant (S) at < 0.05.

DISCUSSION

The Fagerström test is a simple method for evaluating a person's level of addiction to nicotine [21]. The nicotine dependence of all patients in our study was low according to the Fagerström test, and the patients' nicotine dependence decreased significantly over the study period (between pre- and post- the intervention). However, no significant differences between patients in the two

groups were noted that may be explained by; firstly no NRT medications were accompanied the intervention for more abstinence rate and secondly patients were randomly selected in the two groups not based on their desire to quit. Furthermore participants' low dependence can be linked to their poor response to the intervention which probably due to their belief that smoking less cigarettes wouldn't cause much harm. This is consistent with the results of a controlled multi-centre study [22] performed to evaluate an intervention programme for tobacco cessation in patients with diabetes mellitus in Sweden. These results are promising and suggest successful quitting attempts in the future because nicotine dependence is decreasing.

The American and Malaysian guidelines for tobacco cessation recommended assessing patients' motivation to quit as one of the first steps, followed by motivational advice if needed [23-25]. However, patients' motivation decreased over time in the two groups, but the decrease was not significant. At the end of the study period, all patients continued to be well motivated to quit according to the Richmond test and as mentioned before it is due to random selection for the patients in the two groups. However, a significant difference between the two groups was observed on their last visit, highlighting the need for intensive motivational counselling in the future. Findings reported by Thankappan K. and colleagues [26], who found that more than half of the patients who were ready to quit at baseline successfully quit smoking tobacco after 6 months. However, most of the participants who believed that smoking tobacco is a habit did not change their mind-set. Thus, further training sessions for physicians may be necessary in the future to motivate smokers to quit smoking tobacco and to discuss how to connect disease progress or deterioration with the negative effects of tobacco smoking.

CONCLUSION/RECOMMENDATIONS

The study revealed a significant effect of the intervention throughout the study period among all participants with respect to the nicotine dependence. Furthermore, the main effects between participants in the two groups were statistically significant with respect to their motivation to quit. These results should prompt further research investigations with longer follow-up periods, more intensive interventions and add on medications (NRT) to improve the participants' tobacco smoking behaviour. In conclusion, future research is highly recommended to determine how to motivate diabetic smokers to quit tobacco smoking. The increased understanding provided by this study findings are the cornerstone for future studies in tobacco cessation interventions among diabetic patients in Malaysia.

Table 5: Within-subject effects

Source	Measure	Df	F	Sig.	Partial Eta-Squared
Fagerström test	Sphericity Assumed	2	3.663	0.027	0.032
Fagerström test*patient group	Sphericity Assumed	2	0.087	0.917	0.001
Error	Sphericity Assumed	220			
Richmond test	Huynh-Feldt	1.814	1.849	0.164	0.017
Richmond test*patient group	Huynh-Feldt	1.814	0.660	0.504	0.006
Error	Huynh-Feldt	199.536			
Error	Sphericity Assumed	218			

The P value is significant (S) at < 0.05

Table 6: Between-subject effects

Source	Df	F	Sig.	Partial Eta-Squared
Fagerström test (patient group)	1	2.712	0.102	0.024
Richmond test (patient group)	1	3.975	0.049	0.035
Error	110			

The P value is significant (S) at < 0.05

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