SMOKING CESSATION INTERVENTION AMONG ACUTE CORONARY SYNDROME PATIENTS

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Background: Smokers with Acute Coronary Syndrome (ACS) are often unable to quit smoking without assistance. The effort to maintain their self-efficacy while quitting smoking is also challenged by their withdrawal symptoms. Thus, smoking cessation intervention with pharmacotherapy at a hospital based quit smoking clinic, is aimed at sustaining support for such patients following hospital discharge.

Objective: To examine the effect of smoking cessation intervention with pharmacotherapy on patients' smoking cessation rate, self-efficacy in quitting, and on their management of withdrawal symptoms.

Methods: A quasi-experimental design. Smokers with ACS (N=73) were recruited for a control group (n=39) and treatment group (n=34). The smoking behavioural counselling educationwith pharmacotherapywas tailored to their stage of readiness to quit and to move them forward through subsequent stages to eventual success.

Setting: Tertiary cardiac hospital.

Results: Evaluation for one month showed 41.2% (n=14) of the group who received the intervention (n=34) were able to quit compared with 15.4% (n=6) of the control group

(n=39). Smoking cessation self-efficacy increased significantly within one month in the intervention group (z= -4.865, p<0.05) but remained the same in the control group (z= -.787 p>0.05). The carbon monoxide score was significantly reduced across baseline, at day 14 and at day 30 (intervention group) with $\chi 2$ (2, n=34) = 63.79, p<0.05). The smoking cessation intervention with pharmacotherapy had an effect size of 0.6 after the first two weeks compared with 0.55 two weeks later. Change in smoking withdrawal symptoms score was correlated with change in carbon monoxide level (Rho= 0.358, p <0.05).

Conclusion: Smoking cessation intervention with pharmacotherapy among smokers with ACS has an effect on patients' smoking cessation rate and self-efficacy to quit smoking by virtue of frequent contact hours within one month following hospital discharge. The findings suggest an early assistance for patients who are struggling with smoking withdrawal symptoms.

Keywords: smoking cessation, cessation intervention, acute coronary syndrome.

Introduction

Acute coronary syndrome (ACS) is one of the leading causes of morbidity and mortality globally, as well as in Malaysia specifically (Alwan et al., 2011; Centers for Disease Control, 2010; Ministry of Health Malaysia, 2013; Chin et al., 2008). Among the modifiable risk factors for coronary heart disease (CHD) which include ACS, smoking is the strongest. One mechanism by which smoking cessation appears to reduce CHD risks is its ability to restore endothelial function. The results of a clinical trial on smoking cessation medications shows flow-mediated vasodilation increased after one year in those who quit smoking, but not in those who continued to smoke (Johnson, Gosset, & Piper, 2010). Moreover, helping a smoker with ACS achieve cessation reduces their mortality by up to 50% over the next 3 to 5 years (Wilson et al., 2000).

However, despite the value of smoking cessation for CHD patients, over half of those patients continue to smoke after hospital discharge (Berndt et al., 2012; Scholte et al., 2006). Even though many of these patients have made several attempts to quit, they seem unable to quit smoking without assistance. Several studies show psychosocial cognitive factors could also contribute to the success or failure of smoking cessation attempts during and after hospitalization for CHD (Berndt et al., 2013; Berndt et al., 2012; Bolman et al., 1998; Johnston et al., 2004; VanBerkel et al., 2000; Bursey&Craig, 2000; Chouinard&Robichaud, 2007).

The readiness to quit and high cessation-related self-efficacy, often predict lower levels of withdrawal symptoms in the patient throughout the cessation process and a higher likelihood of abstinence after completing a smoking cessation program (Ezat et al, 2008, Morrell et al, 2011 & Schnoll et al., 2011). Hence, self-efficacy has been evaluated as a specific predictor of treatment outcomes in the context of smoking cessation trials (Hendrick

et al., 2010). A study by Bakker et al. (2015) showing the interaction found between smoking behaviour and self-efficacy, indicates that only quitters show a positive relation between self-efficacy and intention to (permanently) abstain from smoking. In smokers, self-efficacy is not related to their intention to quit (Bakker et al., 2015).

On the other hand, high nicotine dependence is also one of the factors associated with smoking resumption after hospital discharge (Attebring et al., 2004; Holtrop et al., 2009; MacKenzie et al., 2004; Quist-Paulsen et al., 2005). Smokers experience symptoms of nicotine withdrawal as a consequence of diminished nicotine receptor stimulation and falling levels of dopamine (Pipe et al., 2010). Thus, this emergence of nicotine withdrawal symptoms can trigger a relapse during attempts to quit smoking (Pipe et al., 2010).

Literature review

Several studies have examined the effectiveness of smoking cessation interventions (behavioural counselling) to help patients to give up smoking and reasonable evidence indicates the potential benefit of behavioural counselling (Rice et al., 2013). Furthermore, intensive counselling delivered post-discharge for at least one month, has been shown to achieve much higher quit rates than the provision of brief in-hospital advice and assistance. (Rigotti et al, 2012, Berndt, et al., 2014).

Nicotine replacement therapy (NRT) and several non-nicotine pharmacotherapies, including bupropion and varenicline, have also been shown to improve quit rates when used in conjunction with counselling for behavioural change and should be considered an important adjunct to, but not a replacement for, nursing interventions (Stead and Lancaster, 2012). Therefore, evidence-based guidelines for quitting smoking have recommended combined approaches that use behavioural and pharmacological therapies (Fiore et al., 2008; Van Weel et al., 2005) since these have been shown to be most likely to increase cessation

rates (Rigotti et al., 2012). A study done by Berndt et al, (2014) has shown the effectiveness of combined approaches using intensive behavioural counselling and NRT in patients with established CHD.

Apart from the component of smoking cessation intervention, hospital-initiated smoking cessation interventions have been nominated as the gold standard for patients with CHD (Rigotti, 2009; Smith & Burgess, 2009b). However, the hospital admission stay is brief and busy, and thus it is quite difficult to offer inpatient smoking cessation interventions to the patient. Bollman et al, (2002), in their study, tested bedside counselling with optional follow-up telephone calls after hospital discharge provided by nurses, but these types of interventions turned out to be unfeasible in practice. Other studies have also shown that nurses often report difficulties in providing in-hospital smoking cessation counselling and follow up care, citing lack of time, lack of skills,no reimbursement, and other priorities (Segaar et al. 2007; Sarna et al, 2009).

On the other hand, a study undertaken by Berndt et al. (2011) found brief smoking cessation practices (5A's- Ask, Assess, Advise, Assist, Arrange) are adequately performed on cardiac wards; yet, the most of effective practices, such as offering assistance and arranging for follow-up, are still less than optimal. Thus, newer approaches for supporting smoking cessation recommend nurses minimize their brief smoking cessation practice by identifying smokers, advice to quit, and refer them to out-patient smoking cessation services (Berndt et al., 2013; Orleans et al., 2006).

Consequently, the focus of these approaches is no longer on the accomplishment of nursing counselling at the bedside. In light of this, there has been a shift in smoking cessation treatment from the inpatient to the out-patient setting, enabling ward nurses to refer patients to competent community health professionals dedicated to smoking cessation

counselling with adequate time (Berndt et al., 2011; Berndt et al., 2013). In Malaysia, with an estimated 5 million smokers and an incidence of ACS of approximately 141 per 100, 000 adults per year (National Cardiovascular Disease Database, 2006), the need of hospital based smoking cessation in a Malaysian setting with follow up support after hospital discharge, has the potential to reach many smokers and yield substantial clinical and public health benefits (Robson and Hussain, 2012).

In light of this need, the study aims to examine the effectiveness of an individualized smoking cessation intervention with pharmacotherapy at a hospital-based quit smoking clinic among ACS patients on their point prevalence of abstinence rate (smoking cessation rate), self-efficacy while quitting smoking and their ability to cope with withdrawal syndrome.

Methods

Study design and sampling

A pretest-post-test quasi-experimental design was used with two non-randomized study groups (intervention and control). This design was chosen to examine the effectiveness of the individualized smoking cessation intervention with pharmacotherapy among ACS patients on their point prevalence of abstinence rate, self-efficacy in quitting smoking and their ability to cope with withdrawal syndrome.

Purposive sampling was done of identified patients who were smokers at least one month prior to hospitalization, and at the preparation stage of quitting smoking. The inclusion criterion for recruitment were patients diagnosed with CHD generally, or ACS specifically, who reported still smoking one month prior to hospitalization. Patients were excluded if they had mental illness.

Sample size

The sample size was calculated by using PS Software and was based on previous research (standard deviation and effect size). For a significance level of 0.05 (one tailed) and a power of 80%, this implied a sample size of 36 per group. Assuming 20% dropouts, the sample included 40 smoking patient (per group), and a total number of 80 patients at baseline was recruited.

Setting and recruitment

The study was conducted at cardiac wards of a tertiary cardiac hospital. This hospital also known as a main cardiac referral centre in Malaysia.Data was collected from January 2012 until June 2012. The recruitment sites for the study were six wards (medical cardiology and surgical cardiothoracic wards), including a day care unit. Patients who agreed to participate in the study were approached and then underwent a screening process to ascertain their stage of readiness to quit (pre-contemplation, contemplation, preparation and action) according to the transtheoretical model (TTM) algorithm adapted from DiClemente et al (1991).

The Fagerstrom test (Heatherton et al., 1991) questionnaire was used to assess patients' levels of dependence on nicotine. Then, based on the screening results, patients were allocated equally either to the intervention or control group. However, patients were given a choice to change if they preferred. Despite having been assigned a group. This was because some patients had financial constraints in attending the smoking cessation intervention at out-patient hospital-based quit smoking clinics. Baseline data, including patients' demographics, smoking quitting history, self-efficacy level and withdrawal symptoms were obtained from each patient using a self-administered questionnaire.

Under the usual hospital care, all patients received a health education session (include smoking cessation component) given by cardiac rehabilitation nurses in the ward. Following hospital discharge, the control group was informed by the researcher that a phone call follow up wouldbe made at Day 14 and again at Day 30. Any questions regarding smoking cessation were clarified promptly before patients were discharged from hospital. Meanwhile, for the intervention group, the weekly appointment date to attend individualized smoking cessation at a hospital based quit smoking clinic, was given. The researcher made a reminder phone call to every patient in the intervention group a day before their appointment date in order to increase the response rate.

Intensive smoking cessation intervention with pharmacotherapy

Patients in the intervention group received face to face individualized smoking cessation intervention with pharmacotherapy at an out-patient hospital-based quit smoking clinic.

The individualized smoking cessation intervention was tailored based upon TTM (Prochaska DiClemente, 1983). This model suggests that behaviour change involves a nonlinear progression through the stages of pre-contemplation, contemplation, preparation, action and maintenance. The TTM of behaviour change incorporates Bandura's (1986) notion of self-efficacy, which refers to the level of confidence an individual has in his ability to change a particular behaviour. Self-efficacy increases linearly with each successive stage (DiClemente et al., 1991). Therefore, this individualized smoking cessation intervention was incorporated to matched with the individual's stage of readiness to change.

The tailored individualized smoking cessation intervention entails steps for the patient on learning how to remove the cues for relapse, how to develop coping skills and gain social support from the family. The intensity of intervention was up to one hour or more at the first

session and half an hour for the subsequent follow-ups. The high intensity of interaction was aimed to develop the provider-patient trust relationship and enhance the patients' motivational levels. Meanwhile, during follow up at Day 14, the nurse counsellor reinforced patients' actions in tackling their smoking withdrawal symptoms, gave attentive responses to patients' change-talk, and provided ongoing supportive motivation for behaviour modification.

At the end of each session of individualized smoking cessation intervention, patients in the intervention group received a pharmacotherapy either a Nicotine Replacement Therapy (NRT) or Varenicline (non-nicotine pharmacotherapy) according to their preference. Pharmacotherapy has been prescribed to each patient throughout the study duration (one months) along with information sheet on NRT/Varenicline necessity and instruction of usage.

Measures/Questionnaires

Demographic variables

Baseline assessments of demographic information (age, gender, race, education level, job, income, diagnosis) and smoking-related information (smoking duration, smoking consumption, previous quit attempts, and method of quitting) were collected.

Nicotine dependence

The Fagerstrom Test for Nicotine Dependence (FTND) (Fagerstrom, 1978) was administered to measure patients' nicotine dependence level with Cronbach's $\alpha = 0.722$. The instrument uses a five-point Likert scale for all six items, on a scale of 0–11, with 11 being the highest level of nicotine dependence. A total score is obtained by summing raw scores, as outlined by scoring codes, for each item. Cut-offs, indicating level of dependence, are 0–2 = low dependence, 3–6 = moderate dependence and 7–11 = high dependence.

Smoking abstinence self-efficacy scale

The smoking abstinence self-efficacy scale (SASE) was used to assess smokers' levels of confidence that they would not smoke in nine challenging situations (positive/social situations, negative/affective situations and habit/addictive situations). The SASE uses the short form of the Situational Self-efficacy Measure, which was originally developed and tested by Fava, Rossi, Velicer, and Prochaska in 1991 (as cited in Fava, Velicer, &Prochaska, 1995). Each subscale is a 3-item, 5-point scale. Level of confidence was indicated on a five-point Likert scale from 1="Not all confident" to 5="extremely confident". A total score was computed to represent greater self-efficacy by summing the nine items of this scale (1-5 points). To obtain mean scores for individual subscales, sum items scores for each subscale and divided by three. Higher scores indicate higher confidence not to smoke.

Smoking withdrawal symptoms

The Wisconsin Smoking Withdrawal Scale (WSWS) questionnaire was used in this study to identify patients who experienced withdrawal symptoms during the process of quitting smoking (Welsch et al., 1999). This 28-item scale contains seven reliable subscales (Anger, Anxiety, Sadness, Concentration, Craving, Sleep, and Hunger), tapping the major symptom elements of the nicotine withdrawal syndrome with Cronbach's α =0.836. The items were scored on a five-point Likert type scale (0 = strongly disagree, 4 = strongly agree). Scale scores are calculated as the sum of respective items and no items are reverse scored.

Point prevalence of abstinence rate

In this study, point prevalence of abstinence rate was measured across three time durations i) baseline (prior to hospital discharge) ii) at Day 14 and iii) at Day 30. It was used to obtain patients' self-reported smoking behaviour and categorised as abstinence or not,

according to the answer given to the question, “Have you refrained from smoking at baseline, at Day 14 and Day 30”? (o=no; 1=yes).

For the control group, their self-report of smoking status was obtained at baseline (prior to hospital discharge and the telephone follow-up was made following hospital discharge at Day 14 and at Day 30. Their self-report was not validated by carbon monoxide (CO ppm) verification due to financial constraints and the impracticability of attending the quit smoking clinic just for this procedure. For the intervention group, on the other hand, the self-report of smoking status was verified by biochemical verification (CO ppm level) using reliable smoker lyzer equipment at the quit smoking clinic.

According to Velicher&Prochaska (2004), the use of point prevalence abstinence rate in an intervention study allows lapses (brief returns to smoking) or relapses (extended returns to smoking) to occur following treatment without making it necessary to categorize the smoker as a permanent failure. This smoking cessation measure therefore captures the dynamic process of quitting and reflects better how people change in their natural environments, than does a continuous abstinence measure.

Data analysis

The data collected was recorded and analysed using SPSS 16. In addition to percentage, frequency and average analyses, smoking cessation rates were calculated on the basis of available follow-up data, coding patients who were still smokers on follow-up. In this study, non-parametric testing was used as collected data was non-normally distributed. Data that were statistically significant were those with a p-value of <0.05.

A Wilcoxon Signed Rank Test was used to examine the difference between smoking cessation self-efficacy at baseline and after one month. Then, a Friedman Test was used to examine whether any reduction in expired carbon monoxide (CO ppm) levels had occurred

across three times spans (Day 1, Day 14 and Day 30). Meanwhile, Spearman Rho Correlation was used to determine the association between age, education level, duration of smoking (in years), nicotine dependence, and withdrawal symptoms.

In addition, multiple logistic regression analyses were performed to study the associations between intervention vs control, demographics and smoking cessation as the outcome.

Ethical considerations

The study was approved by the Institutional Review Board (reference no: IJNEC/04/2011(2). Informed consent from patients was obtained prior to administering the questionnaire.

Results

At the beginning, 80 patients were enrolled in this study. During follow up at one month, one patient from the control group had deceased and six patients from the intervention group failed to follow up. This left a total of 73 patients (39=control group and 34=intervention group), with a response rate of 91.1% at the end of one month's evaluation. In this study, all patients were male and this could be due to the national high prevalence of smoking among males compared to that among females (Global Adult Tobacco Survey Malaysia, 2011). 76.7% of the patients were Malay and almost all respondents (91.8%) were married, 56.2% had attained secondary school education, 65.8% were still working and 30.1% reported their monthly income as being below RM 1000.00 @ USD 230.00

All the participants had been smoking for 34 years (mean duration of smoking), had moderate levels of nicotine dependence and experienced somewhat high levels of smoking withdrawal symptoms. It was noted that all the patients intended to quit smoking gradually (all were in the preparation stage following TTM), 50.7% had attempted to quit smoking

more than once previously, and 90.4% of the participants in this study had been admitted for Percutaneous Coronary Intervention (PCI) (Table 1.1).

Table 1.1
Distribution of the Socio-Demographic of respondents (N=73)

Variable	Control (n=39)				Intervention (n=34)			
	f	(%)	Mean	SD	f	(%)	Mean	SD
Age			51.6	12.5			52.8	11.7
Gender								
Male	39	(53.4)			34	(46.6)		
Race								
Malay	32	(82.1)			24	(70.6)		
Chinese	1	(2.6)			4	(11.8)		
Indian	5	(12.8)			5	(14.7)		
Other	1	(2.6)			1	(2.9)		
Marital status								
Married	36	(92.3)			31	(91.2)		
Single	3	(7.7)			3	(8.8)		
Occupation								
Yes	26	(66.7)			22	(64.7)		
No	2	(5.1)			3	(8.8)		
Pensioner	11	(28.2)			9	(26.5)		
Education Level								
Primary school	7	(17.9)			5	(14.7)		
Secondary school	25	(64.1)			16	(47.1)		
College/University	7	(17.9)			3	(38.2)		
Income								
Less than RM1000 @	15	(38.5)			7	(20.6)		
USD230	10	(25.6)			11	(32.4)		
RM1001 – RM2000	4	(10.3)			5	(14.7)		
RM2001 – RM3000	10	(25.6)			11	(32.4)		
RM3001 and above								
Admission Reason	5	(12.8)			0	(0)		
For CABG	23	(84.6)			33	(97.1)		
For Angiogram	1	(2.6)			1	(2.9)		
Other								
			32.7	13.2			35.7	11.6
Duration of smoking								
Attempt to quit smoking previously:	19	(48.7)			6	(17.6)		
None	3	(7.7)			8	(23.5)		
Once	17	(43.6)			20	(58.8)		
More than once								
Intended to quit smoking as:	0	(0)			0	(0)		
Cold Tukey	39	(100)			34	(100)		
Gradually								
			3.48	2.06			4.85	2.53
Nicotine dependence level								

Smoking withdrawal symptom			62.1	6.58			62.5	3.76

Point prevalence of abstinence rate

Point prevalence of abstinence rate shows that 20.6% patients who received smoking cessation intervention were able to stop smoking after 14 days. The number of patients who were able to quit increased to 41.6% patients at the end of the one-month evaluation period. It was noticed that only 15.4% patients in the control group were able to quit (gradually or cold turkey) at the end of the one month evaluation period (Table 1.2).

Table 1.2

Point prevalence of smoking abstinence rate among respondents (N=73)

Point Prevalence of smoking abstinence rate	**Control group (n=39)**		**Intervention group (n=34)**	
	n	**%**	**n**	**%**
At baseline:				
Yes (smoking)	33	(84.6)	33	(97.1)
No (quit smoking)	6	(15.4)	1	(2.9)
At Day 14:				
Yes (smoking)	33	(84.6)	27	(79.4)
No (quit smoking)	6	(15.4)	7	(20.6)
At Day 30:				
Yes (smoking)	33	(84.6)	20	(58.8)
No (quit smoking)	**6**	**(15.4)**	**14**	**(41.2)**

Smoking cessation self-efficacy for both groups

The fact that self-efficacy increased after the intervention was statistically significant ($z = -4.865$, $p < 0.05$) (Table 3.3.1). The study demonstrated that the magnitude of intervention had a large effect size ($r = 0.59$) on patients' self-efficacy. Compared to the control group, self-efficacy remained the same after the one-month evaluation and it was not significant ($z = -.787$, $p > 0.05$) (Table 1.3).

Table 1.3

Smoking Cessation Self efficacy score at baseline and after one month follow up among intervention and control group

	Median Difference	**Z**	**P value**
Control group	3	-.787	>0.05
Intervention group	12	-4.865	**<0.05***

*. Correlation is significant at the 0.05 level (2-tailed).

Expired carbon monoxide (CO ppm) levels across three time points (Baseline, Day 14 and Day 30) for the intervention group

Table 1.4 shows there was a statistically significant difference in reduction of expired CO over time, with $\chi 2\ (2) = 63.79$, $p<0.05$. Further post-hoc tests suggested the reduction in median CO and the largest effect size was found ($r = 0.6$) from Day 1 to Day 14, and it was significant ($z = -4.951$, $p < 0.05$). Meanwhile, the reduction in expired CO ppm level from Day 14 to Day 30 was also significant ($z = -4.558$, $p < 0.05$, with large effect size ($r = 0.55$) (Table 1.5).

Table 1.4

The effect of smoking cessation intervention with pharmacotherapy among intervention group on Carbon Monoxide (CO ppm) level across three time periods (baseline, at day 14 and at day 30)

	n	χ^2	**df**	**P value**
CO ppm score across three time periods (day 1, day 14 and day 30)	34	63.79	2	**<0.05***

*. Correlation is significant at the 0.05 level (2-tailed).

Table 1.5

Median Difference and effect size between two duration periods (baseline to day 14 and at day 14 to day 30)

Intervention periods	**Median difference**	**Effect size**
Day 1 to Day 14	3	0.6
Day 14 to Day 30	1	0.55

Relationship between age, nicotine dependence level, duration of smoking and withdrawal symptoms with CO ppm level

The correlation between withdrawal symptoms and CO ppm level was found statistically significant (rho = 0.358, $p<0.05$) (Table 1.6). Meanwhile, in this study, CO ppm level and age, education level, duration of smoking and nicotine dependence were found not to be correlated.

Table 1.6

Positive relationship between smoking withdrawal symptoms with CO ppm level among intervention group

	Rho@r	P value
Age	-.141	>0.05
Duration of smoking	-.171	>0.05
Nicotine Dependence score	.078	>0.05
Smoking withdrawal score	.036	**<0.05***

*. Correlation is significant at the 0.05 level (2-tailed).

Multiple logistic regression analysis

The logistic regression analysis for point prevalence abstinence shows a significant intervention effect, *Z*= 4.325 -2.123(Group). The *p* value for group is 0.014 indicating group (intervention and control) is a significant predictor of point prevalence abstinence. The more the intervention given the point prevalence of abstinence will be shorter.The OR=0.120, and the 95% CI is [0.022, 0.649] *P*=0.014, Thus, for every unit increase in intervention, the odds of point prevalence of abstinence is expected to decrease by 2.123. Base on the magnitude, the OR value is very small. Though the value of 1 does not falls within the 95% CI, the whole interval is very close to 1. Hence, intervention is poor predictor of point prevalence of abstinence.

Likewise for education the logistic regression shows Z= 4.325 -1.743(education). The p value for group is 0.022 indicating education level is a significant predictor of point prevalence abstinence. The higher the education level given the point prevalence of abstinence will be shorter.The OR is 0.175, and the 95% CI is [0.39, 0.782] P=0.022, Thus,

for every unit increase in education level, the odds of point prevalence of abstinence is expected to decrease by 1.743. Base on the magnitude, the OR value is very small. Though the value of 1 does not falls within the 95% CI, the whole interval is very close to 1. Hence, education is poor predictor of point prevalence of abstinence.

However, it was also noticed, none of the demographic data (other than education level) was significantly related to intention towards non-smoking.

Discussion

Given the importance of smoking cessation in cardiac patients, this study emphasizes the need of enhancing patients' self-efficacy in preparation of quitting smoking following hospital discharge. Comparing patients in the control group who quit without assistance, the study yields the fact that self-efficacy among patients in the intervention group was increased when they received individualized intensive smoking cessation therapy at a quit smoking clinic hospital following discharge.

A study by Schnoll et al. (2010), revealed that respondents who exhibited a greater increase in self-efficacy while quitting smoking over the course of the first two weeks of treatment, were significantly more likely to be abstinent at the end of treatment, and that this relationship persisted in the assessment of abstinence conducted at six months following the target quit date. This study suggests that without smoking cessation intervention, patients with low self-efficacy are almost certain to be relapse, even knowing they have been diagnosed with ACS. Thus, promoting a smoker's ability to quit smoking seems important in enhancing their self-efficacy for success following treatment (Schnoll et al., 2010).

In this study, the intervention groups made frequent face to face contact with the nurse counsellor and received intensive smoking cessation intervention. The nurse counsellor delivered the individualized smoking cessation program along and used patient medical

records to reflect on the patient's current treatment and management and to link the effect of smoking with their current health status. The first visit and therapeutic contact are very important for developing patient interest in empowering themselves to quit smoking.

According to Roberts et al., (2013), a patient-centred approach enhances an individual's motivation for change through self-examination and identification of ambivalence to change and the subsequent resolution that leads to sustained positive behaviour change. In the present study, group support counselling was offered to the intervention groups in a separate session after Day 30 and the response from the group was overwhelming. A systematic review done by Stead & Lancaster (2005) concluded that group counselling allows participants to share their experience in quitting, and it encourages peer support.

Apart from that, the patients' motivation to quit in the preparation stage increases linearly with each successive stage. Although the stages are generallyexpressed as discrete steps, the process has also been depicted as a spiral (Chouinard, 2005), as cyclical (switching between quitting and relapse; , 2004) or as a contemplation ladder (Patten, 2004) to indicate the likelihood of progression and relapse before achieving behavioural change.

Meanwhile, a reduction in expired CO (suggesting a decrease in cigarette consumption) among patients in the intervention group was observed within the one month period of evaluation. In this study, patients were involved and engaged in monitoring their own CO ppm level at each visit. In an effort to improve success rates, this activity could be suggested as a motivational tool for them and it could be a useful means of communicating the risks of smoking to patients in an effective way (Martin et. al, 2011).

Nevertheless, the reduction in expired CO also could be due to fact that cardiac patients might feel quite motivated to quit smoking after experiencing a life threatening

event. The constant vulnerable feeling might also influence them to sustain abstinence after setting the quit date during the initial smoking cessation intervention.

However, a reduction in effect size was noticed towards the end of evaluation period (one month) in this study. This could suggest that patients in this study might be struggling with smoking withdrawal symptoms and tending to relapse despite having been prescribed the NRT or varenicline. On the other hand, smoking withdrawal symptoms experienced by the intervention group in this study were correlated with expired CO scores.

In this study, pharmacotherapy (NRT or varenicline) was used to taper the craving for nicotine and minimize withdrawal symptoms. It also could be suggested, pharmacotherapy used with smoking cessation intervention substantially enhances behavioural treatment (Fiore et al., 2008).

Cahill, et al., (2011) highlighted varenicline as an effective smoking cessation aid, which more than doubles quit rates of placebos. However, Erika et al. (2008) mentioned that underutilization of pharmacological treatment as an initial adjuvant to behavioural therapy was a predictor of relapse rather than a predictor of smoking cessation, and thus a confounder by indication.

The results support the claim that high intensity counselling combined with pharmacotherapy which includes extended support for at least one month after hospital discharge, is effective in increasing the self-efficacy of cardiac patients to quit smoking and decrease withdrawal symptoms.

Limitation

The present study is subject to certain limitation. Indeed, all the patients recruited were at the preparation stage of the TTM (ready to take action to quit in the next 30 days) at the time of screening.

The point prevalence of abstinence rate for the control group was solely based on self-reportingand it was not verified by biochemical validation. This was because patients had financial constraints such that they could attend the quit smoking clinic only for CO measurement. Thus, the self-reporting on point prevalence of abstinence rate of both groups could not be compared equally.

The limitation of the study was the relatively small sample size. For this reason, these findings could not be generalized to the broader community based on this study alone.

Conclusion

The present study findings augment our current understanding that extended smoking cessation intervention following hospital discharge is able to enhance self-efficacy and increase cessation rates among cardiac patients. Our study recommended that counselling should be individualized to meet patient needs and that it is best handled by an experienced nurse counsellor with dedicated blocks of time for patient education. Also, the pharmacological treatment should be initiated as early as possible in the smoking cessation intervention to assist patients who are really struggling to cope with withdrawal symptoms.

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