

RESEARCH COMMUNICATION

Predictors of Smoking Cessation among Staff in Public Universities in Klang Valley, Malaysia

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Abstract

Smoking cessation studies are often performed in clinic based settings. The present example aimed to find predictors of success among staff in worksite smoking cessation programmes in two major public universities in Klang Valley, Malaysia. All staff from both universities received an open invitation via staff e-mail and letters to participate. At the start of treatment, participants were administered the Rhode Island Stress and Coping Questionnaire and Family Support Redding's Questionnaire. Behaviour therapy with free nicotine replacement therapy (NRT) were given as treatment. After two months, they were contacted to determine their smoking status. 185 staff from University A (n=138) and University B (n=47), responded and voluntarily showed interest to quit. There was no significant difference in respondents with respect to socio demographic characteristics and smoking history. After two months of treatment, quit rates were 24% in University A vs. 38 % in University B (p>0.05). Univariate predictors of cessation were adherence to NRT (p<0.001), smoking fewer cigarettes per day (p<0.05) and the number of behaviour therapy sessions attended (p<0.001). Logistic regression identified 3 significant predictors of smoking cessation. Participants attending more than one session (OR= 27.00; 95% CI : 6.50; 111.6), and having higher pre-treatment general stress (OR= 2.15; 95% CI: 1.14; 4.05) were more likely to quit, while a higher number of cigarettes smoked (OR= 0.19; 95% CI: 0.06; 0.59) reduced the likelihood of quitting. Increasing age, ability to cope with stress and family support were not significant predictors. We conclude that factors such as the number of counseling sessions, the amount of cigarettes smoked at baseline, adherence to NRT and pretreatment stress are important considerations for success in a worksite smoking cessation programme.

Keywords: Smoking cessation - predictors - university - worksite - staff

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Introduction

Tobacco is considered the single most preventable cause of premature morbidity and mortality. It is a major cause of lung cancer, cardiovascular diseases, chronic obstructive airway diseases (COPD) and other chronic diseases, resulting in 1.2 million deaths annually. Despite these health hazards, more than 1.2 billion people in the World are daily smokers (Raw et al., 2002).

The Ministry of Health, Malaysia has signed and ratified the WHO Framework Convention on Tobacco Control (FCTC) beginning year 2003. According to FCTC, all countries who signed in have to follow the requirements of tobacco control within a 5 years' time span (Bialous et al., 2003). Since the ratification, indeed Malaysia has managed to increase excise duty to 18 cents (give the equivalent in US Dollars) per pack in the latest 2009 National Budget, eliminated taxes on exported cigarettes and tobacco leaves, banned all indirect tobacco

advertisements in 2003, increasing anti tobacco campaigns and setting up of smoking cessation services.

Nevertheless, efforts in tobacco control have been challenging in Malaysia. It receives various disputes from government and non government agencies. This arises because tobacco control has to work within larger government agendas and policies such as poverty alleviation (job availability) and promotion of Bumiputra (Malay and native) business (small and medium size local tobacco companies) and the encouragement of foreign investors. Other competing factors include direct financial interest through ownership of shares in the tobacco industry, and protection of local tobacco produce through high import tariffs, and successful strategies by the major tobacco companies in lobbying their way out of restrictions and regulations (Assunta and Chapman, 2004). In Malaysia, the prevalence of daily smokers was 23.4% in 1996, with a decline of only 2.3% in 2006. Among the men, it was reported that nearly half of the population are

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smokers, with the majority among the Malays (Zariyah et al., 2007).

One good way of reducing this problem as an aid to the existing cessation clinics, is the setting up of worksite cessation programmes. Establishing smoking cessation programmes in the workplace has potential to increase cessation rates as shown by studies in Japan and the United Kingdom (Cruse et al., 2001; Tanaka et al., 2006). The study in Japan showed that even a low intensity worksite intervention among less motivated smokers had significantly higher success rates after 36 months compared to the control group (12.1% vs 9.4%, $p=0.02$). In a small-scale study in UK, among smokers involved in a workplace 10 week programme with nicotine replacement therapy, results showed a 15% ($n=19/123$) success rates at 12 months. In other studies, workplace cessation programmes have also shown to reduce smoking prevalence, increase the number of quit rates. Such studies also show that smokers continue smoking but smoke fewer cigarettes per day (Osler et al., 1999; Nerin et al., 2004).

In addition, the setting up of worksite cessation programmes may alleviate many worksite related problems. It has been shown that in the workplace, smoking leads to increased absenteeism and reduced productivity and increased occupational injuries (Halpern et al., 2001; Lana et al., 2003). In addition to that, workplace may be considered as a significance source of ETS (Environmental tobacco smoke), thus putting fellow non-smokers at risk. The economic costs associated with exposure to ETS at the workplace can also be very high. The estimated cost in Scotland could be as high as £40 million per annum for smoking related absences and £450 million per annum for productivity losses (Parrott et al., 2000). Hence, in recent years, concern has grown over the need to protect employees at the workplace. This responsibility of, as with other types of health and safety at work, not only lies with the employers but also the employees. Thus, many cessation programmes have been developed in the workplace over the last decade, but not much information was available from the South Eastern region.

Individual and clinic based predictors of success have been examined in the West. It is associated with younger age of smoking initiation (Breslau and Peterson, 1996) and history of previous quit attempts (Murray et al., 1991; Zhu et al., 1999; Etter, 2004). Studies also showed that, there is an association between nicotine dependence and manic depressive disorder (MDD), where a high prevalence rate of smokers in this group (Anda et al., 1990; Breslau, Kilbey et al. 1993), although the association remains unknown. However, it was argued that smoking may help smokers alleviate stress (Revell, Warburton et al. 1985) or help to cope with a depressed mood (Glassman, 1993). Other predictors of success in quitting found include a higher severity of nicotine dependence (Dale et al., 2001; Harris et al., 2004; Abdullah et al., 2006) and smokers with no previous history of alcoholism (Breslau and Peterson, 1996). Furthermore, it has also been shown that smokers have a greater likelihood of quitting and remain abstinent with social support from spouses (McBride et al., 1998).

However, predictors of success have been mainly

focused on attendees to cessation clinics, and self supported efforts; with very few concentrating in programmes conducted in the workplaces, especially in university settings. Results may differ, as smokers attending such a programme tend to be less motivated smokers (Tanaka, Yamato et al. 2006). Hence, identification of individual characteristics that predict success in a worksite smoking cessation effort in this region is important, as this could help to match smokers with a worksite strategy that is more likely to help them quit. It may also be useful to identify smokers who might need more intensive treatment (who would then require referral to specialist centres), and make the most of healthcare resources.

This study aims to identify predictors which include stress and social factors that may predict short term smoking cessation among smoking university workers involved in a specific smoking cessation programme.

Materials and Methods

Recruitment and Participation

A prospective cohort study was performed. Data was collected between November 2009- March 2010 in University A and March 2010-June 2010 in University B. We aimed to set up non-clinic based smoking cessation programme in each university. Student centres and a Student College were used as temporary sites. All employees working at the two sites were targeted for the study with full approval from the university boards.

In University A, there were over 6,000 working staff. It has a strict non-smoking regulation, where smoking has been banned in the premises for over a year. Smokers caught smoking in the campus will be fined up to RM200.00 (USD 65.00) per offence. Smokers were recruited to join this study through; 1) the yearly Wellness Health Screening (110 participants); 3) Wellness Day exhibition (25 participants); 3) individual e-mail (30 participants) letters sent to all staff (20 participants). Among these participants who showed interest to join, 138 participants showed up for treatment and counselling.

University B has a staff population of slightly over 15,000. In contrast to University A, it has a loose anti-smoking policy. There were few smoking restriction signages and lack of proper enforcement. Due to the large number of staff and the poor health promotion activities, we were only able to recruit staff through staff e-mail, individual letters sent to all heads of department, newsletters and main websites. We received 45 respondents from e-mail and 10 respondents from letters to heads of department. Out of these participants, 47 showed up for the clinic sessions. This poor response could be due to lack of cooperation from over 30 heads of faculties and managers of centres. Informed consent was obtained from all the respondents prior to the study. Ethical approval was obtained from University A, and top management approval was obtained from University B.

Treatment consisted of combined medical and cognitive behavioural therapy. To avoid bias, similar programmes were conducted and all sessions were given by a medical officer and an assistant. The smoking history, socio demography, stress and coping and family

support questionnaires were administered prior to treatment. Medical treatment consisted of NRT gums/patch, depending on the patients' medical history, degree of nicotine dependence and preferences. Cognitive behavioural therapy involved three sessions, which covered; coping strategies, risks and benefits of quitting, relapse prevention, stress reduction and weight control. Abstinence was determined during follow-up sessions, with self reported abstinence and confirmed by CO < 10ppm using Mini Smokerlyzer (Bedfont Scientific Ltd, Rochester, England).

Data collection

Socio demographic and smoking history: Main sociodemographic and smoking history analyzed were age group, age of smoking initiation, educational achievement, work categories, number of initial cigarettes per day and previous quit attempts.

Stress and Coping Questionnaire: Stress and coping skills were associated with smoking relapse and cessation, as studied by Fava et al.(1998). This 12 item survey will ask participants to rate how often they experienced stress, in a 5 point Likert scale 1(never) to 5 (repeatedly). The scoring for the stress as well as coping skills were performed by adding the points assigned for the coping questions and stress questions for an overall stress score of (7-35) and coping score of (5-25).

Family Support Questionnaire: Partner smoking and support may influence the smoking behavior of the respondent. A brief questionnaire was administered to examine these variables. This questionnaire uses a four item five point Likert scale adapted from adolescent smoking study(Redding, Evers et al. 1998). The scoring of this instrument was accomplished by adding the values for each individual to obtain an overall Partner Support score (range from 5-20). Both questionnaires were translated into the Malay language and tested for reliability. Reliability analysis for both instruments revealed Cronbach's alpha of between 0.80- 0.83 and correlations of between 0.5-0.8.

Statistical Analysis

Data management and statistical analysis were performed with a database created with SPSS 15.0. A descriptive analysis was performed. Categorical variables were analyzed by Chi Squared tests and quantitative variables by independent t tests. Univariate logistic regression was performed to assess the relationship between each variable and abstinence at 2 months. Significant variables along with important sociodemographic variables, as determined by the univariate analysis, were

then entered into a multivariate logistic regression model.

Results

Sociodemographic Characteristics

The sample comprised of 185 participants, 138 from University A and 47 from University B. All subjects were male with mean (SD) age of 35.9 (10.9) years. In terms of education attainment, 2.7% had only completed elementary school, 57.9% had completed both primary and secondary school and 39.3% had gone to college. The majority (93.4%) of participants were in the support staff categories (E.g. technical workers, clerical workers and labourers), while only 6.6% were in the professional group. With regard to prior attempts to quit smoking, 14.6% of the patients had never attempted to quit, while 85.4% had made one or more quit attempts.

Smoking Cessation

NRT was given to all the participants, for a minimum of 2 weeks. Compliance to the treatment was considered adherent when continuing NRT for more than 2 weeks. Adherence was seen/ reporting among 58.9% (n=109), and non-adherent for 41.1% (n=76) of the smokers. Sociodemographic variables and smoking history variables i.e. age group, occupational status, education level, marital status, number of cigarettes per day, age initiated smoking, previous quit attempt, use of NRT and counselling sessions attended, awareness of university rules and smoking in campus were not significant when University A compared to University B. Of the patients included in the study, 33% (n=61) continued to abstain from smoking at 1 week, 27% (n=51) at 2 months. At 6 months, when the smokers were contacted to determine their smoking status, 49% (n=25) still remained abstinence while the remaining majority had relapsed. University B had 56% (n=10 /18) relapsed cases as compared to University A, with 48 % (n=16/33),

Logistic Regression

Univariate logistic regression showed that the following independent categorical variables were not predictive of success at two months: age group, education attainment, occupational status, marital status, ethnic group, age started smoking, previous quit attempt, awareness of university rules, and smoking in the campus, family support, and stress/coping. The only variables that correlated significantly at two months were number of cigarettes per day, NRT used, and number of counselling sessions attended (see Table 1). However, only the variables that positively contributed towards the model were included in the multivariate analysis in a forward logistic regression.

Table 1. Multiple Logistic Regression Analysis of Smoking Cessation at 2 Months

Variables	β	Wald	Odds Ratio (95% CI)	P value
Amount of counseling sessions	3.3	20.72	27.00 (6.5-111.6)	<0.001
Amount of cigarettes	-1.66	11.53	0.19 (0.06-0.59)	0.004
Marital status	-0.59	0.43	2.25 (0.89-5.68)	0.06
Family Support Q	0.21	0.13	0.89 (0.87-1.09)	0.72
Rhode Island Stress Q	-0.77	5.61	2.15 (1.14-4.05)	0.02

The following variables were considered to be potential predictors of success and were finally included in the multivariate logistic regression model: Amount of counselling sessions, the amount of cigarettes smoked, marital status, family support and stress. Results from the multivariate model showed that success at three months – which had given clear indications of having predictive value- amount of counselling sessions, amount of cigarettes and pre treatment stress were the only variables predictive of successful outcome at two months.

Discussion

This study provided new information with regards to smoking cessation among Malaysian smokers whom attended a non-clinic based smoking cessation programmes, and filled an important gap of such information in Asian countries. The characteristics of the smokers in our study were quite different from other studies in worksite cessation programmes (Chong et al., 2000; Cruse et al., 2001; Erikson 2005). Those studies concentrated on blue collar/ white collar workers and certain low socioeconomic status, our study in contrast was opened to all staff in the university. Considering the units involved in university settings, the workers' category comprised of academic teaching staff, technical work, managerial workers, clerical workers and labourers. The only similarity of our study was in terms of socioeconomic status, where 57.2 % only completed high school. The higher number of less educated smokers in our country (Zarihah et al., 2007) might explain the higher percentage of lower socioeconomic status that attended the programme.

The participation rate was quite disappointing in University B, as compared to University A. Other studies managed to get better participation when the top management of a worksite enforces all smokers to be involved in such programme, although there is a higher likelihood of receiving a greater percentage of low motivated smokers joining the programme (Tanaka et al., 2006; Nishiura et al., 2009). Our study may conclude that having a written and highly enforced no smoking policy may lead to higher participation rate of smokers attending a cessation programme. However, there was no significant difference found in success rate after providing a similar cessation programme. In addition, no difference was noted among the two universities on awareness related to the smoking restriction regulation.

Our two- month prevalence of quit rate was similar to other studies (Abdullah et al., 2006). At 6 months our smokers were less successful in quitting, as shown by the number of high relapse rates. Other international studies also reported diminished success after a much longer period (Cruse et al., 2001; Nerin et al., 2004). This could be due to Malaysian smokers being less motivated (Moy et al., 2006). The relapse rate was also found to be poorer in university B, attributed to a less supportive environment. Other reasons for relapse and factors that contributed to it need to be investigated in future studies.

Among Malaysian University workers participating in this worksite cessation programme, independent

univariate predictors at two months were: number of cigarettes per day, NRT used, and number of clinic sessions attended. Multivariate predictors also included the amount of counseling sessions attended and pre treatment stress as possible predictors. Predictors of success correlated with previous studies that supported our study include smoking fewer cigarettes per day, which was found among African-American enrolled in a randomized controlled trial of bupropion (Harris et al., 2004) and among a cohort of Danish smokers (Godfredsen et al., 2001) in an unassisted cessation attempt. Attending more than one session correlated with one local study conducted in eight Malaysian government cessation clinics across the country, where it was found that smokers attending cessation clinics at least four times were more likely to quit (Ezzat et al., 2008). Although, we only conducted a minimum of two intensive sessions and one follow-up session, but the intensity of our programme was an added advantage in producing an almost similar success rate. Factors such as alcoholism could not be assessed in our study, because only three of our smokers drank alcohol.

Nicotine replacement therapy has been shown to be more effective than behavioural therapy alone in many studies (Mitrouska et al., 2007). Our study also reported that it is an important predictive factor for quitting. However, many smokers in our study were not able to comply with NRT as directed due to its intolerable side effects. Smokers who had quit also refused to attend subsequent follow-up due to their busy schedule or failed to obtain permission from head of unit and were noted to develop relapse at two months and/or six months.

Our study contrasted other studies in terms of pre treatment stress (Anda et al., 1990; Breslau et al., 1993) as was discussed earlier where smokers with higher levels of negative moods and depressive symptoms was shown to be less likely to quit. Contradictory evidence also existed, a meta-analysis by Hittsman et al. (2003) found that a lifetime history of depression does not appear to be an independent risk factor for cessation failure, which was also supported by recent evidence from the Veterans Administration of Normative Aging Study (Kinnunen et al., 2006). Although our study did not examine depressive moods, smoking cessation itself produces mood disturbance due to withdrawal symptoms and affective symptoms (Niaura et al., 2002) which itself is an important stressor. Our study found the opposite, where smokers with higher stress levels reported a greater likelihood of quitting. This could be due to smokers' perception of stress being highly correlated with developing withdrawal symptoms throughout the smoking cessation process. Symptoms such as depressed mood, anxiety, nervousness, restlessness, irritability, fatigue and drowsiness, are more pronounced during cessation and normally will return to baseline within a month of abstinence (Anda et al., 1990). This result could also be explained by the fact that, some motivated smokers could have entered the quitting process earlier, prior to attending the first appointment session and answering the questionnaires.

Another finding of our study was that psychosocial variables such as social support and marital status do not predict cessation. Western studies addressed that

partner influence or social support interventions may be of some benefit in producing higher success rates (May and West, 2000). The majority of our smokers were married to non-smokers or were still living with their families. Our findings were negative probably due to inadequate assessment of pertinent psychosocial factors that are particularly relevant to Malaysian smokers. For example, measures of religious belief, cultural differences and perceptions may play an important role in smoking cessation.

The current study possessed several strengths. First, this is one of the first studies in Malaysia to investigate the predictors of success of smokers, in a smoking cessation programme conducted in a non-clinic based setting. This is one of the very few studies addressing staff in university settings of various categories with an intensive promotional effort. Our study clearly demonstrates that, conducting a small-scale intensive program for smokers may give a potentially good outcome on cessation rate and reach individuals with busy working hours, but however had poor long term success rate.

There are also several limitations to our present study. Identifying the success rates among workers was not the main purpose of this study and could have been strengthened by the inclusion of additional variables such as job control, job content, types of life stressors, health and psychiatric morbidities. In addition, the sample was predominantly male and Malay. Thus, the results may only be generalized to South East Asian countries.

In short, we concluded that individuals who complied with treatment and attending at more cessation sessions had a higher probability of achieving success with combined medical and behavioural therapy. These findings should be taken into account throughout the smoking cessation process, and patients should be informed of these facts to enforce abstinence. In addition, our study demonstrated the need to involve top management in supporting such a programme in order to produce higher participation rates and should be emphasized in any worksite cessation programme.

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