RESEARCH COMMUNICATION

Smokers Can Quit Regardless of Motivation Stage in a Worksite Smoking Cessation Programme in Malaysia

Siti Munira Yasin[1,2*], Masilamani Retneswari[2], Foong Ming Moy[2], David Koh[3], Marzuki Isahak[2]

Abstract

Background: There is an unclear relationship between smoker's early motivation and success rates. Here we aimed to explore the correlates of motivation and smoking abstinence and relapse in worksite smoking cessation programmes. Methods: This prospective cohort study involved employees from two major public universities in Malaysia. Participants were actively recruited into a smoking cessation programme. At the start of treatment, participants were administered a questionnaire on sociodemographic variables, smoking habits and 'stage of change'. Behaviour therapy with free nicotine replacement therapy (NRT) was given as treatment for two months. A similar stage of change questionnaire was given at six months, and their smoking status was determined. Results: There were 185 smokers from both Universities, who joined the programme. At six months, 24 smokers reported sustained abstinence while the others had relapsed. Prior to the programme, the majority of smokers were seriously planning on quitting (59.5% - preparation stage), but over a third had no plans to quit (35.5% - contemplation stage). There was no significant difference noted in changes of motivation stage among the relapsers and the non quitters. In addition, logistic regression showed that sustained abstinence was not predicted by pre-session motivation stage, but this did predict higher relapse for the participants, compared to those in the preparation stage. Conclusion: It is possible to help smokers in the lower motivation groups to quit, provided extra caution is taken to prevent relapse. Healthcare providers' recruitment strategies for cessation programmes should thus encompass smokers in all motivation stages.

Key words: smoking cessation programme - motivation - stage of change - worksite - Malaysian

Asian Pacific J Cancer Prev, **12**, 2193-2198

Introduction

The challenge faced by many smoking cessation experts and researchers is to produce a smoking cessation porgramme or intervention with the highest success rate (Moshammer et al., 2007). In most circumstances, smokers must actively search for such programmes, to receive assistance in quitting. However, this strategy only manages to appeal to the well educated groups and the highly motivated smokers (Velicer et al., 1995). Consequently, it resulted in low participation rates, but achieved a considerably good abstinence rate (Moshammer et al., 2007). In proactive recruitment, smokers are actively recruited and offered cessation assistance, for example, counselling sessions, free pharmacotherapy and self-help materials. Although this can reach a greater segment of the of population, with various backgrounds and motivation stages - the abstinence rate six months or one year follow-up seems low (<10%) in some studies, (Ashander, 1997) but reasonable (>16%) in another (Pisinger et al., 2005).

The "transtheoretical model" popularized by Prochaska and DiClemete (Prochaska et al., 1983) comprises three major constructs, which has been utilized in smoking cessation: stages of change, decisional balance and processes of change. The "stage of change" describes smoking cessation as a process involving several phases (DiClemente et al., 1991). These phases can categorize smokers based on their awareness to quit and their immediate and future quit plans. Nevertheless, the majority of smoking cessation campaigns and programmes are aimed at smokers who are planning to quit soon, and focus less on the smokers who are reluctant to quit in the near future. As such, these smokers may only be reached by an active recruitment strategy (Pisinger et al., 2005).

Many efforts have concentrated on providing adequate behavioural therapy as a means of increasing

*[1]Population Health and Preventive Medicine, Faculty of Medicine, University Technology MARA, [2]Department of Social and Preventive Medicine, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia, [3]Department of Epidemiology and Public Health, National University of Singapore, Republic of Singapore *For correspondence: sitimu.yasin@gmail.com*

motivation for smokers and enhancing the quitting success (Coleman et al., 2010). However, the empirical evidence supporting the relationship between motivation and success rate and relapse remains inconclusive. While previous results have shown that smokers in the highly motivated group have increased likelihood of quitting (Marlatt et al., 1988; West, 2004), more recent evidence from large population based trials show that smokers may quit regardless of their initial motivation stage (Pisinger et al., 2005) and unaided smoking cessations (Borland et al., 2010). In addition, motivation stage may be also not able to predict relapse (Segan et al., 2002).

To our knowledge, this association has not been examined in proactive worksite cessation programmes, which, given the employer's support, might be able to capture a significant number of lower motivated smokers. In this study, we aim to explore the predictive value of initial motivation stage on quitting and relapse, and investigate whether changes in motivation stage among smokers involved in a workplace smoking cessation programme are related to success in quitting.

Materials and Methods

Recruitment and Cessation Programme

A prospective cohort study was performed. Data was collected between November 2009- September 2010 in University A and March 2010-December 2010 in University B. Student centres and a Student College were used as temporary sites for the smoking cessation programmes in the universities. Detailed explanations of both universities have been explained in our previous article (Yasin et al., 2011). Recruitment strategies for both universities included sending individual emails and formal letters to all 20,000 university staff (regardless of smoking status), mailing letters to Head of Departments to ask for participation and support, distributing flyers in the canteens of the universities and personal contacts during other university health health promotion activities. We also managed to post the programme on the university websites and obtained support from the chancellory of both universities. Ethical approval was obtained and full support given by managements and unions of both universities.

Treatment consisted of combined medical and cognitive behavioural therapy over a period of two months. Similar programmes were conducted and all sessions were given by the first author, a medical officer and doctorate student and an assistant. The smoking history was obtained, and a Stage of Change Questionnaire was administered prior to treatment and at the end of the two-month sessions. Medical treatment consisted of nicotine replacement therapy (NRT) gums/ patch. The exact treatment given depended upon the participants' medical history, degree of nicotine dependence and preferences. Cognitive behavioural therapy was given in three sessions, covering issues on coping strategies, risks and benefits of quitting, relapse prevention, stress reduction and weight control.

Sociodemographic variables and smoking behaviour

The main socio demographic variables were the age, educational achievement and category of work. Smoking behaviour included age of smoking initiation, number of initial cigarettes per day (categorized into light, medium, heavy) and previous quit attempts (yes/ no). Abstinence was determined during follow-up sessions, by self reported abstinence and confirmed by carbon monoxide (CO) reading using Mini Smokerlyzer (Bedfont Scientific Ltd, Rochester, England). A CO level of <6 parts per million (ppm) was used as the cut-off point for non-smokers (Jane et al., 2006).

Sustained quitters were smokers who had achieved prolonged abstinence (did not smoke even a single cigarette) until the time of assessment. Quitters at six months were smokers who achieved abstinence at least 24 hours at the point of assessment. Relapsers are smokers who achieved at least 24 hours abstinence, then later relapsed to smoking.

Stage of Change Questionnaire

The stage of change of each participant in the sample was measured using the Stage of Change Questionnaire Short Form (DiClemente et al., 1991). This questionnaire which was initially developed in 1982 (Prochaska et al., 1982), asks about previous quit attempts and current plan for smoking cessation.
Stage membership is determined by the subject's level of readiness to make a behavior change. This is a three item measure of participant's motivation, designed to categorize participants into 3 stages: pre contemplation, contemplation and preparation. a) Precontemplation: Has no intention and no plans to take action within the next 6 months. b) Contemplation: Intends to take action within the next 6 months, but has no plans. c) Preparation: Intends to take action within the next 30 days and has taken some behavioural steps in this direction. This person has both intention and plans for quitting.

Morera and associates (1998) tested the reliability of the Stage of Change construct in a longitudinal study involving 261 women over a period of 24 months. Measures of stability were found to be 0.88 -0.98 and measures of reliability were from 0.69-0.76. This indicated a good measure of model fit for the stage of change (Morera et al., 1998). The Questionnaire used in this study was translated to Bahasa Malaysia language, pretested and validated. Test-retest reliability result showed a kappa of 0.83.

During the treatment phase of six months, all smokers were presumed to be either in the Preparation stage or action stage (action stage = has changed overt behavior for less than 6 months). After 6 months, a similar stage of change questionnaire was administered, to determine the changes in stage of change that

occurred after treatment.

Statistical Analysis

Data management and statistical analysis were performed with a database created with SPSS 15.0. Significance level was preset at an alpha of 0.05. 95% confidence interval (95% CI) was provided in assessing the associations between the dependent and independent variables. Pre-session and post- session Stage of Change was analyzed by Chi-squared tests among the relapsers and the never quit group. Changes in motivation of smokers were further categorized into "improved" or "no change/reduction", and Fisher's Exact test was used. To identify whether the Stage of Change can predict cessation and relapse at six months, binary logistic regressions were performed. Results of sustained abstinence, point prevalence of quitting and relapse at six months were treated as dependent variables in three logistic regressions. The models were controlled for sociodemographic characteristics and smoking history.

Results

Sociodemographic Characteristics

There were 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 (Table 1).

Table 1. Demographic and Smoking Characteristics of 185 Participants in the Smoking Cessation Programme

Characteristics	Total (N=185)
Demographic Characteristics	
Age group	
18-29 years	77 (42)
30-40 years	43 (23)
41-50 years	43 (23)
51 years and above	22 (12)
Education Level	
Primary School	5 (2)
Secondary School	107 (58)
Diploma and Above	73 (40)
Occupational Status	
Support Group	171 (92)
Professionals	14 (8)
Marital Status	
Single	68 (37)
Married	113 (61)
Divorced	4 (2)
Smoking History	
Number of Cigarettes/day	
<10 (light)	28 (15)
10-19 (medium)	113 (611)
20 and above (heavy)	44 (24)
Age Started Smoking	
8-12 years	19 (10)
13-18 years	120 (65)
19 years and above	46 (25)
Previous Quit Attempt within 1 year	
No	28 (15)
Yes	157 (85)

The mean number of cigarettes/day smoked was 14.5 (SD=7). About three quarters (73.8%) of the smokers were in the light to moderate smoking categories. The mean age of smoking initiation was 16.9 years old (SD=4). The majority of participants, 85.4%, had made one or more quit attempts, and 14.6% had never attempted to quit. The socio demographic 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 statistically significantly different when comparing participants from the two different universities.

Smoking cessation results

Among the participants, 55.7% (n=103) continued to abstain from smoking at one week and 27.6% (n=51) at two months. At six months, when the smokers were contacted to determine their smoking status, 22.2% (n=41) still remained in abstinence while the others had relapsed. Smokers who had sustained abstinence (never developed any lapse episodes from the quit date) were much lower, from 27 participants at three months to 24 by the end of six months. Smokers who quit at least 24 hours within six months totaled to 120 participants, of which 72 had relapsed by the end of six months.

For the number of clinic sessions attended by the smokers, 40% of the smokers attended only one initial session, 32 % attended two sessions within two weeks, 17% joined three sessions, while the remaining 11% attended more than four or more sessions. NRT was given to all the participants for a minimum of two weeks. Participants were considered adherent when continuing NRT for more than two weeks. Adherence was seen/ reported among 58.9% and non-adherence among 41.1% of the smokers. All smokers (100%) answered the questionnaires at zero months, prior to smoking cessation sessions, and the response rate for the second set at six months was 90.8%.

Stage of Change pre and post sessions

Table 2 presents the findings of baseline Stage of Change. Prior to attending the first smoking cessation session, the majority of smokers were in the preparation stage. Smokers who have quit at least 24 hours will be considered as entering the Action Phase (Segan et al., 2006). After six months, 41 smokers had quit and had entered the maintenance stage. Among these, some

Table 2. Stages of Change among Participants during the Pre-smoking Cessation Sessions and the Post Sessions

Stages of Change	N (%)
Pre-sessions[1]	
Preparation	110 (59.5)
Contemplation	62 (33.5)
Pre-contemplation	13 (7.0)
Total	185 (100)
Post-sessions[2]	
Preparation	26 (14.1)
Contemplation	85 (45.9)
Pre-contemplation	16 (8.6)
Action stage to maintenance stage[3]	41 (22.1)
Missing values	17 (9.1)
Total	185 (100)

[1]0 months; [2]6 months; [3]quitters

Table 3. Changes in Stage of Change Pre- and Post -session among Relapsers and Never Quitters

Pre- sessions (0 month)	Change Post-sessions[1]	Relapser N (%)	Never QuittedN (%)
Preparation	Contemplation	29 (40.2)	20 (36.4)
	Pre-contemplation	1 (1.4)	5 (9.1)
	No Changes[2]	10 (13.9)	3 (5.4)
Contemplation	Preparation	8 (11.1)	3 (5.5)
	Pre-contemplation	1 (1.4)	6 (10.9)
	No Changes[3]	19 (26.4)	9 (16.4)
Pre-Contemplation	Preparation	1 (1.4)	1 (1.8)
	Contemplation	3 (4.2)	5 (9.1)
	No Changes[3]	0 (0.0)	3 (5.4)
Total, N (%)		72 (100.0)	55 (100.0)

[1]6 months; [2]preparation; [3]contemplation

Table 4. Changes in Stage of Change among Relapsers and those who never Quit

Changes	Relapsers	Never Quit
Improvement	12 (16.7)	9 (16.4)
No Change or Reduction	60 (83.3)	46 (83.6)
Total n (%)	72 (100)	55 (100)

were still at the action stage, as they developed multiple relapse and had not been able to sustain quit status for at least six months. Seventeen subjects were lost to follow up.

Changes in Motivation Stage and its relation to Outcome

We compared pre-session stages with post- sessions (Table 3) among the lapsers and the non quitters. In the preparation stage, the highest percentage was those that changed from preparation to contemplation, both in the non-quitters and lapser group, although this change was higher among lapsers. Smokers who did not change in contemplation were also greater in the lapser group. The non- quit group revealed little improvement in pre-contemplation stage, with 5.4% remained unchanged in behaviour. Chi squared test showed that in all the stages, there was a significant difference between the relapsers and those that never quitted (P<0.001).

To determine whether there was a significant improvement or reduction in motivation among the smokers after six months, the participants were grouped into two categories; improvement in motivation or no change/ reduced motivation (see Table 4). Chi Squared test showed no significant difference between the relapsers, and the never quit groups in terms of reduction / improvement in Changes in Stage of Change after six months. (Fisher's Exact Test= 0.56; P>0.05; Chi squared test: OR =1.06; 95% CI= 0.40- 2.84).

Predictors of Stage of Change for Quitters and relapsers

The logistic regressions results in Table 5 showed that pre-session Stage of Change did not predict sustained quitting at six months. However, among quitters at six months (non sustained quitters- with one/more lapses) the pre-session contemplation stage predicted lower point prevalence of quitting compared to the preparation stage. Among relapsers, pre-session contemplation predicted higher relapse compared to those with a pre-session preparation stage.

Discussion

This study is one of the few studies assessing the changes in smokers' motivation in relation to success rate in quitting among Malaysian smokers. Our cessation rates of 22% at six months were comparable to local studies in smoking cessation clinics of between 17.3% to 31.8% (Ezzat et al., 2008). It is also comparable to success rates of other worksite cessation programmes of between 20-50% (Nerin et al., 2004), and greater than the general cohort (<10%) without any particular smoking cessation programme (Atsuhiko et al., 2010).

With regard to smoking relapse, the percentage of 65.9% from 120 that achieved at least 24 hour abstinence does not differ much to other studies of between 65- 90% (Cui et al., 2009). However, the considerably high relapse rate could be attributed to our proactive recruitment approaches, which had captured the less motivated smokers. In addition, the number of

Table 5. Predictors of Sustained Quitters and Relapsers at 6 Months

Pre-session stages	Sustained Quitter[a]		Quitters[a]		Relapser[a]	
	N (%)	OR (95%CI)	N (%)	OR (95%CI)	N (%)	OR (95%CI)
Preparation	18 (75.0)	ref	31 (28.2)	ref	44 (55.7)	ref
Contemplation	6 (25.0)	0.42 (0.15-1.23)	10 (16.1)	0.39 (0.17-0.94)*	31 (39.2)	3.53 (1.29-9.67)*
Pre Contemplation	0 (0.0)	NA	0 (0.0)	NA	4 (5.1)	NA
Total	24 (100)				79 (100)	

*P <0.05; [a]Adjusted for sociodemographic characteristics, smoking history, NRT adherence and clinic sessions

three sessions may be inadequate to further motivate the former smokers. As such, most smokers did not continue follow-up counselling after they have quit, despite being encouraged to. Knowing the fact that relapse rate was proven to be profoundly high during the first few weeks post cessation (Hughes et al., 2004), we presumed that lack of physician support in the early cessation weeks could worsen the problem. To ascertain this however, warrants further investigation.

Approximately 60% of the smokers who joined the programme were in the preparation stage (planning to quit within the next month). This is consistent with our initial assumption of receiving highly motivated smokers who will join the programme. Nevertheless, we still received a considerable amount of smokers (33.5%) in the contemplation stage, as was found in other studies (Pisinger et al., 2005). We suppose that some individuals attending the cessation sessions were persuaded by their peers or superiors to make a quit attempt. This may also imply that many smokers who may not anticipate a quit attempt soon, may do so if they acquire extra support and accessibility. Thus, these less motivated smokers would probably not have been reached by the conventional smoking cessation clinics and campaigns.

At six months, 26% of smokers had reverted back to the contemplation, after initially being in the preparation stage. Isolated cases changed from either contemplation (4%) or preparation (1%) to pre-contemplation stage. One reason behind this could be the smokers' feeling of despair and hopelessness after failing to quit. The torment of alleviating the addictive nature of nicotine may have impaired their motivation to quit in the future. Nonetheless, studies had shown that, the smoker's intention to quit may change over a short period of time, as short as one week to one month (Hughes et al., 2005). Hence, healthcare providers may still target the relapsers in the future, but possibly with a different approach.

The motivation stage during the pre-treatment stage did not predict sustained abstinence at six months. This finding is in consistent with a large intervention study: the Inter99 study (Pisinger et al., 2005). When examined against point abstinence, smokers in a higher motivated group had higher cessation rates. However, some of the smokers with point abstinence had only achieved short term abstinence and are still prone to relapse. Given this fact, point abstinence is not a good measure of abstinence compared to sustained abstinence. Therefore, we suggest that motivation merely predicts abstinence. This may possibly reflect that participation in a smoking cessation programme has probably obliterated the preprogramme motivation.

A systematic review revealed that the "stage of change" is strongly valid when applied to the motivation and intervention in tobacco use (Spencer et al., 2002). However, recent evidence had shown that Stage of Change based interventions may not seem promising, as smokers in precontemplation and contemplation showed no difference in quitting success compared to preparation stage (Paul et al., 2009). This is consistent with our findings. Two possible reasons could explain why the "stage of change" merely predicts a successful quit attempt in our study. Firstly, this could be due to our proactive recruitment strategy. The less motivated smokers made quick stage transitions, when given appropriate counselling and provided pharmacological assistance to quit.

Secondly, the "stage of change" concept was initially designed for self-quitters, and may not be entirely applicable for smokers enrolled in an intensive assisted smoking cessation programme. Nevertheless, among relapsers, initial motivation stage did appear to play a role in determining later relapse. Smokers with lower pre- session motivation (contemplation) had three times the likelihood of experiencing relapse compared to those with a higher motivation stage (preparation). The rapid stage transition, from contemplation to action stage, may imply that smokers who were less prepared to make a quit attempt, might eventually relapse. As such, these smokers might not be able to withstand the challenges experienced during the quitting process.

This study has some limitations. Firstly, our study was conducted among male workers. Although all smokers were invited, no female smokers showed up for treatment. This study population might thus not represent the general Malaysian working population. Similarly, it may not be generalized to smokers attending normal clinic based smoking cessation programmes. Next, we did not examine variables related to other aspects of smoking cessation, such as self belief in quitting (self efficacy), the processes within the trastheoretical model and initial perception of quitting. We also do not know how much these factors interact with motivation and smoking cessation.

Thirdly, the exact time of quitting and relapse was not validated biochemically. Nevertheless, self reported smoking behaviour in recent studies was assessed to be reliable and useful (Ezzat et al., 2008), and the difference in reported abstinence between self reported results and biochemical validation was found to be negligible (Pisinger et al., 2005).

In conclusion, we found it possible to recruit participants in any motivation stage, by active recruitment process and support from top management of the workplaces. It was also noted that a smoker's motivation can be changed within a short period of time. Smokers with lower motivation may achieve sustained abstinence, as cessation was shown to be achievable among smokers without initial quitting plans. Nonetheless, smokers with moderate to low motivation should be monitored with extra-caution, as they have an increased risk of developing relapse. Based on these results, we suggest that all smokers, irrespective of motivation, should be offered assistance to quit.

Acknowledgments

This project was funded by the University of Malaya Research Grant (PS161/2009B, RG051/09HTM) and University of Technology MARA. We thank the participating study sites in University A and B. We also thank the top managements of both universities for granting access and permission to conduct this study among their staff.

References

Ashander R (1997). A systematic review of the effectiveness of promoting lifestyle change in general practice. *Fam Pract*, **14**, 160-76.

Atsuhiko O, Takeshi M, Nobufumi Y, et al (2010). Psychosocial job characteristics and smoking cessation: A prospective cohort study using the Demand-Control-Support and Effort-Reward Imbalance job stress models. *Nicotine Tobac Res*, **12**, 287-93.

Borland R, Yong H-H, Balmford J, et al (2010). Motivational factors predict quit attempts but not maintenance of smoking cessation: Findings from the International Tobacco Control four country project. *Nicotine Tobac Res*, **12**, S4-11.

Coleman T, Barrett S, Wynn A, et al (2003). Comparison of the smoking behaviour and attitudes of smokers who believe they have smoking related problems with those who do not. *Fam Pract*, **20**, 520-3.

Cui Y, Wen W, Moriarty CJ, et al (2006). Risk factors and their effects on the dynamic process of smoking relapse among veteren smokers. *Behav Res and Ther*, **44**, 967-81.

DiClemente C, Prochaska J, Fairhurst S, et al (1991). The process of smoking cessation: an analysis of precontemplation, contemplation, and preparation stages of change. *J Consult Clin Psychol*, **59**, 295-04.

Ezzat W, Salehuddin A, Aljunid S, et al (2008). Patterns and predictors of smoking cessation among smokers attending smoking cessation clinics in peninsular Malaysia. *J Commun Hlth*, **14**, 17-23.

Hughes JR, Keely J & Naud S (2004). Shape of relaspe curve and long term abstinence among untreated smokers. *Addiction*, **99**, 29-38.

Jane H, Ching-Hua L, Jung-Der W, et al (2006). Exhaled carbon monoxide level as an indicator of cigarette consumption in a workplace cessation program in Taiwan. *J Farmos Med Association*, **105**, 210-3.

Lai D, Cahill K, Qin Y, et al (2010). Motivational interviewing for smoking cessation. Cochrane database of systematic reviews(1). doi: 10.1002/14651858.CD006936.

Marlatt G, Curry S & Gordon J (1988). A longitudinal analysis of unaided smoking cessation. *J Consult Clin Psychol*, **56**, 715-20.

Morera OF, Johnson TP, Freels S, et al (1998). The Measure of Stage of Readiness to Change: Some Psychometric Considerations. *Psychological Assessment*, **10**, 182-6.

Moshammer H & Neuberger M (2007). Long term success of short smoking cessation seminars supported by occupational healthcare. *Addict Behav*, **32**, 1486-93.

Nerin I, Crucelaegui A, Mas A, et al (2004). Results of a comprehensive worksite program for the prevention and treatment of smoking addiction. *Arch Bronconeumol*, **41**, 197-10.

Paul A, Louise M, Amanda P, et al (2009). The effect of Transtheoretical Model based interventions on smoking cessation. *Soc Sci and Med*, **68**, 397-03.

Pisinger C, Vestbo J, Borch-Johnsen K, et al (2005). It is possible to help smokers in early motivational stages to quit. The Inter99 study. *Prev Med*, **40**, 278- 84.

Pisinger C, Vestbo J, Knut B-J, et al (2005). Acceptance of the smoking cessation intervention in a large population-based study: The Inter99 study. *Scand J Public Health*, **33**, 138-45.

Prochaska JO, DiClemente CC (1983). Stages and processes of self-change of smoking: toward an integrative model of change. *J Consult Clin Psychol*, **51**, 390-5.

Prochaska JO & DiClemente CC (1982). Transtheoretical theory: Toward a more integrative model of change. *Psychotherapy: Theory, Research, and Practice*, **20**, 161-73.

Segan CJ, Borland R, Greenwood K (2002). Do transtheoretical model measures predict the transition from preparation to action in smoking cessation? *Psychol Health*, **17**, 417-35.

Segan CJ, Borland R, Greenwood KM (2006). Can transtheoretical model measures predict relapse from the action stage of change among ex-smokers who quit after calling a quitline. *Addict Behav*, **31**, 414-28.

Spencer L, Pagell F, Hallion M, et al (2002). Applying the transtheoretical model to tobacco cessation and prevention: a review of literature. *Am J Health Promot*, **17**, 7-71.

Velicer W, Fava J, Prochaska J, et al (1995). Distribution of smokers by stage in three representative samples. *Prev Med*, **24**, 401-11.

Wee LH, Shahab L, Bulgiba A, et al (2011). Stop smoking clinics in Malaysia: characteristics of attendees and predictors of success. *Addict Behav*, **36**, 400-3.

West R (2004). ABC of smoking cessation: Assessment of dependence and motivation to stop smoking. *BMJ*, **328**, 338-9.

Yasin SM, Masilamani R, Ming MF, et al (2011). Predictors of smoking cessation among staff in public universities in Klang Valley, Malaysia. *Asian Pac J Cancer Prev*, **12**, 811-6.

Zundert RMPV, Nijhof LM, Engels RCME (2009). Testing Social Cognitive Theory as a theoretical framework to predict smoking relapse among daily smoking adolescents. *Addict Behav*, **34**, 281-6.