Evaluation of biological, psychosocial, and interventional predictors for success of a smoking cessation programme in Hong Kong

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ABSTRACT

Introduction: Predictors for smoking cessation have been identified in different studies but some of the predictors have been variable and inconsistent. In this study, we reviewed all the potential variables including medication, counselling, and others not commonly studied to identify the robust predictors of smoking cessation.

Methods: This historical cohort study was conducted in smoking cessation clinics in Hong Kong. Subjects who volunteered to come for free treatment between January 2010 and December 2011 were reviewed. Those under the age of 18 years, or who were mentally unstable or cognitively impaired were excluded. Counselling and quit-smoking medications were provided to the participants. The outcome measure was self-reported 7-day point prevalence abstinence rate at week 26.

Results: Univariate analysis showed that the following were significant predictors of quitting: (1) psychosocial variables such as feeling stressed, feeling depressed, confidence in quitting, difficulty in quitting, importance of quitting, Smoking Self-Efficacy Questionnaire score; (2) smoking-related variables such as number of cigarettes smoked per day, Fagerström Test for Nicotine Dependence score, number of high-risk situations encountered; (3) health-related variable of having mental illness; (4) basic demographics such as age, marital status, and household income; and (5) interventional variables such as counselling and pharmacotherapy. Multiple logistic regression showed that the independent predictors were age, having mental illness, daily cigarette consumption, Fagerström Test for Nicotine Dependence score, reasons for quitting, confidence in quitting, depressed mood, external self-efficacy, intervention with counselling and medications.

Conclusions: This clinic-based local study offers a different perspective on the predictors of quitting. It reminds us to adopt a holistic approach to deal with nicotine withdrawal, to enhance external self-efficacy to resist temptation and social influences, to provide adequate counselling, and to help smokers to cope with mood problems.

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New knowledge added by this study

- A more holistic list of predictors of smoking cessation were included in this local clinic-based study, and differed from many other studies by population survey. Household income, marital status, gender, years of smoking, smoking cohabitant, perceived health, anxious mood, perceived importance, and difficulty in quitting were no longer predictors. Many of these are not modifiable. It is more important to enhance self-efficacy and to use counselling and medication to counter mood problems.

Implications for clinical practice or policy

- In clinical practice, we should adopt a holistic approach to smoking cessation by providing more intensive counselling, managing withdrawal symptoms with medication, strengthening external self-efficacy to resist external temptation, and screening for mood problems.

Introduction

Smoking has long been identified as a major global public health issue. It is the leading cause of preventable death worldwide and kills about 6 million people each year.[1] Although Hong Kong has the lowest smoking prevalence among the major cities of China, at 11.1% as reported in 2010, it still accounts for about 5700 deaths annually, approximately one fifth of all deaths per year. In 1998, there were 1324 passive smoking–related deaths reported.[2,3]

要成功推行戒煙計劃在生理、心理和干預方面預測因素的評估

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引言：不同研究發現多項預測成功戒煙的因素，但部分因素並不一致且有很大差異。本研究探討所有包括藥物治療、心理輔導和其他不常用的潛在變量，以確定能預測成功戒煙的因素。

方法：這項歷史隊列研究在香港的戒煙診所進行。於2010年1月至2011年12月期間自願接受免費戒煙治療的參與者均被納入研究範圍。本研究不包括18歲以下、精神狀態不穩定或有認知障礙的人士。研究期間會為參與者提供戒煙輔導和戒煙的藥物。研究的主要結果測量是在第26週時得出的自我報告成功戒煙率，即在過去七天內完全沒有吸煙。

結果：單變量分析顯示以下均為預測成功戒煙的因素：（1）心理變量：如感到有壓力、心情鬱悶、戒煙的信心、戒煙的困難、戒煙的重要性和吸煙自我效能問卷得分；（2）與吸煙相關的變量：如每天吸煙數量、Fagerström尼古丁依賴測試分數和遇上高風險情況的次數；（3）與精神健康有關的變量；（4）基線人口特徵：如年齡、婚姻狀況和家庭收入；以及（5）介入變量：如輔導和藥物治療。多元邏輯迴歸分析顯示獨立的預測因素為年齡、有精神障礙、每天吸煙數量、Fagerström得分、放棄戒煙的原因、戒煙的信心、低落的情緒、外部自我效能、戒煙輔導和戒煙藥物治療。

結論：本研究在診所內進行，並從不同角度提供有關成功戒煙的預測因素。研究結果提醒我們須採取全面的措施來戒斷尼古丁以抗拒誘惑和社會影響的外部自我效能，提供合適的戒煙輔導，並幫助吸煙者應付情緒問題。

According to the evidence-based MPOWER measures introduced by the World Health Organization[4] to reduce the demand for tobacco, to provide smoking cessation services and cessation support in the public health care system, governments around the world have put more emphasis on smoking cessation programmes to reduce the tobacco-related health risks.[5] On 1 January 2007, the Hong Kong Special Administrative Region (SAR) Government enacted the Smoking (Public Health) Ordinance and on 25 February 2009, tobacco tax was increased by 50%. In 2009, the Tung Wah Group of Hospitals (TWGHs) was commissioned by the Hong Kong SAR Government to provide a community-based smoking cessation service in Hong Kong.

The Integrated Centre on Smoking Cessation (ICSC) of the TWGHs was set up in different districts of Hong Kong, namely Shatin, Kwun Tong, Sheung Shui, Tuen Mun, Mongkok, Wanchai, Cheung Sha Wan, and Tsuen Wan to provide a free smoking cessation service to Hong Kong citizens. An integrated model of counselling and pharmacotherapy was adopted.[6,7]

Identification of predictors and determinants of success in smoking cessation is crucial for smoking cessation service.[8] Over the last decade, health care professionals have endeavoured to identify the predictors and characteristics of successful quitters.[9] Overseas studies have identified the following: old age, high socio-economic status,[10-12] male gender, younger age at smoking initiation, previous quit attempts, being married, fewer depressive symptoms, fewer anxiety symptoms, lower prior tobacco consumption, lower score of Fagerström Test for Nicotine Dependence (FTND), no cohabitating smoker, and high cessation-related motivation/confidence.[8,10-14] Nonetheless, many studies have shown that these predictors are not always consistent.[11,15] This may be due to different methodologies and environments in different studies. Some studies were population surveys based on individual recall and did not include interventions. In this study, we analysed all potential variables and interventions. With a more comprehensive list of variables, we hoped to identify some robust independent predictors of successful quitters.

Methods

Study setting

Clients who attended an ICSC in different districts in Hong Kong from 1 January 2010 to 31 December 2011 were recruited via smoking cessation hotlines, referral from health care professionals, or self-referral.

All clients received counselling, and pharmacotherapy was prescribed if the client agreed. An average of four face-to-face counselling sessions were conducted over the first 8-week intensive treatment phase by registered social workers who were all trained in tobacco cessation counselling. Phone follow-up and counselling were also offered during this treatment phase and between 9 and 12 weeks. The stage of change theory and motivational interviewing techniques were adopted.[16-18] Clients were followed up by telephone at week 26 and week 52 to ascertain abstinence from smoking. The medications provided by ICSC included nicotine replacement therapy (NRT) and non-NRT. The former included nicotine patches, gum, lozenges, and inhalers. Oral medications included varenicline and bupropion. Medications were prescribed according to the clients' personal preference and clinical conditions following a thorough explanation by counsellors or medical officers. For example, NRT gum would not be given to a client with dentures and a patch would not be given to a client with skin allergy.

Study design, participants, and data collection

This was a historical cohort study. All cases commenced treatment between 1 January 2010 and

31 December 2011. The inclusion criteria of the study were adults aged 18 years or above. Clients who were mentally unstable or cognitively impaired were excluded.

A structured questionnaire was used to collect the following information: (i) socio-demographic variables: age, gender, marital status, education, monthly household income, number of people living together; (ii) health-related variables: perceived health, cessation advice by nurse, cessation advice by doctor, cessation advice by any medical professional, severe/chronic illness, mental illness; (iii) smoking-related variables: age started smoking, years of smoking, cohabitation with another smoker, number of cigarettes smoked per day, FTND score,[19] previous quit attempt, number of previous quit attempts, time of last attempt, reason to quit, high-risk situation; (iv) psychosocial variables: self-perceived stress, self-perceived depression, perceived importance, difficulty and confidence in quitting (from a scale of 0-100), perceived source of social support, Smoking Self-Efficacy Questionnaire (SEQ-12)[20,21]; and (v) intervention variables. Consent was obtained and confidentiality was assured. The questionnaire was self-administered and illiterate clients were given help as appropriate. Completed forms were validated by the counsellors.

Outcome measure

The outcome measure was self-reported 7-day point prevalence abstinence rate at week 26. Clients who were not able to be followed up or with an absent response for smoking status were considered to have not quitted.

Statistical analyses

Data management and analysis was performed using the Statistical Package for the Social Sciences (Windows version 22.0; SPSS Inc, Chicago [IL], US). Univariate logistic regression was used for all studied predictors. All predictors with a reported P value of <0.10 were then included in multiple logistic regression analysis. Backward elimination was used in the multivariate analysis to identify independent predictors of abstinence as well as to calculate the adjusted odds ratio (AOR) and 95% confidence interval. All statistical analyses were two-tailed tests and a P value of <0.05 was considered statistically significant.

Results

Demographics

A total of 4045 clients who attended the ICSC during 1 January 2010 to 31 December 2011 were reviewed and 3853 cases who met the inclusion criteria were analysed. The gender ratio of male-to-female was approximately 7:3. Their age ranged from 18 to 89 years with a mean of 42 years; mean duration of smoking of this cohort was 20 years, and mean cigarette consumption was 18 cigarettes per day (Table 1).

Univariate logistic regression

The abstinence rate at week 26 was 35.1% (1353/3853). Univariate analysis of basic demographic data revealed that successful quitting was related to

TABLE 1. Demographics and smoking-related characteristics of subjects (n=3853)

	Data*
Demographic variables	
Age (years)	42.2 ± 12.2
Gender	
Male	2740 (71.1)
Female	1113 (28.9)
Marital status†	
Single	1146 (29.9)
Married/cohabited	2220 (57.8)
Separated/divorced/widowed	472 (12.3)
Education†	
Primary school or below	410 (11.2)
Form 1 to Form 3	1067 (29.1)
Form 4 to Form 7	1670 (45.6)
Post secondary or tertiary	516 (14.1)
Monthly household income (HK$)	
<10 000	1031 (26.8)
10 000-19 999	1129 (29.3)
20 000-29 999	642 (16.7)
≥30 000	575 (14.9)
Not disclosed	476 (12.4)
No. of people in household†	2.9 ± 1.4
Smoking-related characteristics	
Age started smoking (years)†	20.2 ± 7.7
Time as daily smoker (years)†	21.9 ± 11.9
Any cohabited smokers†	
Yes	725 (20.5)
No	2815 (79.5)
No. of cigarette(s) per day†	18.2 ± 9.2
FTND score†	
Low (0-3)	777 (20.2)
Medium (4-5)	998 (26.0)
High (6-10)	2064 (53.8)

Abbreviation: FTND = Fagerström Test for Nicotine Dependence

* Data are shown as mean ± standard deviation or No. (%) of participants

† Some cases have missing field (range, 14-339), and the %s displayed are based on available cases only

older age, being married, and higher household income (Table 2). Mental illness was significantly related to failure to quit but chronic illness was not, for examples, hypertension, diabetes, and chronic obstructive pulmonary disease.

Analysis of smoking-related variables showed that successful quitting was related to longer years of smoking, not cohabiting with a smoker, lower daily cigarette consumption, and lower FTND score. Successful quitters were more likely to report "prove my ability to quit smoking" and "avoid discrimination as a smoker". A higher number of high-risk situations in quitting were negatively related to quit rate. Significant individual high-risk situations included "under time pressure", "arguing with others", "depressed or frustrated", "drinking alcohol or coffee", "difficulty in sleeping", and "bored" (Table 3).

The following psychosocial variables were correlated to quitting: not feeling stressed, not feeling depressed, high perceived importance of quitting, low perceived difficulty in quitting, high confidence in quitting, perceived support from spouse, and high SEQ-12 score (Table 4). All interventional variables were significant predictors of smoking abstinence: number of face-to-face counselling sessions, over-the-phone counselling, and use of medication.

Multiple logistic regression

All items reported P<0.10 in the univariate logistic regression analysis were included in the multiple logistic model with backward elimination. Only subjects with complete data in all fields of the included items were analysed (n=2714). As shown in Table 5, independent predictors of smoking abstinence at week 26 were older age, quitting based on "prove my ability to quit smoking", high confidence in quitting, high external self-efficacy, more counselling sessions (both office and phone contact), and use of medication. The following characteristics were predictive of failure to quit: history of mental illness, high daily cigarette consumption, high FTND score, and feeling depressed.

Discussion

This is the first comprehensive study of predictors of success for smoking cessation in a local smoking cessation service. Age, mental health, cigarette consumption, FTND score, reasons to quit, confidence in quitting, depressive mood, self-efficacy, sessions of office counselling, phone counselling, and medication treatment were identified as predictors among clients who volunteered to quit smoking.

In the univariate logistic analysis, most of the predictors were consistent with other studies. In many studies of predictors,[15,22] results for gender, number of previous attempts, education level and social status, years of smoking, and history of depression have been inconsistent. In our study, a more comprehensive list of potential predictors from five domains (namely, demographics, health-related, smoking-related, psychosocial, and interventional variables) was included. After multiple logistic regression analysis, many commonly reported determinants/predictors were excluded. They included perceived health, marital status, cohabitation with a smoker, household income, gender, years of smoking, perceived importance of

TABLE 2. Univariate logistic regression analysis of socio-demographic and health-related variables (n=3853)

Variable	Crude OR	95% CI	P value
Socio-demographic variable			
Age	1.01	1.01-1.02	<0.001
Marital status*			
Separated/divorced/widowed	1	Referent	
Married/cohabited	1.39	1.13-1.73	0.001
Monthly household income (HK$)			
<10 000	1	Referent	
≥30 000	1.34	1.08-1.65	0.008
Health-related variable			
Reported having mental illness*	0.54	0.44-0.66	<0.001

Abbreviations: CI = confidence interval; OR = odds ratio
* Data were missing in this item (range, 15-74)

TABLE 3. Univariate logistic regression analysis of smoking-related variables (n=3853)

Smoking-related variable	Crude OR	95% CI	P value
Years of smoking*	1.01	1.01-1.02	<0.001
Have cohabited smoker*	0.82	0.69-0.97	0.024
No. of cigarette(s) per day*	0.98	0.97-0.99	<0.001
FTND score*			
Low (0-3)	1	Referent	
Medium (4-5)	0.80	0.66-0.97	0.024
High (6-10)	0.60	0.51-0.71	<0.001
Reasons to quit			
Prove my ability to quit smoking	1.25	1.08-1.46	0.003
Avoid discrimination as a smoker	1.33	1.07-1.67	0.012
Perceived high-risk situation			
Under time pressure	0.72	0.61-0.86	<0.001
Arguing with others (feeling irritated/angry)	0.83	0.71-0.97	0.017
Depressed or frustrated	0.85	0.74-0.98	0.027
Drinking alcohol or coffee	0.82	0.71-0.96	0.011
Difficulty in sleeping	0.75	0.62-0.89	0.001
Bored	0.77	0.67-0.89	<0.001
No. of perceived high-risk situations	0.94	0.92-0.97	<0.001

Abbreviations: CI = confidence interval; FTND = Fagerström Test for Nicotine Dependence; OR = odds ratio
* Data were missing in this item (range, 11-313)

TABLE 4. Univariate logistic regression analysis of psychosocial and interventional variables (n=3853)

Variable	Crude OR	95% CI	P value
Psychosocial variable			
Felt stressed*	0.71	0.62-0.81	<0.001
Felt depressed*	0.76	0.66-0.88	<0.001
Importance of quitting (0-100)*	1.01	1.00-1.01	0.001
Difficulty in quitting (0-100)*	0.99	0.99-1.00	0.002
Confidence in quitting (0-100)*	1.01	1.01-1.02	<0.001
Perceived social support			
Spouse	1.15	1.01-1.32	0.035
Self-efficacy			
Self-efficacy (total)*	1.02	1.01-1.02	
Self-efficacy (external)*	1.02	1.01-1.03	<0.001
Self-efficacy (internal)*	1.03	1.02-1.04	<0.001
Interventional variable			
No. of face-to-face counselling*	1.20	1.17-1.24	<0.001
No. of over-the-phone counselling*	1.10	1.07-1.13	<0.001
Drug used*			
No drug used	1	Referent	
NRT	3.20	2.64-3.89	<0.001
Non-NRT	3.39	2.21-5.21	<0.001

Abbreviations: CI = confidence interval; NRT = nicotine replacement therapy; OR = odds ratio

* Data were missing in this item (range, 7-311)

quitting or difficulty in quitting, feeling anxious, and internal self-efficacy in quitting.

The effect of age appeared to be consistent with the results of local[23,24] and some international studies[11-13] that older age was an independent predictor.[25] Results for the predictive power of male gender have been controversial: some studies have reported it as a predictor of cessation success,[8,10,26] while others have found it to have no significant effect or a negative effect.[12,27,28] Our study could not confirm these findings. In addition, the role of marital status, education, household income, and number of cohabitants were shown not to be predictive, contrary to some overseas studies.[29,30] Nonetheless, consistent with many studies, cigarette consumption and FTND score were negatively correlated with quit rate.[8,27,31]

Extensive research indicates that individual motivation, especially intrinsic motivation, is predictive of the long-term cessation result.[8] In our study, two robust reasons to quit that could significantly predict abstinence were "prove my ability to quit smoking" and "avoid discrimination as a smoker". This seemed to correspond to the "self-control" and "social influence" factors of Reasons for Quitting scale.[32] In Hong Kong, smoking in some designated areas and public places is forbidden. This may precipitate the "avoid discrimination as a smoker" response. In service provision, operational initiatives and promotion strategies may be tailored to these two areas when motivating smokers to quit.

Perceived depressive mood (AOR=0.77) and history of mental illness (AOR=0.67) greatly enervated the success rate of quitting in our participants. Similar results have been reported in western countries as well as in Asia.[8,33-35] This reinforces the importance of implementing appropriate mental health screening and referral in smoking cessation clinics. Presence of a chronic illness was not shown to be predictive although this may have been due to our relatively small sample size for this group of clients or because ours was a cohort of smokers who were motivated to quit. The effect of chronic illness may thus be attenuated. Studies have also shown that not all chronic diseases have the same impact on smoking cessation.[36,37]

The link between self-efficacy and successful quitting has long been established.[22,38] Both external and internal self-efficacy in SEQ-12 scales have been found to be predictive in smoking cessation in western countries.[21] In our study, after adjusting all potential predictors, a high degree of confidence and external self-efficacy were predictive of cessation, while the predictive ability of total and internal sub-score of SEQ-12 faded after adjustment. This is consistent with a previous Hong Kong study.[20] Manifestation of cultural differences in self-efficacy during smoking cessation warranted further investigation. According to the results in the current study, smoking cessation counselling should focus more on helping clients to develop techniques to resist external temptation and to enhance external self-efficacy.

Consistent with overseas reviews of smoking cessation counselling,[15,39] our study indicated that the number of sessions of face-to-face counselling or phone support were strong predictors (AOR=1.15 and 1.12, respectively). Both kinds of medication (NRT and non-NRT) were also associated with successful smoking cessation. Most previous predictor studies have not included these parameters, however.

There are some limitations in our study. Since this was a retrospective case review study of smokers who were motivated to quit, the results cannot be generalised to the whole smoking population. In addition, in the process of multiple logistic regression, only 2714 clients instead of all study subjects were analysed. Interventional variables such as office counselling, phone counselling, and medication modality were not randomly allocated. Patient compliance with medication was not evaluated, thus information on the use of medication may be biased. Another potential confounding factor was a small amount of missing data for some predictors. The effect of job nature and different chronic illnesses was not included in this study because of insufficient

TABLE 5. Multiple logistic regression (n=2714)

Variable	Adjusted OR	Adjusted OR of 1 SD (SD)	95% CI	P value
Demographic				
Age	1.01	1.12 (12.2)	1.00-1.02	0.025
Health-related				
Reported having mental illness	0.67		0.52-0.88	0.003
Smoking-related				
No. of cigarette(s) per day	0.98	0.86 (9.24)	0.97-1.00	0.008
FTND score				
Low (0-3)	1		Referent	
Medium (4-5)	0.79		0.62-1.00	0.054
High (6-10)	0.68		0.54-0.87	0.002
Reason to quit				
Prove my ability to quit smoking	1.23		1.11-1.49	0.036
Avoid discrimination as a smoker	1.39		1.05-1.84	0.023
High-risk situation				
Time pressure	0.84		0.68-1.03	0.096
Drinking alcohol or coffee	0.84		0.69-1.02	0.071
Psychosocial				
Confidence in quitting (0-100)	1.01	1.28 (22.4)	1.01-1.02	<0.001
Feel depressed	0.77		0.65-0.92	0.004
Self-efficacy (external)	1.01	1.10 (6.98)	1.01-1.03	0.039
Interventional				
No. of face-to-face counselling	1.15		1.11-1.20	<0.001
No. of over-the-phone counselling	1.12		1.08-1.17	<0.001
Drug used				
No drug used	1		Referent	
NRT	2.33		1.81-3.01	<0.001
Non-NRT	2.63		1.56-4.43	<0.001

Abbreviations: CI = confidence interval; FTND = Fagerström Test for Nicotine Dependence; NRT = nicotine replacement therapy; OR = odds ratio; SD = standard deviation

data; only chronic disease as a group was analysed. Self-reported 7-day point prevalence abstinence rate was not biochemically validated although previous study has shown that self-reported abstinence does not differ much to abstinence according to biochemical validation.[40]

Conclusions

This local study has identified a number of predictors of smoking abstinence at week 26 in clients who volunteered to seek treatment from a smoking cessation clinic. Most large-scale overseas studies have been based on a population survey. This was a large-scale comprehensive study performed in a real-life smoking cessation programme in Hong Kong. As such, it offers a better understanding of the determinants of successful quitting. Although some predictors have not been addressed and need further study, this study highlights the need for a holistic approach to the management of nicotine withdrawal, and to enhance external self-efficacy and motivation, to provide an adequate number of counselling sessions and to help smokers cope with mood problems.

References

1. WHO Report on the global tobacco epidemic. Geneva: World Health Organization; 2013.
2. Lam TH, Ho SY, Hedley AJ, Mak KH, Peto R. Mortality and smoking in Hong Kong: case-control study of all adult deaths in 1998. BMJ 2001;323:361.
3. Hong Kong Council on Smoking and Health: Annual Report 2011-2012. Hong Kong: Hong Kong Council on Smoking and Health; 2012.
4. WHO Report on the global tobacco epidemic, 2008: The MPOWER Package. Geneva: World Health Organization; 2008.
5. Wang L, Kong L, Wu F, Bai Y, Burton R. Preventing chronic diseases in China. Lancet 2005;366:1821-4.

6. 2008 PHS Guideline Update Panel, Liaisons, and Staff. Treating tobacco use and dependence: 2008 update U.S. Public Health Service Clinical Practice Guideline executive summary. Respir Care 2008;53:1217-22.
7. Reducing tobacco use: a report of the Surgeon General—executive summary. Nicotine Tob Res 2000;2:379-95.
8. Caponnetto P, Polosa R. Common predictors of smoking cessation in clinical practice. Respir Med 2008;102:1182-92.
9. Prochaska JO, DiClemente CC, Velicer WF, Ginpil S, Norcross JC. Predicting change in smoking status for self-changers. Addict Behav 1985;10:395-406.
10. Hymowitz N, Cummings KM, Hyland A, Lynn WR, Pechacek TF, Hartwell TD. Predictors of smoking cessation in a cohort of adult smokers followed for five years. Tob Control 1997;6 Suppl 2:S57-62.
11. Monsó E, Campbell J, Tønnesen P, Gustavsson G, Morera J. Sociodemographic predictors of success in smoking intervention. Tob Control 2001;10:165-9.
12. Osler M, Prescott E. Psychosocial, behavioural, and health determinants of successful smoking cessation: a longitudinal study of Danish adults. Tob Control 1998;7:262-7.
13. Hyland A, Borland R, Li Q, et al. Individual-level predictors of cessation behaviours among participants in the International Tobacco Control (ITC) Four Country Survey. Tob Control 2006;15 Suppl 3:iii83-94.
14. Haas AL, Muñoz RF, Humfleet GL, Reus VI, Hall SM. Influences of mood, depression history, and treatment modality on outcomes in smoking cessation. J Consult Clin Psychol 2004;72:563-70.
15. Iliceto P, Fino E, Pasquariello S, D'Angelo Di Paola ME, Enea D. Predictors of success in smoking cessation among Italian adults motivated to quit. J Subst Abuse Treat 2013;44:534-40.
16. Miller WR, Rollnick S. Talking oneself into change: motivational interviewing, stages of change, and therapeutic process. J Cogn Psychother 2004;18:299-308.
17. DiClemente CC, Prochaska JO. Toward a comprehensive, transtheoretical model of change: stages of change and addictive behaviors. In: Miller WR, Heather N, editors. Treating addictive behaviors. 2nd ed. New York: Plenum Press; 1998: 3-24.
18. Lai DT, Cahill K, Qin Y, Tang JL. Motivational interviewing for smoking cessation. Cochrane Database Syst Rev 2010;(1):CD006936.
19. Heatherton TF, Kozlowski LT, Frecker RC, Fagerström KO. The Fagerström Test for Nicotine Dependence: a revision of the Fagerström Tolerance Questionnaire. Br J Addict 1991;86:1119-27.
20. Leung DY, Chan SS, Lau CP, Wong V, Lam TH. An evaluation of the psychometric properties of the Smoking Self-Efficacy Questionnaire (SEQ-12) among Chinese cardiac patients who smoke. Nicotine Tob Res 2008;10:1311-8.
21. Etter JF, Bergman MM, Humair JP, Perneger TV. Development and validation of a scale measuring self-efficacy of current and former smokers. Addiction 2000;95:901-13.
22. Li L, Borland R, Yong HH, et al. Predictors of smoking cessation among adult smokers in Malaysia and Thailand: findings from the International Tobacco Control Southeast Asia Survey. Nicotine Tob Res 2010;12 Suppl:S34-44.
23. Yu DK, Wu KK, Abdullah AS, et al. Smoking cessation among Hong Kong Chinese smokers attending hospital as outpatients: impact of doctors' advice, successful quitting and intention to quit. Asia Pac J Public Health 2004;16:115-20.
24. Abdullah AS, Yam HK. Intention to quit smoking, attempts to quit, and successful quitting among Hong Kong Chinese smokers: population prevalence and predictors. Am J Health Promot 2005;19:346-54.
25. Fiore MC, Novotny TE, Pierce JP, Hatziandreu EJ, Patel KM, Davis RM. Trends in cigarette smoking in the United States. The changing influence of gender and race. JAMA 1989;261:49-55.
26. Piper ME, Cook JW, Schlam TR, et al. Gender, race, and education differences in abstinence rates among participants in two randomized smoking cessation trials. Nicotine Tob Res 2010;12:647-57.
27. Vangeli E, Stapleton J, Smit ES, Borland R, West R. Predictors of attempts to stop smoking and their success in adult general population samples: a systematic review. Addiction 2011;106:2110-21.
28. Bjornson W, Rand C, Connett JE, et al. Gender differences in smoking cessation after 3 years in the Lung Health Study. Am J Public Health 1995;85:223-30.
29. Kim YJ. Predictors for successful smoking cessation in Korean adults. Asian Nurs Res (Korean Soc Nurs Sci) 2014;8:1-7.
30. Chandola T, Head J, Bartley M. Socio-demographic predictors of quitting smoking: how important are household factors? Addiction 2004;99:770-7.
31. Abdullah AS, Ho LM, Kwan YH, Cheung WL, McGhee SM, Chan WH. Promoting smoking cessation among the elderly: what are the predictors of intention to quit and successful quitting? J Aging Health 2006;18:552-64.
32. Curry S, Wagner EH, Grothaus LC. Intrinsic and extrinsic motivation for smoking cessation. J Consult Clin Psychol 1990;58:310-6.
33. Kim SK, Park JH, Lee JJ, et al. Smoking in elderly Koreans: prevalence and factors associated with smoking cessation. Arch Gerontol Geriatr 2013;56:214-9.
34. Lasser K, Boyd JW, Woolhandler S, Himmelstein DU, McCormick D, Bor DH. Smoking and mental illness: A population-based prevalence study. JAMA 2000;284:2606-10.
35. Covey LS, Glassman AH, Stetner F. Depression and depressive symptoms in smoking cessation. Compr Psychiatry 1990;31:350-4.
36. Salive ME, Cornoni-Huntley J, LaCroix AZ, Ostfeld AM, Wallace RB, Hennekens CH. Predictors of smoking cessation and relapse in older adults. Am J Public Health 1992;82:1268-71.
37. Freund KM, D'Agostino RB, Belanger AJ, Kannel WB, Stokes J 3rd. Predictors of smoking cessation: The Framingham Study. Am J Epidemiol 1992;15:957-64.
38. Gwaltney CJ, Metrik J, Kahler CW, Shiffman S. Self-efficacy and smoking cessation: a meta-analysis. Psychol Addict Behav 2009;23:56-66.
39. Clinical Practice Guideline Treating Tobacco Use and Dependence 2008 Update Panel, Liaisons, and Staff. A clinical practice guideline for treating tobacco use and dependence: 2008 update. A U.S. Public Health Service report. Am J Prev Med 2008;35:158-76.
40. Patrick DL, Cheadle A, Thompson DC, Diehr P, Koepsell T, Kinne S. The validity of self-reported smoking, a review and meta-analysis. Am J Public Health 1994;84:1086-93.