RESEARCH ARTICLE

Predictors of Long-term Abstinence Among Chinese Smokers Following Treatment: The Role of Personality Traits

Doris YP Leung[1]*, Doreen WH Au[2], Tai-hing Lam[3], Sophia SC Chan[4]

Abstract

Four hundred and thirty-five Chinese smokers who had attended the first smoking cessation clinic and received stage-matched individualized cessation counseling in Hong Kong during the period of August 2000 to January 2002 were successfully followed-up between February and August 2008. Some 38% of the participants (165/495) had stopped smoking during the 12-month follow-up after treatment. Participants with higher conscientiousness score (OR = 1.65, 95% CI: 1.09 – 2.48) and lower openness to experience score (OR = 0.64, 95% CI: 0.45 – 0.92) showed a greater likelihood of quitting smoking after controlling the effect of daily cigarettes smoked and stage of readiness at baseline. The study suggests an important role of conscientiousness and openness to experience on long-term quitting behaviors following treatment, and provides useful information for the development of matched intervention for smoking cessation among Chinese smokers.

Keywords: Cigarette smoking - personality traits - long-term abstinence - Chinese smokers

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Introduction

Smoking cessation should be a high priority, as it will result in health gains, reduced medical burdens and fewer premature deaths due to diseases attributable to smoking. A few number of prior research have pointed out the significant role of personality in smoking initiation, maintenance, or cessation (Malouff et al., 2006), yet studies on the association between personality and smoking cessation are much less established. Specifically, it remains unclear how different personality trait affect long-term quitting behaviors following treatments. Given that smoking cessation programs are increasingly concerned with matching interventions to some relevant dimensions, such as the degree of nicotine dependency or the stage of readiness to quit (Prochaska et al., 2001; Lawrence et al., 2005; Velicer et al., 2006), a better knowledge of the impacts of individual differences, variables or personality traits in particular on quitting behaviors may help to manage smoking cessation symptoms and improve the cessation treatment outcomes.

A growing consensus has supported the five-factor model (FFM) as a comprehensive yet manageable taxonomy of personality traits (John et al., 1991). The FFM taxonomy organizes personality into five broad dimensions that are often labeled as extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience which have been shown to be generalizable across-cultures including Hong Kong (Schmitt et al., 2007).

Studies on the associations between smoking cessation and personality are scarce and are mostly conducted within the western context. An meta-analysis of 25 cross-sectional studies reported that both increased extraversion and increased neuroticism were associated with an increased likelihood of being a smoker but the effect sizes were small (Munafò et al., 2007) while another meta-analysis of nine studies found some supporting evidence that high scores on traits of neuroticism, and low scores on agreeableness and conscientiousness discriminated the persistent smokers from the abstainers (Malouff et al., 2006). Other studies also found that smokers reported higher scores on Eysenck's psychoticism, a construct inversely related to agreeableness and conscientiousness, than non-smokers (Aluja et al., 2002; 2004). However, the participants in these studies had not received any cessation treatments.

A few of convergence evidence about the impact of individuals' personality traits on smoking abstinences following treatments and the results are mixed. A 12 months follow-up study indicated that higher levels of neuroticism had greater difficulty maintaining abstinence than those with lower levels (Cosci et al., 2009). Alternatively, a prospective study with length of follow ups ranged from 10 months to 1.9 years reported that low scores on neuroticism and openness were associated with tobacco abstinence following treatment for nicotine dependence (Hooten et al., 2005). Yet, no previous study has examined how the personality variables associated with tobacco abstinence following treatment among the Chinese populations and conducted a much longer

[1]The Nethersole School of Nursing, The Chinese University of Hong Kong, [2]Department of Rehabilitation Sciences, The Hong Kong Polytechnic University, [3]School of Public Health, [4]School of Nursing, The University of Hong Kong, Hong Kong, China
**For correspondence: dorisleung@cuhk.edu.hk*

follow-up period.

The aim of the current study was to fill this research gap by providing evidence on the associations between personality traits and long-term quitting behaviours following treatment within the Chinese context. It is important to determine whether the influence of treatment on cessation behaviours varies according to different personality traits. If such differences in cessation behaviours in different personality profiles are uncovered, it would be beneficial to the improvement in cessation interventions through personalized treatment and public policies, especially for China where cessation programs are under developed.

Materials and Methods

Participants and Procedures

This is a 7-year (on average) cohort study involving 1173 Chinese-speaking smokers who had attended the first smoking cessation clinic and received four sessions of stage-matched individualized cessation counseling at baseline, 1-month, 3-month, and 12-month in Hong Kong during the period of August 2000 to January 2002, and their smoking status were assessed at each of the three follow-ups (Abdullah et al., 2004). From February to August 2008, invitation letters were sent to all the participants with available addresses to remind them about the smoking cessation service they had received seven years ago at the clinic, and explained the purpose, procedures and research team of the study. One week after sending out the invitation letters, a trained interviewer called the participants to complete the questionnaire and three draw prize incentive of one thousand Hong Kong dollars were used to boost up the response rate. Oral consent from the participants was obtained before the administration of the questionnaires. The average follow-up time was seven years. Details of the data collection procedure were reported elsewhere (Leung et al., 2012). This study was approved by the institutional review board of the participating university.

Measures

Participants were asked regarding their smoking behaviors in the past 30 days. The abbreviated 29-item Big Five Inventory (Leung et al., 2012) was used to measure the five personality trait dimensions: extraversion, agreeableness, conscientiousness, neuroticism and openness to experience using a 5-point Likert scale, ranged from 1 = 'strongly disagree' to 5 = 'strongly agree'. Information related to smoking behaviors at baseline included the Fagerström Test for Nicotine Dependence (FTND) score (Heatherton et al., 1991), stage of readiness to quit smoking (action, preparation, contemplation, and contemplation), whether smoked 15 cigarettes or more per day and age started smoking, and self-report smoking status at 12-month follow-up and total number of the four sessions of counseling had been received during the 12-month period were retrieved from record. A participant was classified as a long-term quitter if he or she reported not smoking for the last 7 days at 12-month and for the last 30 days at 7-year. Aggregate scores for the five personality traits were computed by averaging the scores of the corresponding items in the trait, with a higher score indicates a participant was more positive in that trait.

Data analysis

Baseline characteristics of participants who complete the follow-up questionnaire and those who were not were compared using the chi-square test for categorized variables and the two-sample t-test for continuous variables. A multivariate logistic regression analysis utilizing a stepwise, backward elimination procedure was used to identify independent predictors of quitting smoking. Age, sex, marital status, education level, number of cigarettes smoked per day, age started smoking, age started smoking regularly, FTND, stage of readiness to quit, intensity of counseling received and personality variables were the independent variables and long-term quitting was the dependent variable. In all cases, the likelihood ratio statistics was used for testing significance and p-values <0.05 were considered evidence of findings not attributable to chance.

Results

A total of 480 (41%) participants completed the follow-up survey, 152 refused, 522 were lost to follow-up and 19 were reported dead. No differences between completers and non-completers in terms of nicotine dependency and stage of readiness to quit at baseline. However, completers were more likely to be male (83.8% vs 76%, $p = 0.002$), not married (33.5% vs 47.5%, $p < 0.001$) and older (mean age 40.6 ± 12.0 (mean ± SD) years vs 37.3 ± 14.3 years, $p = 0.001$) (Table 1).

Among the 480 completers, 435 (90.6%) provided complete information in the study and hence were included in the analysis. Among them, a majority were male (83.7%), unmarried (66.4%), had not completed secondary school education (75.6%), and a mean age of 40.6 years of age and had started smoking at the age of 18 (SD = 4.6) years old on average. A total of 165 (37.9%) reported as long-term quitters. The rank of the mean scores in the five personality traits was from the highest

Table 1. Comparison of Baseline Characteristics at the Time of the 7-year Follow-up Survey

Characteristics	Completers (n=480)		Non-completers (n=693)		
	Mean	SD	Mean	SD	*P*-value
Age in years	40.6	12	37.3	14.3	0.001
Age started smoking	18.2	4.6	17.6	4.8	0.02
	n	%	n	%	
Male	402	83.8	527	76	0.002
Married	161	33.5	329	47.5	<0.001
Nicotine dependency					0.4
Mild	146	30.8	195	28.1	
Moderate	122	25.4	200	28.9	
Severe	212	44.2	298	43	
Stage of readiness to quit					0.16
Pre-contemplation	29	6	56	8.1	
Contemplation	319	66.5	452	65.2	
Preparation	87	18.1	128	18.5	
Action	45	9.4	57	8.2	

Table 2. Factors Predicting Long-term Quitting among Chinese Smokers Following Treatment

	Adjusted OR	95% CI	*P*-value
Conscientiousness	1.65	1.09-2.48	0.017
Openness to experience	0.64	0.45-0.92	0.017
Baseline variable			
CPD	0.66	0.44-0.99	0.044
Stage of readiness to quit			
Action	1 (ref)		
Preparation	0.43	0.19-0.94	0.034
Contemplation	0.49	0.25-0.95	0.035
Precontemplation	0.29	0.09-0.88	0.029

in conscientiousness (3.73 ± 0.56), then in agreeableness (3.67 ± 0.52), extraversion (3.36 ± 0.61), openness to experience (3.19 ± 0.65), and lastly in neuroticism (2.70 ± 0.68). At baseline, the participants were relatively young (mean age 40.13 ± 11.67 years), most were male (84.4%), many were married (66.9%) and some had completed secondary education (24.4%). 231 (53.1%) smoked more than 15 cigarettes per day, 134 (30.8%) had a low level, 106 (24.4%) had a moderate level and 195 (44.8%) had a high level of nicotine dependency, and 42 (9.7%) in the action, 78 (17.9%) in the preparation, 290 (66.7%) in the contemplation and 25 (5.7%) in the precontemplation stage. During the 12-month period after recruitment, 307 (70.6%) of participants had completed all the four and 95 (21.8%) had completed three treatment sessions.

The final logistic regression result revealed that participants with higher conscientiousness score, lower openness to experience score, smoked fewer than 15 cigarettes per day and in the action stage at baseline showed a greater likelihood of long-term quitting smoking (Table 2).

Discussion

The present study provides new information on the impact of personality and smoking cessation among Chinese smokers who attended the clinic-based smoking cessation intervention 7 years ago. Our results showed that conscientiousness was associated with a greater likelihood of quitting smoking which is in line with previous study which demonstrated that more conscientious individuals engage in more health-enhancing and fewer health-damaging behaviors (Bogg and Roberts, 2004). As a result, this might be possible that more conscientious people were more likely to fulfill their commitments to treatment programs. Similar to previous findings (Hooten et al., 2005), we also found that trait of openness, a construct subsumes some features of sensation seeking, was negatively associated with tobacco abstinence following cessation treatment (Rawlings et al., 2000). Such traits are shown to be correlated with a range of health damaging behaviors, such as smoking and drug use (Zuckerman, 2007; De Vries et al., 2009).

In this study, extraversion was not found to influence smoking cessation outcome. Such observation is further support by recent findings (Malouff et al., 2006). Besides, traits of neuroticism and agreeableness were not significantly associated with long-term quitting behaviors. The discrepancies across studies might be due to cultural factors and public policies which influence greatly the prevalence of smoking population and in turn the characteristics of smokers (Johnson et al., 2006). However, studies on this topic are too small to allow firm conclusions to be drawn.

The present study had a number of limitations. First, the smoking abstinence status at both 12-month and 7-year follow ups was determined by self-report which may subject to confirmation bias. However, the use of self-report has been shown to be accurate when smoking status was collected over time (Tate et al., 1996; Mak et al., 2005). Second, the follow-up rate in the present study was not high which may introduce sampling bias to the results and limits its generalizability to the Chinese smoking population as a whole, however, high attrition rate is a common problem in smoking cessation studies, in particular with long follow-up time (Chan et al., 2010). Third, it is desirable to obtain personality information before cessation treatment to examine its temporal relationship with long-term quitting. Since personality traits are believed to be very stable over time, especially among adults (Chapman et al., 2007), findings on its association with long-term quitting are expected to be stable over time.

Our results indicate an important role of personality traits on long-term quitting behaviors following treatment. Understanding one's personality would shed light on the development of smoking cessation interventions. One approach would be to identify individuals with personality traits associated with health-enhancing and health-damaging behaviors and to intervene with techniques or pharmacological treatments that specifically target those personality traits. For example, Conrad and her colleagues (2000) have developed and tested interventions specially targeting key personality traits that are consistent predictors of health-damaging behaviors, particularly substance misuse. They found that the personality-matched interventions are effective to lesser the likelihood of engaging health-damaging behaviors. In line with their findings, the present study provides the basis for further research on the implementation and evaluation of personality-matched cessation interventions.

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