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Prospective predictors of quitting behaviours among adult smokers in six cities in China: Findings from the International Tobacco Control (ITC) China Survey

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Abstract

Aims—To examine predictors of quitting behaviours among adult smokers in China, in light of existing knowledge from previous research in four western countries and two southeast Asian countries.

Design—Face-to-face interviews were carried out with smokers in 2006 using the International Tobacco Control (ITC) China Survey, with follow-up about 16 months later. A stratified multi-stage cluster sampling design was employed.

Setting—Beijing and other five cities in China.

Participants—A total of 4732 smokers were first surveyed in 2006. Of these, 3863 were recontacted in 2007, with a retention rate of 81.6%.

Measurements—Baseline measures of sociodemographics, dependence and interest in quitting were used prospectively to predict both making quit attempts and staying quit among those who attempted.

Findings—Overall, 25.3% Chinese smokers reported having made at least one quit attempt between Waves 1 and 2; of these, 21.7% were still stopped at Wave 2. Independent predictors of making quit attempts included having higher quitting self-efficacy, previous quit attempts, more immediate intentions to quit, longer time to first cigarette upon waking, negative opinion of smoking and having smoking restrictions at home. Independent predictors of staying quit were being older, having longer previous abstinence from smoking, and having more immediate quitting intentions.

Conclusions—Predictors of Chinese smokers' quitting behaviours are somewhat different to those found in previous research from other countries. Nicotine dependence and self-efficacy seem to be more important for attempts than for staying quit in China, and quitting intentions are related to both attempts and staying quit.

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INTRODUCTION

Tobacco is a highly addictive substance. Many smokers find it very difficult to quit smoking (1, 2). It is critically important to understand factors that are associated with quitting behaviours in specific cultural and socio-economic contexts to provide appropriate help for people to quit smoking. However, most research to date comes from Western developed countries, and very limited longitudinal studies on smoking cessation have been reported from developing countries.

Many past studies in the West took initiation and maintenance of smoking cessation as a single process, but an increasing numbers of recent studies (3–7) found that predictors of making quit attempts differ from those that predict maintenance. Based on findings of relevant studies conducted in Western countries, the following sociodemographic and smoking-related factors have been found to be predictive of making quit attempts: being young (4, 8–10), well-educated (9), male gender (11), white race (12), lower level of nicotine dependence (4, 8, 13–18), greater quitting intention/motivation (4, 16, 19), past quit attempts (4, 7, 19), higher self-efficacy (20–22), having a history of tobacco-related medical conditions (17), and concern for health effects caused by smoking (4, 17, 23–25). Some studies have looked at predictors of successful quitting among those who tried to quit and found that demographic variables such as being older (5, 9, 10, 26, 27), married or living with a partner (5, 7) and having higher levels of education (5, 13, 28) to be associated with successful quitting. In addition, lower level of dependence (4, 18, 27, 29), no symptoms of depression and anxiety (7, 30), having rules against smoking at homes (5), having fewer smoking friends (29) and social/family supports for quitting (7, 31, 32) (5, 10, 13, 31, 32) have been found to be predictive of quit success.

Hyland et al (2006) used longitudinal data from four developed countries (Australia, Canada, the UK and USA) that are all part of the International Tobacco Control Policy Evaluation (ITC) Four-Country Survey (ITC-4) to examine individual-level predictors of making quit attempts and smoking cessation among cigarette smokers and found that nicotine dependence was the most consistent variable associated with both the initiation and maintenance of smoking cessation across all four countries. Hyland and colleagues found that intention to quit and a history of past quit attempts were strongly associated with making a serious quit attempt, but only past quit attempts were independently associated with succeeding in that attempt. Self-efficacy was found to be positively associated with maintenance (but not with quit attempts), while a small negative relationship was found between outcome expectancy for quitting and maintenance (4).

In a recent study Li et al (2010) used cohort data from the ITC Southeast Asia Survey (ITC-SEA) to examine quit behaviours among smokers in Malaysia and Thailand (3). The results indicated that while lower nicotine dependence, higher levels of self-efficacy and more immediate quitting intentions were predictive of both making a quit attempt and staying quit in both countries, higher health concerns about smoking were only predictive of making an attempt. Older age was only associated with staying quit. These predictors differed somewhat from those found in the above four Western countries (3).

One longitudinal study on smoking cessation among adult smokers has been reported in mainland China by Yang et al (33). They found that intention/determination to quit and lower consumption predicted sustained quitting (at 1 year follow up) among participants in a Quit and Win competition (33). Abdullah and Yam (2005) used a cross-sectional survey to examine the factors associated with smoking cessation among Hong Kong Chinese smokers and found that being married and not smoking to kill time were associated with past quitting

attempts, while being male, married and not smoking to kill time were associated with intention to quit smoking (34).

This paper used cohort data from the first two waves of the ITC China Survey to examine predictors of quitting behaviours among adult smokers in six selected cities in mainland China, in light of existing knowledge from the above mentioned ITC studies (namely the Hyland et al 2006 study and Li et al 2010 study) that used many of the same measures.

METHODS

Data source

The data for this paper came from the ITC China Survey. The ITC China Survey is a face-to-face cohort study modelled after the ITC-4 study designed to evaluate the psychosocial and behavioural impacts of tobacco control policies (35, 36).

The first wave of the survey was conducted between April and August 2006 in six cities (800 adult smokers in each city: Beijing, Shenyang, Shanghai, Changsha, Guangzhou and Yinchuan). These cities were selected based on geographical representations and levels of economic development. Within each city there was a random sample selected using a stratified multi-stage design. In each of the six cities, 10 Jie Dao (Street Districts) were randomly selected at the first stage, with probability of selection proportional to the population size of the Jie Dao. Within each selected Jie Dao, two Ju Wei Hui (Residential Blocks) were selected, again using probability proportional to the population size of the Ju Wei Hui. Within each selected Ju Wei Hui, a complete list of addresses of the dwelling units (households) was first compiled, and then a sample of 300 households were drawn from the list by simple random sampling without replacement. The enumerated 300 households were then randomly ordered, and adult smokers were then approached following the randomized order until 40 adult smokers were surveyed. Smokers were defined as respondents who had smoked more than 100 cigarettes in their life and smoked at least weekly at the survey time. Because of low smoking prevalence among women, one male smoker and one female smoker from every selected household were surveyed whenever possible to increase the sample size for women. Where there was more than one person in a sampling category to choose from in a household, the next birthday method was used to select the individual to be interviewed. The smokers were surveyed through face to face interviews in Chinese by trained health professionals from local Centers for Disease Control. The average time to complete a survey was 31 minutes.

In the first wave a total of 4732 adult smokers were surveyed in the above six cities. Of these, 3863 were successfully followed up in the second wave in late 2007 (with a follow-up rate of 81.6% and an inter survey interval of 16 months). These 3863 respondents who completed both waves constituted the longitudinal sample for this study. More detailed description of the methods of the ITC China Survey can be found in Wu et al. 2009 (37).

Measures

The main outcomes assessed in this study were: (1) quit attempts between Wave 1 and Wave 2; (2) staying quit, defined as reporting being quit (no-longer smoking) at Wave 2, analysed among those who made a quit attempt. Regression models were constructed using these outcomes. Respondents were defined as having made a quit attempt between waves if they answered 'yes' to: 'Since we last talked to you in 2006 have you made any attempts to quit smoking?', or if they were currently quit.

All predictor variables were measured in the baseline wave. Sociodemographic variables were city of residence (Beijing, Shenyang, Shanghai, Changsha, Guangzhou, Yinchuan),

gender (male, female), age (18–24, 25–39, 40–54, 55 and older), ethnicity group (majority group-Han, minority group), education ('Low' level of education refers to no schooling or having only primary school education, 'moderate' were those with high school or technical secondary education, and 'high' were those with university or postgraduate degree), and income (those with monthly household income less than 1000 Chinese yuan (CNY) (approximately US\$145) were coded as 'low income', those between 1000–3000 CNY (US \$145–\$440) were coded as 'medium income', and those equal or greater than 3000 CNY (US\$440) were coded as 'high income', and those who did not provide an answer were coded as 'Don't know').

Nicotine dependence was measured using the following categorical variables: (1) number of cigarettes per day (CPD), based on responses to: 'On average, how many cigarettes do you smoke each day [for daily smokers]/each week [for those who smoked less than everyday] (including both factory-made and hand-rolled cigarettes)?', recoded to: ' ≤ 10 CPD', '11–20 CPD', '21 to 30 CPD', '31 or more CPD', and 'don't know'; (2) time to first cigarette upon waking (coded: ≤ 5 minutes, 6–30 min, 31–60 min, 61 min or more, and don't know), and (3) daily/non-daily smokers.

Past quitting history variables assessed were: tried to quit smoking within last year (yes, no), and longest time off smoking (never, less than 1 month, 1–6 months, more than 6 months).

Respondents' were asked about their intention to quit via the following question: 'Are you planning to quit smoking?' Response options were 'within the next month', 'within the next 6 months', 'sometime in the future, beyond 6 months', 'not planning to quit' and 'don't know'. Self-efficacy of quitting was assessed by: 'If you decided to give up smoking completely in the next 6 months, how sure are you that you would succeed?' Response options were 'not at all sure', 'somewhat sure', 'very sure', 'extremely sure' and 'don't know'.

Outcome expectancy for quitting was assessed by: 'How much do you think you would benefit from health and other gains if you were to quit smoking permanently in the next 6 months?' (not at all, somewhat, very much, and don't know). We also asked smokers about their health concerns: 'How worried are you, if at all, that smoking will damage your health in the future?' (not at all, somewhat, very much, and don't know). Favourable attitude toward smoking was assessed by extent of agreement or disagreement with, 'You enjoyed smoking too much to give it up', with the original 5-point scale recoded into: 'agreeing' (agree and strongly agree) versus 'other'. Overall opinion about smoking was measured by asking "What is your overall opinion of smoking?" (recoded into negative, very negative, with all positives and others grouped together because of small number).

In addition, we asked about smoke-free environments at home: 'Which of the following best describe smoking inside your home?' ('smoking is not allowed in any indoor area', 'smoking is allowed only in some indoor areas', and 'no rules or restrictions', with the latter two combined for analysis).

Data analysis

Group differences for categorical variables were examined using chi-square tests. The association between smoking cessation outcomes and a range of potential predictor variables was examined using logistic regression. Simple logistic regression models were used to examine the bivariate association between an outcome variable and each predictor. All variables were then entered into the multivariate logistic regression model to determine their independent effects. A α level of $p < 0.05$ was used for all statistical tests. All data analyses were conducted with SPSS Program (PASW Statistics 18).

RESULTS

Sociodemographic and smoking-related characteristics

Table 1 presents the sociodemographic and smoking-related characteristics of the sample. The 3863 followed-up smokers were predominantly male, reflecting the large gender gap in smoking rates in China. The majority had received secondary education. The respondents were predominantly of Han ethnicity. The smoking-related characteristics of the followed-ups and those lost to follow-up were generally comparable, although there were differences in the composition of age, education and income between these two groups. Those retained were more likely to be older, have lower education and lower income (Table 1).

Making quit attempts between Waves 1 and 2 and associated factors

Overall, 979 out of the 3863 (25.3%) Chinese smokers reported having made at least one quit attempt between Waves 1 and 2. Multivariate analyses show that independent predictors of making quit attempts included having higher quitting self-efficacy, previous quit attempts, more immediate intentions to quit, longer time to first cigarette upon waking, negative opinion of smoking and having smoking restrictions at home (Table 2). There was significant variability in attempts between cities, being far lower in Shanghai (especially using adjusted odds ratio) than in all other cities.

Staying quit at Wave 2 among those who tried and associated factors

Of those 979 respondents who attempted between Waves, 212 (21.7%) were still stopped at Wave 2. Independent predictors of staying quit among those who attempted were being older, having longer previous abstinence from smoking (more than 6 months), and having more immediate quitting intentions (planning to quit within 1 month). There were also significant between city effects with success markedly lower in Shenyang than in the other cities (Table 3).

DISCUSSION

The results indicate that predictors of Chinese smokers' quitting behaviours are somewhat different to those found in the ITC-4 and ITC-SEA countries. Having higher levels of quitting self-efficacy was found to be predictive of making quit attempts in China and in ITC-SEA countries, but it was not predictive in the ITC-4 countries (Appendix I). Similarly, having immediate quitting intentions was found to be predictive of staying quit in both China and in ITC-SEA, but not in ITC-4 countries (Appendix II). Having negative opinions/attitudes on smoking was shown to be associated with making attempts in China and the ITC-4 countries, but this was not the case in Malaysia and Thailand. Lower levels of nicotine dependence and higher self-efficacy were found to be predictive of staying quit in both ITC-4 and ITC-SEA surveys, however, they were not significantly associated with staying quit in China.

As consistently found in the ITC-4 survey and ITC-SEA survey, lower nicotine dependence, more immediate quitting intentions and longer previous quit attempts were found to be associated with increased quit attempt rates among Chinese smokers. We also found some similarities in predictors of staying quit among Chinese smokers and those in the other ITC countries. Having past quit attempts (longer than 6 months, especially when compared with short ones rather than no attempt) was found to be associated with increased rates of staying quit in all countries. We found that being older was strongly associated with having higher rate of maintenance among the Chinese smokers, and that is consistent with the findings from the ITC-SEA survey. However, being older was not an independent predictor of staying quit in the ITC-4 countries (4), but has been found to be a predictor in other Western

studies (5, 9, 26, 27). Even though the actual predictors vary, in all countries it seems that the predictors of making attempts differ from those variables that predict success.

Compared to countries in the ITC-4 Survey and ITC-SEA Survey, considerably fewer adult smokers in China (25.3%) attempted to quit between Waves 1 and 2. This, over a 16 month period, is much lower than what we have found in ITC SEA (3) or ITC-4 countries (4, 38). The finding that Chinese smokers were less likely to make quit attempts suggests that there is a need for more programs to motivate people to quit smoking. Thailand experienced a huge increase in quitting activities following its first mass media campaign (3).

It is unclear what might account for the disparity in findings across countries although we suspect these differences could be due to either or a combination of cultural factors unique to these countries and differences in tobacco control history across these countries. Like many other Asian countries, China has comparatively short history in tobacco control. Before 2006, China only conducted sporadic tobacco control efforts, such as public education activities on the street and television around the World No Tobacco Day, but nothing approaching a comprehensive large scale campaign like those in the ITC-4 countries. More systematic tobacco control measures have been introduced since then as a result of Chinese commitment to implement the WHO FCTC. Generally speaking, the social norms are very positive for smoking in China and level of knowledge about the harms of smoking is low (39). More effort is clearly needed, especially given its huge numbers of smokers (over 300 million) and high smoking rates, especially among the males (66%)(40, 41).

It is worth noting that in this study some motivational measures, such as having more immediate quitting intentions and negative opinion about smoking, were significantly associated with increased attempt rates, although the latter motivational measure (as well as dependence) did not predict staying quit. Smoking cessation is an area where motivation is of critical importance, although motivation itself is a multi-dimensional concept (7, 42–44). Our finding that motivational measures such as intentions and opinion/attitudes on smoking predicted quit attempts has some important implications. It suggests that enhancing Chinese smokers' quitting intention and their negative opinion on smoking is promising to stimulate them to make quit attempts, and hopefully with more smokers attempting to quit more of them (especially those less-addicted) may succeed. Given its limited tobacco control resources, China might consider prioritising mass media anti-smoking campaigns to motivate its smokers to try to quit. International evidence suggests that strong disease-related messages are potent motivators of making quit attempts (45). At the population level, this may be a more cost-effective strategy for China than heavily investing in providing large-scale expensive cessation services, at least until enough smokers identify themselves as needing extra help. However, we are not arguing for the abandonment of cessation help. It is important to have some smoking cessation services available to the public. Such services can help those who are heavily addicted and who do need help to quit, can be used to speed up smoking cessation among role models such as doctors and other health professionals (46), and also they symbolise the importance of quitting.

The failure of self-efficacy to predict success, while it did predict attempts, suggests that Chinese smokers may have unrealistic expectations of how easy quitting will be, likely due to little or no real experience of trying, so after quitting these beliefs should change in response to experienced difficulties. Indeed, when we compared self-efficacy ratings at time one (ie, Wave 1 of the survey) and time two (Wave 2) we found they were only correlated 0.1, consistent with these beliefs being unstable.

This study relied on self-reported data from participants. It is likely that there was under reporting of quit attempts, especially early in the inter-wave period, and for shorter attempts, due to memory effects (47, 48). These would have had the effect of diluting effects, especially for predictors that change over time. However, this is no evidence to suggest that self-report is systematically inaccurate in population-based studies of this kind. Previous similar studies that used many of the same measures have already demonstrated their validity (3, 4). In addition, because the sample was from six urban centers in China, cautions should be exercised when one wants to generalise the findings to other parts of China, especially to the vast rural areas of China, which has different economic conditions. Further, the variability in quit rates across cities suggests that local conditions can have large effects. A small part of the effect may be in responding as the smokers from cities reporting the higher rate of attempts tended to have lower reported success. We do not have a clear answer as to why the quit attempt rates in Shanghai were so low. The lower maintenance rates in Shenyang may be partly related to the fact that the smokers there were more likely to be exposed to tobacco marketing activities, as found by Yang et al who used Wave 1 data of the ITC China Survey (49), but the effect we found is much stronger, so it could at least be a partial explanation.

This study, along with other recent research from our group, raises the intriguing possibility that the determinants of making quit attempts and of staying quit might vary as a function of the history and presumably effects of tobacco control activities. Work is needed to test this hypothesis as it has profound implication for the kinds of interventions that are being planned and/or implemented as countries pursue their obligations under the WHO FCTC.

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Table 1

Socio-demographic and smoking-related characteristics of smokers who were followed up and lost to follow-up

	Followed up (n=3863)		Not followed up (n=869)		p-value for chi-square tests (Followed vs Not- followed)
	n	%Followed-up	n	%NOT followed-up	
City					0.000
Beijing	710	18.4	75	8.6	
Shenyang	583	15.1	198	22.8	
Shanghai	703	18.2	81	9.3	
Changsha	648	16.8	152	17.5	
Guangzhou	560	14.5	231	26.6	
Yinchuan	659	17.1	132	15.2	
Gender (male)	3671	95.0	830	95.5	0.55
Age at recruitment					0.000
18-24	34	.9	22	2.5	
25-39	602	15.6	190	21.9	
40-54	1895	49.1	419	48.2	
55+	1332	34.5	238	27.4	
Education					0.000
Low	526	13.6	94	10.9	
Moderate	2563	66.4	535	61.8	
High	773	20.0	236	27.3	
Income					0.001
Low	785	20.3	140	16.1	
Moderate	1749	45.3	383	44.1	
High	1071	27.7	261	30.1	
Don't know	256	6.6	84	9.7	
Majority (Han)	3664	94.8	833	95.9	0.22
Daily/weekly smokers					0.64
Daily smokers	3613	93.5	809	93.1	
Weekly smokers	250	6.5	60	6.9	
Cigarettes per day					0.17

	Followed up (n=3863)			Not followed up (n=869)			p-value for chi-square tests (Followed vs Not- followed)
	n	%	Followed-up	n	%	NOT followed-up	
<=10 CPD *	1313	34.0		327	37.6		
11–20 CPD	1892	49.0		415	47.8		
21–30 CPD	342	8.9		63	7.2		
31+ CPD	296	7.7		58	6.7		
Don't know	20	.5		6	.7		
Time to first cigarette							0.17
61 minutes or more/don't know	1255	32.5		312	35.9		
31–60 minutes	548	14.2		127	14.6		
6–30 minutes	954	24.7		207	23.8		
<=5 minutes	1106	28.6		223	25.7		
Intention to quit							0.43
No intention	2483	64.6		570	65.6		
Beyond 6 months/don't know	819	21.3		167	19.2		
Within 6 months	235	6.1		62	7.1		
Within 1 month	307	8.0		70	8.1		
Longest time quit							0.62
Never tried	1820	47.4		404	47.1		
<1 month	836	21.8		195	22.7		
1–6 months	743	19.3		152	17.7		
>6 months	444	11.6		107	12.5		
Tried to quit within last year	641	16.8		143	16.8		0.99
Self efficacy							0.67
Not at all sure	1644	42.6		360	41.4		
Somewhat sure	946	24.5		212	24.4		
Very sure	511	13.2		111	12.8		
Extremely sure	486	12.6		126	14.5		
Don't know	274	7.1		60	6.9		
Outcome expectancy							0.48
Not at all	775	20.1		169	19.4		
Somewhat/don't know	1756	45.5		415	47.8		

	Followed up (n=3863)		Not followed up (n=869)		p-value for chi-square tests (Followed vs Not- followed)
	n	% Followed-up	n	% NOT followed-up	
Very much	1328	34.4	285	32.8	
Worries about health					0.36
Not at all	1336	34.6	304	35.0	
Somewhat/don't know	1839	47.6	395	45.5	
Very much	685	17.7	170	19.6	
Enjoy smoking too much to quit					0.36
Other	1725	44.7	403	46.4	
Agree	2137	55.3	466	53.6	
Overall opinion about smoking					0.67
Other	1819	47.1	423	48.7	
Negative	1477	38.2	319	36.7	
Very negative	566	14.7	127	14.6	
Smoking restrictions at home					0.58
Home bans	411	10.6	771	88.7	
No home bans	3452	89.4	98	11.3	

* CPD: cigarettes per day.

Table 2Prospective predictors of making a quit attempt between Waves 1 and 2 (n=3863[^])

Factors	n	% Quit attempt	Crude OR	95% CI	Adjusted OR	95% CI
City				***		***
Beijing	708	23.0	Ref [#]		Ref	
Shenyang	582	30.4	1.46	1.14–1.87**	1.24	.93–1.65
Shanghai	703	13.2	.51	.39–.67***	.65	.48–.88**
Changsha	646	28.2	1.31	1.03–1.68*	1.28	.96–1.69
Guangzhou	555	25.0	1.12	.86–1.45	1.32	.99–1.77
Yinchuan	659	34.1	1.73	1.37–2.19***	1.30	.99–1.72
Age at recruitment				**		*
18–39	635	26.8	Ref		Ref	
40–54	1892	22.8	.81	.66–.99*	1.01	.80–1.27
55+	1326	28.4	1.09	.88–1.34	1.27	.98–1.63
Sex				NS		NS
Female	192	30.2	Ref		Ref	
Male	3661	25.2	.78	.57–1.07	1.02	.69–1.48
Education				*		NS
Low	526	30.0	Ref		Ref	
Moderate	2553	24.6	.76	.62–.94*	.87	.67–1.12
High	773	24.8	.77	.60–.98*	.76	.56–1.05
Majority/minority				**		NS
Others	199	35.7	Ref		Ref	
Han	3654	24.8	.59	.44–.80***	.80	.56–1.13
Income				*		NS
Low	784	27.3	Ref		Ref	
Moderate	1744	26.7	.97	.80–1.17	.97	.78–1.22
High	1067	22.0	.75	.61–.93***	.84	.65–1.09
Don't know	256	25.4	.91	.66–1.25	1.01	.69–1.45
Longest time quit				***		***

Factors	n	% Quit attempt	Crude OR	95% CI	Adjusted OR	95% CI
Never tried	1815	15.6	Ref		Ref	
Less than 1 month	831	34.3	2.81	2.32–3.41***	1.62	1.29–2.04***
1–6 months	743	35.3	2.94	2.41–3.58***	1.59	1.27–2.01***
>6 months	444	31.5	2.48	1.96–3.15***	1.41	1.08–1.84*
Tried to quit within last year				***		***
Yes tried	639	47.6	Ref		Ref	
Not tried	3175	20.8	.29	.24–.35***	.61	.49–.76***
Daily/weekly smokers				***		NS
Daily smoker	3604	24.5	Ref		Ref	
Weekly smoker	249	38.6	1.93	1.48–2.52***	1.11	.79–1.57
Cigarettes per day				***		NS
<=10 CPD	1312	30.3	Ref		Ref	
11–20 CPD	1885	23.4	.70	.60–.83***	1.04	.86–1.27
21–30 CPD	340	19.4	.56	.41–.74***	.89	.63–1.26
31+ CPD	296	22.6	.67	.50–.91**	1.18	.83–1.67
Time to first cigarette				***		**
61+ min/don't know	1250	32.6	Ref		Ref	
31–60 min	547	24.7	.68	.54–.85***	.72	.56–.93*
6–30 min	952	21.5	.57	.47–.70***	.67	.53–.84***
<=5 min	1104	20.9	.55	.45–.67***	.67	.54–.88***
Self efficacy				***		*
Not at all sure	1641	16.0	Ref		Ref	
Somewhat sure	942	30.5	2.31	1.90–2.79***	1.33	1.06–1.67*
Very sure	511	36.6	3.04	2.43–3.79***	1.38	1.05–1.78*
Extremely sure	483	39.5	3.44	2.75–4.31***	1.27	.94–1.69
Don't know	274	18.6	1.20	.86–1.68	.87	.59–1.25
Intention to quit				***		***
No intention	2477	16.6	Ref		Ref	
Beyond 6 months/don't know	816	35.5	2.76	2.31–3.30***	1.58	1.28–1.95***

Factors	n	% Quit attempt	Crude OR	95% CI	Adjusted OR	95% CI
Within 6 months	235	44.7	4.05	3.07–5.35***	2.37	1.71–3.23***
Within 1 month	306	54.6	6.02	4.69–7.72***	2.61	1.93–3.53***
Outcome expectancy				***		NS
Not at all	774	16.1	Ref		Ref	
Somewhat/don't know	1753	22.2	1.48	1.19–1.85***	1.01	.78–1.28
Very much	1322	35.1	2.81	2.25–3.51***	1.05	.81–1.39
Worries about health				***		NS
Not at all	1332	18.2	Ref		Ref	
Somewhat/don't know	1835	24.4	1.47	1.24–1.75***	1.08	.86–1.32
Very much	683	41.4	3.19	2.59–3.92***	1.22	.93–1.59
Enjoy smoking too much				***		NS
Other	1721	28.6	Ref		Ref	
Agree	2131	22.8	.74	.64–.85***	.88	.74–1.04
Overall opinion about smoking				***		*
Other	1812	17.5	Ref		Ref	
Negative	1476	29.1	1.93	1.63–2.28***	1.22	1.01–1.47*
Very negative	564	41.3	3.32	2.69–4.09***	1.45	1.12–1.87**
Smoking restrictions at home				***		*
No home bans	3442	24.3	Ref		Ref	
Home bans	411	34.3	1.62	1.31–2.02***	1.36	1.05–1.74*

[^] Note: "n" in multivariate analysis is slightly less due to missing cases.

[#] Ref: reference value.

* Significant at $p < 0.05$;

** $p < 0.01$;

*** $p < 0.001$.

NS=not significant.

Table 3

Predictors of staying quit among those who made quit attempts (n=979[†])

Factors	n	% Stay quit	Crude OR	95% CI	Adjusted OR	95% CI	*
City				***			*
Beijing	163	23.3	Ref		Ref		
Shenyang	177	9.0	.33	.17-.61***	.41	.20-.83*	
Shanghai	93	24.7	1.08	.59-1.96	1.22	.63-2.40	
Changsha	182	26.9	1.21	.74-1.98	1.40	.78-2.52	
Guangzhou	139	25.2	1.11	.65-1.88	1.30	.71-2.38	
Yinchuan	225	22.7	.96	.59-1.56	1.23	.68-2.24	
Age at recruitment				***			**
18-39	170	12.9	Ref		Ref		
40-54	432	18.3	1.51	.90-2.51	2.11	1.16-3.84*	
55+	377	29.4	2.81	1.70-4.63***	3.21	1.74-5.89***	
Sex				NS			NS
Female	58	27.6	Ref		Ref		
Male	921	21.3	.71	.39-1.29	.94	.44-2.01	
Education				**			NS
Low	158	31.6	Ref		Ref		
Medium	629	19.4	.52	.35-.77**	.69	.42-1.14	
High	192	20.8	.57	.35-.92*	.56	.29-1.05	
Ethnicity	NS			NS			NS
Others	71	14.1	Ref		Ref		
Han	908	22.2	1.75	.88-3.47	1.71	.76-3.92	
Income				NS			NS
Low	214	18.7	Ref		Ref		
Moderate	465	23.4	1.33	.89-1.99	1.75	1.08-2.84*	
High	235	22.6	1.27	.80-2.01	1.45	.81-2.62	
Don't know	65	15.4	.79	.37-1.69	.79	.32-1.91	
Longest time quit				***			**

Factors	n	% Stay quit	Crude OR	95% CI	Adjusted OR	95% CI
Never tried	284	19.4	Ref		Ref	
Less than 1 month	285	14.4	.70	.45–1.09	.67	.37–1.19
1–6 months	262	22.1	1.18	.78–1.79	.97	.58–1.64
>6 months	140	37.9	2.54	1.62–3.98***	1.97	1.16–3.39*
Tried to quit within last year				NS		NS
Yes tried	304	20.4	Ref		Ref	
Not tried	659	21.7	1.08	.77–1.51	.96	.61–1.51
Daily/weekly smokers				***		NS
Daily smoker	883	19.9	Ref		Ref	
Weekly smoker	96	37.5	2.41	1.55–3.76***	1.47	.79–2.73
Cigarettes per day				*		NS
<=10 CPD	397	26.7	Ref		Ref	
11–20 CPD	441	17.9	.59	.43–.83***	.93	.61–1.40
21–30 CPD	66	16.7	.55	.28–1.09	.54	.22–1.26
31+ CPD	67	19.4	.66	.35–1.26	.74	.34–1.61
Time to first cigarette				NS		NS
61+ min/don't know	408	25.7	Ref		Ref	
31–60 min	135	21.5	.79	.49–1.26	.99	.57–1.71
6–30 min	205	17.1	.60	.39–.91*	.61	.34–1.03
<=5 min	231	18.6	.66	.44–.98*	.77	.47–1.29
Self efficacy				***		*
Not at all sure	262	17.6	Ref		Ref	
Somewhat sure	287	13.6	.74	.46–1.17	.64	.36–1.13
Very sure	187	23.0	1.40	.88–2.24	1.08	.60–1.93
Extremely sure	191	34.0	2.42	1.57–3.75***	1.61	.90–2.90
Don't know	51	35.3	2.56	1.33–4.94**	1.86	.85–4.03
Intention to quit				***		**
No intention	412	19.2	Ref		Ref	
Beyond 6 months/don't know	290	19.3	1.01	.68–1.48	1.07	.66–1.73
Within 6 months	105	17.1	.87	.49–1.53	1.06	.54–2.06

Factors	n	% Stay quit	Crude OR	95% CI	Adjusted OR	95% CI
Within 1 month	167	34.1	2.18	1.46–3.27***	2.44	1.38–4.32**
Outcome expectancy						
Not at all	125	24.0	Ref	NS	Ref	NS
Somewhat/don't know	389	22.4	.91	.51–1.38	.79	.45–1.38
Very much	464	20.3	.81	.50–1.29	.89	.48–1.64
Worries about health						
Not at all	242	20.7	Ref	NS	Ref	NS
Somewhat/don't know	452	23.7	1.19	.81–1.74	1.48	.92–2.36
Very much	283	18.7	.89	.57–1.32	.96	.54–1.71
Enjoy smoking too much to quit						
Other	493	22.3	Ref	NS	Ref	NS
Agree	486	21.0	.93	.68–1.25	1.24	.86–1.80
Overall opinion about smoking						
Other	317	22.7	Ref	NS	Ref	NS
Negative	429	21.1	.97	.68–1.38	.82	.54–1.24
Very negative	233	19.3	.82	.54–1.25	.60	.34–1.05
Smoking restrictions at home						
No home bans	838	21.2	Ref	NS	Ref	NS
Home bans	141	24.1	1.18	.77–1.79	.78	.47–1.29

[^] Note: "n" in multivariate analysis is slightly less due to missing cases.

[#] Ref. reference value.

* Significant at $p < 0.05$;

** $p < 0.01$;

*** $p < 0.001$

NS=not significant.

Appendix I

Selected predictors of making quit attempts between Waves 1 and 2: Similarities & differences across countries

Predictors	This study (ITC China)	Li et al (ITC-SEA)	Hyland et al (ITC-4)
Lower Nicotine dependence	√	√	√
More immediate quitting intentions	√	√	√
Higher self-efficacy	√	√	×
Longer past quit attempts	√	√	√
Tried in past year	√	×	√
Higher health concerns	×	√	√
Negative opinions/attitudes on smoking	√	×	√
Having smoking restrictions at home	√	×	N.A.
Being younger	×	×	√

Note: “√” means it is an independent predictor; “×” means it is NOT an independent predictor; “N.A.”: Not applicable.

Appendix II

Selected predictors of staying quit: Similarities & differences across countries

Predictors	This study (ITC China)	Li et al (ITC-SEA)	Hyland et al (ITC-4)
Lower Nicotine dependence	×	√	√
More immediate quitting intentions	√	√	×
Self-efficacy	×	√	√
Longer past quit attempts	√	√	√
Lower outcome expectancy	×	×	√
Health concerns	×	×	×
Being older	√	√	×

Note: “√” means it is an independent predictor; “×” means it is NOT an independent predictor; “N.A”: Not applicable.