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Why are male Chinese smokers unwilling to quit? A multicentre cross-sectional study on smoking rationalisation and intention to quit

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ABSTRACT

Objective We aimed to describe the rationalisation beliefs endorsed by Chinese male smokers and to examine the association between rationalisation and the intention to quit.

Setting Questionnaires were conducted among male smokers in three cities (Shanghai, Nanning and Mudanjiang) which represent different geographical locations, economic development levels and legislative status of tobacco control in China.

Design and participants It was a multicentre cross-sectional survey involved a total of 3710 male smokers over 18 years.

Outcome measures Primary outcomes were intention to quit, smoking rationalisation scores and sub scores in six dimensions. Smoking rationalisation was assessed using a newly developed Chinese rationalisation scale. Multivariable logistic regression was performed to examine the relationship between rationalisation and intention to quit.

Results On average, smokers scored 3.3 out of 5 on the smoking rationalisation scale. With a one point increase in total rationalisation scale, the odds for intention to quit in the next 6 months decreased by 48% (OR=0.52, 95% CI: 0.44 to 0.61; p<0.001). Separate logistic regressions for six subscales of rationalisation shown consistent inverse associations with intention to quit (all p values <0.001). Believing that smoking was socially acceptable was the strongest predictor (OR=0.62, 95% CI: 0.55 to 0.71; p<0.001).

Conclusions Rationalisation beliefs could be important barriers to smoking cessation. Some beliefs have stronger association with quit intention than others. Eroding rationalisation beliefs endorsed by smokers is a potential strategy for smoking cessation intervention.

INTRODUCTION

Despite having the world's largest population of smokers, China has one of the lowest smoking cessation rates.[1] Data from the Global Adult Tobacco Survey revealed that China was among the highest countries which more than 80% of current smokers

Strengths and limitations of this study

► It is the first study to confirm the inverse association between smoking rationalisation and intention to quit in China.
► We measured smoking rationalisation using a validated scale that was developed for Chinese male smokers.
► With a cross-sectional design, causality cannot be inferred between smoking rationalisation and quit intention.
► The study only focused on male smokers, so the results may not generalise to female smokers in China.

did not make an attempt to quit in the past 12 months or did not consider quitting in the next 12 months.[2] Only 23.6% of current smokers in China intend to quit, in contrast to Australia, Canada, UK and USA the percentages range from 65.3% to 81.1%, reported from Surveys of the International Tobacco Control.[1–3] National survey found only 17.6% of Chinese current smokers planned to quit smoking in the next 12 months in 2015, a figure unchanged from 2010.[4 5]

The behavioural theories such as Theory of Planned Behavior,[6] Transtheoretical Model of Behavior Change[7] consider behavioural intention as an important component in behaviour change, which has been confirmed by empirical studies.[8–11] Population-based research has also shown that having an intention to quit predicts quit attempts and subsequent smoking cessation.[12 13] A comprehensive understanding of correlates and predictors of the intention to quit among Chinese smokers is important in addressing the smoking epidemic in China.

Previous studies have concluded that sociodemographic variables, including age, educational attainment and family income,

are associated with intention to quit.[14–18] Smoking-related factors, such as knowledge about smoking-related diseases, nicotine dependence and previous quit attempts also predict smokers' quit intention.[16–19] One important yet understudied modifiable predictor of intention to quit among Chinese smokers is smoking rationalisation. Smokers often subscribe to smoking rationalisation beliefs, also known as self-exempting beliefs, to justify or rationalise their smoking behaviours. Smoking rationalisation can predict a lack of intention to quit.[20–28] To date, most of the evidence was found from European, USA or Australian samples, a few from Asian countries like Thailand and Malaysia, and there is no evidence from Chinese smokers. The extent to which smoking rationalisation predicts intention to quit among Chinese smokers remains unknown.

In China, such beliefs about smoking are widely held among smokers. For example, some smokers consider tobacco use to be an important social and cultural tradition, and some consider smoking to be a patriotic action because of beliefs that tobacco is important to the national economy.[29] Our previous work has identified six types of rationalisation beliefs with several of them unique to Chinese smokers.[30] Another study found that Chinese men with higher level of self-exempting beliefs were more likely to be daily smokers.[31] Taken together, it is plausible that smoking rationalisation plays an important role in the lack of intention to quit among Chinese smokers. In the present study, we described the rationalisation beliefs endorsed by Chinese male smokers and examined the association between rationalisation and the intention to quit.

METHODS
Design and setting
We conducted a multicentre cross-sectional survey among male smokers in three Chinese cities (Shanghai, Nanning and Mudanjiang) during September and December 2013. The three cities represent different geographical locations, economic development levels and legislative status on tobacco control in China. Shanghai, located on east costal area, is one of the most developed cities in China. It is the first city to implement the antismoking legislation in China. Nanning, located in the southwestern area, is one of the moderately developed cities in China. The city is planning to introduce a smoke-free regulation in 2013. Mudanjiang, located in the northeastern area, is one of underdeveloped cities in China. There is no tobacco control legislation in Mudanjiang during the study period.

Study population
Participants were adult (18+) male smokers who smoked at least 100 cigarettes in their lifetime and had smoked more than one cigarette in the last month. Only male smokers were selected due to the much higher smoking prevalence among men compared with women in China

(52.9% for male, 2.4% for female).[4] According to national survey,[4] current smoking prevalence among male smokers differs distinctly by age. Male aged 25–64 were the most likely to be current smokers, which also overlapped with the main working-age population. On the other hand, occupation was also an important determinant of smoking in males. Therefore, respondents were recruited by occupational categories from their workplaces. We used community sampling to supplement workplace sampling to recruit retirees. Officers and clerks in government/institutions and corporations, professionals, businessmen, service employees, farmers and manual workers were sampled from their workplaces, students were sampled from universities/colleges and retirees were sampled from communities. The number of smokers recruited in different occupations reflected the distribution of occupational categories in each city, according to the Chinese Statistical Yearbook.[32] Facilitated by local Centers for Disease Control and Prevention (CDC), workplaces and communities were selected to reflect diverse geographical locations and sizes of employers/communities. If a workplace/community liaison group agreed to participate, all smokers from that workplace were invited to participate, until the target number was reached.

The survey yielded 3721 respondents. After excluding 11 with missing data (missing key information on age, cigarettes ever smoked or intention to quit), 3710 (99.7%) respondents were included in the following analyses.

Participants and public involvement
Participants in this study were not involved in the development of the design, recruitment. Major findings from the study will be disseminated through international/national conference of tobacco control and will be reported by media.

Measures
Smoking rationalisation
Smoking rationalisations were measured by the Chinese smoking rationalisation scale. The scale was developed from a population-based sample of Chinese male smokers, within the context of Chinese social and cultural influence. It had shown good validity and reliability. The scale was the first one that was developed particularly for Chinese male smokers (more detail of the development of the Chinese smoking rationalisation scale can be found in our previous study[30]). The scale consisted of 26 items under six dimensions (subscales) (smoking functional beliefs, risk generalisation beliefs, social acceptability beliefs, safe smoking beliefs, self-exempting beliefs and harmful to quit beliefs)—see online supplementary appendix. Responses to each item were rated by participants on a 5-likert scale from 1 (totally disagree) to 5 (totally agree). The scale was scored by the arithmetic mean of its items (ie, sum the response score of all the items in the scale and then divided by the number of items).

Intention to quit

Intention to quit was assessed by the question 'Which of the following options best describes your intention regarding quitting?' with four options 'never expect to quit', 'may quit in the future, but not in the next 6 months', 'will quit in the next 6 months' and 'will quit in the next month'. Smokers who answered 'will quit in the next 6 months' or 'will quit in the next month' were considered to have an intention to quit.[33]

Covariates

Sociodemographic characteristics, including age, ethnicity, educational attainment, annual household income, marital status and occupation were assessed as covariates. Smoking-related variables include knowledge of smoking-related diseases, nicotine dependence and quit attempt history. Knowledge of smoking-related disease was measured by items regarding four diseases: whether smoking causes heart disease,[34] pulmonary emphysema,[35 36] gastric cancer[37–39] and erectile dysfunction.[40 41] Respondents received one point for each correct answer (total score 0 to 4). Nicotine dependence was measured by the six-item Fagerstrom Test for Nicotine Dependence.[42 43] Smokers' nicotine dependence was calculated by summing scores of the six items (range 0–10), with higher scores representing greater nicotine dependence. Quit attempts were assessed by following question: 'During the past 12 months, have you ever stopped smoking for 1 day (24 hours) or longer?' with possible answers being 'Yes, I have tried with quitting period more than 1 day (24 hours)" and 'No, I have not tried to quit'.

Statistical analysis

All analyses were conducted using SPSS (IBM SPSS V.19) in December 2016. Numbers with percentages are presented for the description of categorical variables and means with SD for continuous variables. Mean scores with SD of the total scale and each subscale (six types of the rationalisations) were calculated. We also counted numbers and percentages of participants who agreed or totally agreed with each statements in the smoking rationalisations scale.

The independent t test was conducted to compare the mean scores of the overall rationalisation scale and subscales between smokers with an intention to quit and those without. Binary logistic regression was performed to assess the association between smoking rationalisation (both the overall scale and subscales) and intention to quit (no/yes) in the overall sample and in each city separately.

RESULTS
Sample characteristics

A total of 3710 participants were included in the analyses. As shown in table 1, participants were on average of slightly older than 40 years, most of them were Han

Table 1 Demographic and smoking characteristics of the study sample

Characteristic	n (%)
Age (mean(SD))	40.5 (14.4)
Ethnicity	
Han	3401 (91.6)
Others	293 (7.9)
Missing data	16 (0.4)
Education level	
Junior school or lower	1100 (29.6)
High school/technical school	1012 (27.3)
College, university or higher	1594 (43.0)
Missing data	4 (0.1)
Family monthly income per capita	
<2000¥*	703 (18.9)
2000–3999¥	1736 (46.8)
4000–5999¥	857 (23.1)
>6000¥	408 (11.0)
Missing data	6 (0.2)
Marital status	
Married	2702 (72.8)
Not married	996 (26.8)
Missing data	12 (0.3)
Occupation	
Professionals	842 (22.7)
Officers and clerks in government, institutions and corporations	554 (14.9)
Business or service employees	614 (16.5)
Farmers and manual workers	1085 (29.2)
Students	179 (4.8)
Retirees	433 (11.7)
Missing data	3 (0.1)
City	
Shanghai	1338 (36.1)
Nanning	1174 (31.6)
Mudanjiang	1198 (32.3)
History of quit attempt	
Yes	1925 (51.9)
No	1781 (48.0)
Missing data	4 (0.1)
	Mean (SD)
Smoking rationalisation beliefs (missing data of 52 participants)	3.3 (0.5)
Knowledge of smoking-related diseases (missing data of 11 participants)	1.6 (1.1)
Nicotine dependence (missing data of 29 participants)	2.9 (2.1)
Intention to quit in 6 months	

Continued

Table 1	Continued	
Characteristic		**n (%)**
Yes		2966 (79.9)
No		744 (20.1)

*1$=6.19¥ (2013).

Chinese, married, university educated and with a family monthly per capita income higher than 2000¥ (323 US$). The numbers of participants from three cities were nearly the same. Slightly over half of the participants had made more than one attempt to quit in the last year. Participants' average knowledge score of smoking-related diseases was 1.6, and nicotine dependence score was 2.9.

Endorsement of smoking rationalisations

Eight statements were most endorsed, with more than half of participants selecting 'agree' or 'strongly agree'. These statements were: (1) smoking can eliminate fatigue and can be refreshing (69.8%); (2) smoking can relieve tension and stress (69.7%); (3) smoking can bring people closer and make socialising easier (63.4%); (4) a lot of non-smokers also get lung cancer (59.8%); (5) smoking is a good way to kill time (54.8%); (6) smoking is good for inspiration and active thinking (54.7%); (7) air pollution, food safety and life stress are much more dangerous to health than smoking (54.7%); (8) smoking is pretty normal for men (51.6%) (see online supplementary appendix).

The mean score of the overall rationalisation scale was 3.3 and means of six subscales ranged from 3.1 to 3.6. Among the six subscales of rationalisation, 'smoking functional beliefs' scored the highest, followed by 'risk generalisation beliefs' and 'social acceptability beliefs'. Smokers with no intention to quit had consistently higher

Table 2 Smoking rationalisation scores by quit intention

Rationalisation	Mean (SD)			P value
	Have intention to quit n=744	No intention to quit n=2966	Total smokers n=3710	
Smoking functional beliefs	3.5 (0.7)	3.7 (0.7)	3.6 (0.7)	<0.001
Risk generalisation beliefs	3.3 (0.7)	3.6 (0.7)	3.5 (0.7)	<0.001
Social acceptability beliefs	3.1 (0.7)	3.4 (0.7)	3.3 (0.7)	<0.001
Safe smoking beliefs	3.0 (0.7)	3.2 (0.7)	3.1 (0.7)	<0.001
Self-exempting beliefs	2.9 (0.8)	3.1 (0.8)	3.1 (0.8)	<0.001
Quitting is harmful beliefs	3.0 (0.8)	3.2 (0.8)	3.2 (0.8)	<0.001
Total scale	3.2 (0.5)	3.4 (0.5)	3.3 (0.5)	<0.001

rationalisation scores than those with an intention to quit (see table 2).

Logistic regression for intention to quit

Table 3 presents results of logistic regression. Adjusted for sociodemographic characteristics and smoking-related variables, higher smoking rationalisation was associated with lower intention to quit and the association was particularly strong in Shanghai. For each one point increase in the score of rationalisation, the odds for intention to quit decreased by 48% (OR=0.52, 95% CI: 0.44 to 0.61; p<0.001).

In addition, results from separate logistic regression models demonstrated that all types of rationalisation beliefs were consistently inversely associated with intention to quit (all p values <0.001). Among six subscales, the 'social acceptability beliefs' was the strongest predictor for of intention to quit (OR=0.62, 95% CI: 0.55 to 0.71; p<0.001) (see table 4).

DISCUSSION

The current study is the first to confirm the inverse association between smoking rationalisation and intention to quit in China. We measured smoking rationalisation using a validated scale that was particularly developed for Chinese male smokers within the context of the Chinese social culture. Results demonstrated that smokers with higher rationalisation were less likely to have an intention to quit, which was consistent with previous studies from other countries.[21 23–28 44] Festinger's Cognitive Dissonance Theory believes that people would feel uncomfortable when performing an action discordant to one's beliefs (ie, dissonance), such as smoking while knowing that smoking is harmful. To reduce dissonance, smokers can either change their behaviour (stop smoking) or their cognitions (ie, beliefs, opinions) towards the behaviour (ie, smoking).[45] Since a change in cognition will be generally much easier than changing a behaviour, smokers tend to align their beliefs towards smoking, which explains why smoking rationalisations are so prevalent among smokers.[46]

Our findings shown that smoking rationalisation beliefs were widespread among male smokers in China. We also noted that all six types of rationalisation were significantly associated with intention to quit, with adherence to social acceptability beliefs being the strongest predictor of the lack of intention to quit. Earlier report also found that Chinese male smokers felt less societal disapproval of smoking compared with smokers from western countries such as the USA and Canada.[1] In fact, beliefs that smoking is 'socially acceptable', along with beliefs that 'quitting is harmful', were very common among Chinese smokers. Social acceptability beliefs, such as 'There are so many smokers in society, so it's difficult to be different' and 'Smoking is pretty normal for men', reflected the widespread social norms of smoking among men in China. The 2015 national survey reported that despite a

Table 3 Multiple logistic regression and city-stratified analyses between smoking rationalisation and intention to quit

Independent variables	Total (n=3710) OR (95% CI)	Shanghai (n=1338)	Nanning (n=1174)	Mudanjiang (n=1198)
Demographics				
Age (year)	0.98 (0.97 to 0.99)**	0.98 (0.96 to 1.00)*	0.99 (0.97 to 1.01)	0.99 (0.97 to 1.01)
Ethnicity				
Han	1.00 (reference)	1.00 (reference)†	1.00 (reference)	1.00 (reference)
Others	1.00 (0.71 to 1.40)	–	0.99 (0.68 to 1.44)	1.20 (0.51 to 2.82)
Education level				
Low	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Medium	0.87 (0.68 to 1.10)	0.72 (0.46 to 1.14)	1.02 (0.65 to 1.59)	0.75 (0.50 to 1.12)
High	0.78 (0.60 to 1.00)	0.66 (0.37 to 1.19)	1.39 (0.90 to 2.15)	0.48 (0.32 to 0.75)
Income (¥)				
<2000	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
2000~	1.07 (0.84 to 1.37)	0.81 (0.47 to 1.42)	0.81 (0.54 to 1.23)	1.42 (0.96 to 2.09)
4000~	1.05 (0.79 to 1.40)	0.77 (0.42 to 1.41)	0.91 (0.57 to 1.47)	1.36 (0.83 to 2.23)
6000~	0.86 (0.60 to 1.24)	0.47 (0.22 to 0.99)	0.69 (0.39 to 1.22)	1.42 (0.72 to 2.81)
Marital status				
Married	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Not married	1.28 (1.01 to 1.64)*	0.74 (0.42 to 1.29)	0.76 (0.49 to 1.18)	0.87 (0.61 to 1.26)
Occupation				
Professionals	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Officers and clerks in government, institutions and corporations	1.29 (0.97 to 1.70)	0.53 (0.26 to 1.08)	1.15 (0.71 to 1.84)	1.79 (1.17 to 2.75)
Business or service employees	1.00 (0.74 to 1.34)	0.64 (0.34 to 1.20)	1.10 (0.65 to 1.87)	1.24 (0.76 to 2.01)
Farmers and manual workers	0.65 (0.50 to 0.86)**	0.53 (0.27 to 1.02)	0.73 (0.45 to 1.18)	0.60 (0.39 to 0.93)*
Students	1.25 (0.80 to 1.95)	1.10 (0.49 to 2.46)	1.74 (0.81 to 3.74)	0.80 (0.35 to 1.81)
Retired people	0.85 (0.56 to 1.30)	0.99(0.46-–2.10)	1.30 (0.60 to 2.85)	0.30 (0.13 to 0.70)**
Smoking-related variables				
Knowledge‡	0.88 (0.81 to 0.97)**	0.94 (0.80 to 1.11)	0.86 (0.74 to 1.00)*	0.87 (0.77 to 0.99)*
Nicotine dependence	0.85 (0.81 to 0.89)***	0.83 (0.76 to 0.91)***	0.90 (0.83 to 0.98)*	0.80 (0.74 to 0.87)***
History of quit attempt				
No	1.00(reference)	1.00(reference)	1.00(reference)	1.00(reference)
Yes	2.70 (2.25 to 3.25)***	3.98 (2.73 to 5.80)***	2.59 (1.88 to 3.56)***	2.11 (1.56 to 2.86)***
Smoking rationalisation	0.52 (0.44 to 0.61)***	0.30 (0.21 to 0.42)***	0.63 (0.47 to 0.84) ***	0.70 (0.52 to 0.95)*
City		–	–	–
Shanghai	1.00 (reference)			
Nanning	1.33 (1.04 to 1.70)*			
Mudanjiang	1.73 (1.38 to 2.16)***			

*p<0.05; **p<0.01; ***p<0.001.
†There were only four non-Han ethnic smokers in Shanghai sample.
‡knowledge is knowledge of smoking-related diseases.

slight decline from previous years, smoking prevalence among Chinese men was still as high as 52.1%.[5] Additionally, smoking rates among doctors and teachers were also high in China,[5 47 48] which is reflected by one item within the social acceptability subscale 'Lots of doctors smoke, so they cannot convince me to quit.' Meanwhile, the

Table 4 Logistic regressions between smoking rationalisation and the intention to quit

Smoking rationalisation	COR (95% CI)	AOR (95% CI)†
Total rationalisation	0.43 (0.37 to 0.50)*	0.52 (0.44 to 0.61)*
Smoking functional beliefs	0.61 (0.54 to 0.69)*	0.67 (0.59 to 0.76)*
Risk generalisation beliefs	0.59 (0.53 to 0.66)*	0.65 (0.58 to 0.73)*
Social acceptability beliefs	0.55 (0.49 to 0.62)*	0.62 (0.55 to 0.71)*
Safe smoking beliefs	0.71 (0.64 to 0.79)*	0.81 (0.72 to 0.91)*
Self-exempting beliefs	0.67 (0.61 to 0.75)*	0.78 (0.69 to 0.87)*
Quitting is harmful beliefs	0.64 (0.57 to 0.71)*	0.71 (0.63 to 0.80)*

*p<0.001.
†With other demographic and smoking characteristics adjusted.

tobacco industry strives to create positive attitudes toward cigarette use, such as promoting smoking as fashionable and promoting gifting cigarettes as a Chinese tradition.[49] All of these may lead prosmoking social norms in China: as celebrities, doctors, teachers and many others are smokers, it is commonly accepted and almost 'expected' that men will smoke, and therefore there is no need for them to quit.

Findings from this study may inspire novel strategies for population-level smoking prevention and intervention. Because of widespread smoking rationalisation, simply disseminating the knowledge of health risk of smoking is insufficient, comprehensive interventions targeting smoking rationalisation as well as health risk education may be more powerful to persuade smokers to quit. Moreover, according to the city-stratified logistic regression, the association between smoking rationalisation and intention to quit was stronger in Shanghai, suggesting that interventions targeting smoking rationalisation may be more effective in a city like Shanghai. Since 'social acceptability' beliefs are deeply grounded in Chinese culture, health communication interventions that target changing this existing prosmoking social norms and establishing a new smoke-free culture could be promising. In fact, there has been a recent successful example of this in China. During 2009, a campaign named 'giving cigarettes is giving harm' was launched through various media (TV, mobile media, outdoor electronic billboards, posters, etc) tackling China's 'cigarettes gifting culture'. Evaluations shown significant improvement in knowledge and attitude towards smoking among smokers in intervention cities.[50]

Beliefs about 'safe smoking', 'self-exemptions' and 'quitting being harmful' may be targeted by comprehensive health education programmes seeking to subvert these particular misconceptions, as has proven effective in other countries.[51 52] For example, in 2012 the US CDC launched an education campaign 'Tips from Former Smokers' nationally, communicating the serious health consequences of smoking through true stories from victims of smoking. Evaluation indicated that exposure to the campaign was associated with increased knowledge of smoking-related diseases and greater cessation intention among US smokers.[51 52]

Our study still had some limitations. First of all, as limited by a cross-sectional data, the causality cannot be inferred between smoking rationalisation and quit intention. Second, although a multicentre design was used in the study aimed to encompass areas with different geographical locations, economic development levels and legislative status on tobacco control in China, our participants were sampled from only three distinct sites, leaving out male smokers that from other areas, especially the northwestern part of China. The results may not be generalisable to the entire population of male smokers in China. However, as shown by national census,[53] only 6% of national population was living in the northwestern part of China (partitioning by the Heihe-Tengchong Line), we believe that participants in our study could be representative of the population of general male smokers in China. Third, the study only focused on male smokers, so the results may not generalise to female smokers in China. In fact, there was a great gender gap in smoking in China (52.9% for male, 2.4% for female).[4] Evidence suggested that there were different motivations for continuing or ceasing smoking between men and women.[54 55] We expect that smoking rationalisation and its association with quit intention among Chinese females may be different from those among Chinese males. Future studies may explore relationship between smoking rationalisation and intention to quit among female smokers.

In conclusion, despite the limitations, our findings suggest that smoking rationalisation plays an important role in the lack of intention to quit among Chinese male smokers. Future interventions should tackle smoking rationalisation beliefs as a strategy to promote smoking cessation.

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