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Factors influencing quit attempts among male daily smokers in China☆

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ABSTRACT

Background. China has the largest population of smokers in the world, yet the quit rate is low. We used data from the 2010 Global Adult Tobacco Survey China to identify factors influencing quit attempts among male Chinese daily smokers.

Methods. The study sample included 3303 male daily smokers. To determine the factors that were significantly associated with making a quit attempt, we conducted logistic regression analyses. In addition, mediation analyses were carried out to investigate how the intermediate association among demographics (age, education, urbanicity) and smoking-related variables affected making a quit attempt.

Results. An estimated 11.0% of male daily smokers tried to quit smoking in the 12 months prior to the survey. Logistic regression analysis indicated that younger age (15–24 years), being advised to quit by a health care provider (HCP) in the past 12 months, lower cigarette cost per pack, monthly or less frequent exposure to smoking at home, and awareness of the harms of tobacco use were significantly associated with making a quit attempt. Additional mediation analyses showed that having knowledge of the harm of tobacco, exposure to smoking at home, and having been advised to quit by an HCP were mediators of making a quit attempt for other independent variables.

Conclusion. Evidence-based tobacco control measures such as conducting educational campaigns on the harms of tobacco use, establishing smoke-free policies at home, and integrating tobacco cessation advice into primary health care services can increase quit attempts and reduce smoking among male Chinese daily smokers.

Introduction

Smoking is the single most preventable cause of premature death worldwide (World Health Organization, 2011), and the health burden imposed by smoking is particularly great in low- and middle-income countries (Mathers and Loncar). China has the largest population of smokers in the world (Li et al., 2011a). The number of smoking-related deaths in China was estimated at about 1 million in 2014, and more than 50 million smoking-related deaths are projected to occur from 2012 to 2050 (Levy et al., 2014). Moreover, in addition to exacting a terrible toll in mortality and morbidity, tobacco use has dire economic consequences. In China, the estimated financial cost (in US dollars) attributable to tobacco use quadrupled in just 8 years, from $7.2 billion in 2000 to $28.9 billion in 2008 (Eriksen et al., 2012).

Persuading current smokers to quit is a critical component of tobacco control efforts internationally. Smokers who quit smoking by age 40 reduce their risk of dying early from smoking-related diseases by more than 90% (US Department of Health and Human Services, 2014). Unfortunately, the smoking prevalence among males in China is very high (estimated at 52.9% in 2010) (Giovino et al., 2012). This dire situation is compounded by the low quit ratio among Chinese male smokers, which was 12.6% in 2010 (Centers for Disease Control and Prevention).

Understanding the determinants of smoking cessation is important for choosing interventions that might help smokers to quit. Research has shown that lower nicotine dependency and awareness of tobacco's harm to health are predictors of making a quit attempt (Hagimoto et al., 2009; Zhou et al., 2009; Hellman et al., 1991; Borland et al., 2010). Data on the association between education level and quit attempts have been mixed (Zhou et al., 2009; Hellman et al., 1991; Borland et al., 2010; Li et al., 2010, 2011b). The literature is also inconclusive on the impact of age on quit attempts; some studies have suggested that older smokers are more likely to make quit attempts (Li et al., 2010, 2011b), while others have found they are less likely to do so (Borland et al., 2010).

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In this study, we used data from the Global Adult Tobacco Survey (GATS) China to determine factors that were associated with quit attempts among male daily smokers in China.

Methods

Sample

GATS China, a nationally representative household survey of adults aged ≥15 years, was conducted during 2009 through 2010 using a multistage stratified cluster sample design. Details of the GATS methodology have been reported previously (Hsia et al., 2010). In all, 13,354 adults completed interviews, including 6603 males and 6751 females. The overall response rate was 96.0%. The present study focused on quit attempts among daily cigarette smokers, defined as adults who reported smoking every day at the time of the survey. Female smokers were not included because of their relatively low smoking prevalence (2.4%) (Li et al., 2011a).

Measures

Dependent variable

Quit attempts. Current cigarette smokers were asked, "During the past 12 months, have you tried to stop smoking?" Response options were "yes," "no," or "refused." Those who refused to answer were coded as "missing" and were excluded from the analysis.

Independent variables

Three demographic variables (age, education, and urbanicity status) were used in the analysis. Age was grouped in four categories: 15–24, 25–44, 45–59, and 60 years or above. Self-reported education levels were classified into four categories: primary school or less, secondary school or less, high school graduate, and college or above. Urbanicity, a measure of how urbanized an area is, was determined by the urban vs rural status of the counties or districts where the respondent resided at the time of the survey.

The seven smoking-related variables included in the analyses were defined as follows:

1) Exposure to smoking at home was defined as how often people smoked inside the respondent's home (daily, weekly, monthly or less, or never). For the analysis, those reporting "never" were aggregated with the group reporting "monthly or less."
2) Nicotine dependency was defined by how soon daily smokers first smoked after waking up (within 5 minutes, 6–30 minutes, 31–60 minutes, >60 minutes).
3) Exposure to tobacco advertising, promotion, and sponsorship (TAPS) was defined as the frequency with which respondents had noticed advertisements or signs promoting cigarettes through various venues in the past 30 days. The venues include advertisements in stores, on television, on radio, on billboards, on posters or promotion materials, in newspapers or magazines, on the Internet, in cinemas, on public transportation, on public walls, at sporting events, at social events, and from other cigarette promotional activities. Based on self-reports, respondents were grouped as either "through one or less venue" or "through two or more venues."
4) Awareness of tobacco harms was determined by the number of selected diseases (i.e., stroke, heart attack, and lung cancer) that respondents believed smoking could cause.
5) The cost of a pack of 20 manufactured cigarettes was calculated using the amount paid and the number bought for their last purchase of manufactured cigarettes in the past 30 days. Three cost categories (in Chinese Ren Min Bi [RMB] currency) were constructed: less than 4 RMB per pack; 4–19 RMB per pack; and 20 RMB or more per pack.
6) A wealth index was computed using a series of questions asking respondents whether they owned specific household items (Rutstein, 1999). Owning more items contributed to a higher index score. The index was categorized into three groups: low, medium, and high, with each groups comprising roughly a third of the respondents.
7) To determine advice to quit from a health care provider (HCP), respondents were asked the number of times they had seen an HCP during the past 12 months and whether they were advised to quit smoking by an HCP during the visits. Respondents were placed in one of three groups: (a) did not visit an HCP, (b) visited an HCP but were not advised to quit, and (c) visited an HCP and were advised to quit.

Data analysis

All analyses were conducted using SUDAAN 11.0 (RTI International, Research Triangle Park, North Carolina, USA). Unadjusted and adjusted logistic regression analyses were used to assess the association between making at least one quit attempt in the past 12 months and the three demographic variables (age, education, and urbanicity), as well as the other smoking-related variables of interest. The multistage cluster sampling design was taken into account to calculate the variance of estimates.

In addition, mediation analyses were conducted on those predictor variables that were not found significant in adjusted logistic regression. Those aimed to explore and understand the potential indirect paths by which independent variables might influence the outcome variables through a mediator. Such mediation analyses might also help further understand the relationships among independent variables. The method and SAS macro described by Hayes were applied for data analyses (Hayes, 2013). A parallel multiple mediator model was adopted. We used the same variable coding used in logistic regression for all variables in the mediation analysis except exposure to TAPS, where the original, ungrouped number of TAPS venues was applied as a mediator, since Hayes' program could not handle dichotomous variables as mediators.

Results

Sample characteristics

In all, 3303 male daily smokers were included in the China GATS 2010 data. The demographic distributions and sample sizes are presented in Table 1. One in nine male daily smokers (11.0%) had made at least 1 attempt to quit smoking in the past 12 months. More than half (56.2%) of the male daily smokers were aged 15–44 years, two-thirds (67.7%) had received a secondary education or less, and 58.0% lived in rural areas. Nearly one-quarter (24.1%) smoked within 5 minutes of waking up. Only 11.8% of the smokers had been exposed to TAPS in two or more venues. Approximately one-fifth (19.9%) were aware that smoking could cause all three of the diseases of interest (lung cancer, heart attack, and stroke), while 24.0% were not aware that smoking could cause any of these diseases. About a one-fifth of the men had visited an HCP but had not been advised to quit, while only 9.8% had visited an HCP and been advised to quit within the past 12 months.

Logistic regression

The adjusted logistic regression analysis (Table 2) indicates male daily smokers aged 15–24 were more likely to make attempts to quit when compared with those aged 60 years or older (OR = 2.23, 95% CI 1.02–4.89) and those aged 25–44 years (OR = 2.18, 95% CI 1.03–4.60). Male daily smokers who were aware that smoking can cause all three diseases of interest were significantly more likely to make a quit attempt than those who were not aware that smoking can cause any of these diseases (OR = 2.58, 95% CI 1.50–4.43). Even smokers who were aware of the connection with smoking for just one of the diseases were significantly more likely to make a quit attempt than those with no awareness (OR = 2.04, 95% CI 1.41–2.97). Smokers who had visited an HCP in the past 12 months and were advised by an HCP to quit smoking were significantly more likely to make a quit attempt compared with smokers who had not visited an HCP during that time period (OR = 2.90, 95% CI 1.98–4.23) or those who had visited an HCP but had not been advised to quit (OR = 2.24, 95% CI 1.43–3.51). There was no significant difference in making a quit attempt between smokers who did not visit an HCP and those who visited one but were not advised to quit.

The frequency of exposure to smoking at home was also a significant factor. Smokers who were exposed to smoking at home monthly or less often were more likely to have made a quit attempt (OR = 1.80, 95% CI 1.17–2.79) than were those who were exposed on a daily basis. Regarding the cost of cigarettes, smokers who spent less than 4 RMB per pack of cigarettes were more likely to make a quit attempt compared with