

The Factors Influencing Tobacco Smoking Behavior Among the Chinese Floating Population

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Abstract

Background: Previous studies have indicated that the prevalence of tobacco smoking among the Chinese floating population was higher than the general population and that more than half of Chinese floating population smoked tobacco heavily. However, only a few studies aimed to identify the underlying factors leading to heavy daily consumption of tobacco smoking among the Chinese floating population. Therefore, this study aims to investigate what subcategories of the Chinese floating population are more at-risk of developing heavy tobacco smoking. **Method:** This research employed the China Labor-force Dynamics Survey 2016 (CLDS) as main data source. Multinomial logistic regression is used to identify the main factors influencing heavy tobacco use within the targeted population. **Results:** The tobacco smoking rate of the Chinese floating population was equal to 30.5%. The smoking rates of males (56.5%) and women (1.9%) differed significantly. The sub-categories of the floating population who were the most at-risk of being heavy smokers display the following characteristics: males (OR: 864.639, 95% CI: 117.821-6345.250); with junior or senior education level and below (OR: 2.711, 95% CI: 1.315-5.591; OR: 2.568, 95% CI: 1.465-4.501); managers of organizations and enterprises (OR: 9.718, 95% CI: 1.537-61.458); exposed to secondhand smoking environment almost every day (OR: 3.977, 95% CI: 2.711-5.835). **Conclusion:** Specific socio-demography characteristics were associated with tobacco smoking behavior among the Chinese floating population. These factors need to be considered when developing tobacco control interventions among floating population to target the most at-risk members of this population.

Keywords

Chinese floating population; Tobacco; Heavy smoking.

1. INTRODUCTION

The 2018 Adult Tobacco Survey in China has reported that 316 million Chinese were tobacco smokers, which represented 26.6% of the total Chinese population (China Adult Tobacco Survey, 2018). The floating population could be defined as the people who move from their city of household registration (hukou) to another city to work for more than 6 months (students, tourists, and patients who seek health care are excluded from this definition) (Cao et al., 2017). The floating population accounts for 17.6% of the total population of China, but shows a higher rate of tobacco smoking than the general population. The previous studies have shown the smoking rate of Chinese floating population was 36.5%, 32.5%, and 34.1% respectively (Cao et al., 2017; Huang et al., 2014; Zheng et al., 2018). This could be at least partially explained by their socio-demographic characteristics and by the unstable nature of their work (Cai et al., 2019; Guo & Sa, 2015; Mao et al., 2012; Wang et al., 2009; Wu et al., 2011; Xu et al., 2015). This is in combination to their difficulties to access health care and obtain reimbursement, which exacerbates the health inequalities between floating population and the general population

(Chen, 2018). These two points make the floating population a particularly at-risk population to tobacco smoking and tobacco-related diseases.

Hence, and in order to reduce the smoking rate of the whole Chinese population to 20%, as planned by the “Healthy China Initiative (2019-2030)”, it is necessary to prevent the smoking behavior among the floating population, which is more prone to tobacco cigarette use. Nevertheless, there is a scarcity of research studies that investigated which sub-populations are the most at-risk to exhibit heavy daily consumption of tobacco cigarettes. Therefore, this study aims to explore the factors influencing the daily consumption of tobacco cigarettes and identify potential sub-groups among the Chinese floating population affected by heavy smoking in order to provide evidences to further reduce the smoking behavior among that population.

2. METHOD

This research employed the third wave of the “China Labor-force Dynamics Survey” of the year 2016 (CLDS 2016) to analyze the factors influencing tobacco smoking behavior among the Chinese floating population. There were 20,186 subjects in CLDS 2016, which incorporated 2,659 Chinese nationals belonging to the floating population. After discarding the missing and unqualified data, 1,783 subjects (the Chinese floating population) remained finally in this study.

2.1. Measurement of Variables

2.1.1 Dependent variable

This study used the number of cigarettes smoked per day as dependent variable. It was specifically measured as a categorical variable with four different levels, which were (1) non-smokers (smoke 0 cigarette per day), (2) light smokers (smoke 1-9 cigarettes per day), (3) moderate smokers (smoke 10-19 cigarettes per day), and (4) heavy smokers (smoke 20 cigarettes and above daily).

2.1.2 Independent variables

Gender was measured as a binary variable: male and female. Age was continuous variable in original database, which classified as categorical variable with 5 different levels: (1) 15-24; (2) 25-34; (3) 35-44; (4) 45-54; and (5) 55-64. Educational level was measured as a categorical variable with three different levels: (1) primary school and below; (2) junior and senior high school; and (3) junior college and above (Xu et al., 2015). The type of occupations classified into six categories: (1) managers of organizations and enterprises; (2) professional and technical personnel; (3) clerical support and related workers; (4) social services personnel; (5) agricultural production personnel; and (6) manufacturing and construction personnel (Cao et al., 2017; Qi et al., 2016). For income, the income was used as an income quartile rank ranging from Q1 – Q4 in this study, which was shown as: (1) Q1= 0-20,000; (2) Q2= 20,001-36,000; (3) Q3= 36,001-60,000; and (4) Q4= 60,001-1,000,000. The frequency of exposure to secondhand smoking was categorized as an ordinal variable into five groups: (1) almost every day; (2) average 3 days and above per week; (3) average 1-2 days per week; (4) average less than 1day per week; and (5) never.

2.2. Statistical Analysis

Descriptive analysis was employed to summarize demographic and socioeconomic characteristics and smoking pattern of the study sample (the floating population). The multinomial logistic regression was ultimately used to examine the association between the selected independent variables and dependent variable. When odds ratios were more than 1, the association was positive. Likewise, when odds ratios were less than 1, the association was negative.

3. RESULTS

3.1. Descriptive Statistics of the Study Variables and Sample

Table 1 summarizes the socio-demographic characteristics of the Chinese floating population, broken down by the number of cigarettes smoked per day.

Concerning the dependent variable among the Chinese floating population, approximately 30.5% were smokers, and 69.5% were not smokers. Among the smokers, 19.7% were categorized as light smokers, 24.5% were moderate smokers, and 55.8% were heavy smokers. 52.3% of the study sample was male and 47.7% female. 98.1% of female floating population were non-smokers. Among the male floating population, approximately 32.4% of males were heavy smokers while 10.2% were light and 13.9% were moderate smokers. Concerning age, the proportion of heavy smokers tends to increase with age. The Chinese floating population with the highest educated were less likely to be heavy smokers (8.2%). However, the heavy tobacco smoking rates of the lower and middle educational levels were among similar proportions with 18.0% and 20.5% respectively. The Chinese floating population who engaged in managers of organizations and enterprises were more likely to smoke cigarettes. The floating population with low income tends to smoke less than individuals with higher income. The proportion of heavy smokers among the floating population who were exposed to secondhand smoking almost every day was equal to 27.5%, which was higher than for the other categories of tobacco secondhand smoking.

Table 1. Socio-demographic characteristics and the prevalence of tobacco smoking among Chinese floating population (percent %)

Variables	Overall (n=1,783)	The number of cigarettes smoked per day			
		Non-smokers (69.5%, n=1,240)	Light smokers (6.0%, n=107)	Moderate smokers (7.5%, n=133)	Heavy smokers (17.0%, n=303)
Gender					
Male	52.3	43.5	10.2	13.9	32.4
Female	47.7	98.1	1.4	0.4	0.1
Age					
15-24	9.4	75.6	8.9	7.7	7.7
25-34	31.9	72.1	7.9	7.7	12.3
35-44	27.7	71.4	4.1	7.9	16.6
45-54	23.8	67.7	4.0	5.4	22.9
55-64	7.2	49.6	7.8	10.9	31.8
Educational level					
Primary school and below	18.1	73.6	3.4	5.0	18.0
Junior and senior high school	57.2	63.9	6.9	8.7	20.5
Junior college and above	24.7	79.6	5.9	6.3	8.2
Occupation					
Managers of organizations and enterprises	1.7	48.4	3.2	19.4	29.0
Professional and technical personnel	11.6	84.0	4.9	4.9	6.3
Clerical support and related workers	3.0	85.2	7.4	3.7	3.7
Social services personnel	49.1	69.4	5.7	7.3	17.6
Agricultural production personnel	7.7	68.6	3.6	8.8	19.0
Manufacturing and construction personnel	26.9	63.5	7.7	8.1	20.7
Income					
Q1: 0-20,000	27.4	75.9	4.5	4.5	15.1
Q2: 20,001-36,000	25.7	74.1	6.1	5.4	14.4
Q3: 36,001-60,000	26.8	66.2	6.1	11.1	16.6
Q4: 60,001-1,000,000	20.1	59.5	7.8	9.2	23.5
The frequency of exposure to secondhand smoking					
Almost every day	39.3	54.9	7.6	10.0	10.0
>=3 days per week	4.5	61.7	13.6	12.3	12.3
1-2 days per week	6.3	81.2	6.2	6.2	6.2
<1day per week	6.8	76.0	4.1	5.8	5.8
Never	43.1	81.0	4.0	5.1	5.1

Table 2. The multinomial logistic regression on light, moderate smokers and heavy smokers versus non-smokers among the Chinese

Variable	Light smokers			Moderate smokers			Heavy smokers		
	OR	95% CI	P-value	OR	95% CI	P-value	OR	95% CI	P-value
Gender									
Male (vs. Female)	16.689	(8.632, 32.265)	0.000***	98.897	(30.252, 323.303)	0.000***	864.639	(117.821, 6345.250)	0.000***
Age									
15-24	0.576	(0.189, 1.754)	0.332	0.563	(0.183, 1.734)	0.317	0.190	(0.070, 0.520)	0.001***
25-34	0.538	(0.271, 1.335)	0.181	0.551	(0.2228, 1.328)	0.184	0.275	(0.134, 0.564)	0.000***
35-44	0.287	(0.113, 0.728)	0.009***	0.598	(0.255, 1.400)	0.236	0.362	(0.183, 0.714)	0.003***
45-54	0.309	(0.121, 0.790)	0.014**	0.411	(0.172, 0.983)	0.046**	0.575	(0.295, 1.117)	0.102
55-64	1.000			1.000			1.000		
Education level									
Primary school and below	1.143	(0.433, 3.017)	0.787	1.519	(0.614, 3.753)	0.365	2.711	(1.315, 5.591)	0.007***
Junior and senior high school	1.514	(0.789, 2.906)	0.213	1.821	(0.961, 3.449)	0.066*	2.568	(1.465, 4.501)	0.001***
Junior college and above				1.000			1.000		
Occupation									
Managers of organizations and enterprises	0.709	(0.066, 7.659)	0.777	7.611	(1.167, 49.634)	0.034**	9.718	(1.537, 61.458)	0.016**
Professional and technical personnel	0.798	(0.215, 2.959)	0.735	1.751	(0.334, 9.191)	0.508	2.910	(0.553, 15.318)	0.208
Manufacturing and construction personnel	1.108	(0.328, 3.747)	0.868	2.132	(0.445, 10.225)	0.344	3.877	(0.811, 18.531)	0.090*
Social services personnel	0.966	(0.298, 3.131)	0.955	2.345	(0.503, 10.924)	0.278	4.687	(0.997, 22.041)	0.050*
Agricultural production personnel	0.726	(0.150, 3.523)	0.691	3.601	(0.624, 20.766)	0.152	3.709	(0.687, 20.032)	0.128
Clerical support and related workers				1.000			1.000		
Income level									
Q1: 0-20,000	0.914	(0.450, 1.858)	0.804	0.958	(0.466, 1.967)	0.907	1.033	(0.600, 1.778)	0.907
Q2: 20,001-36,000	0.795	(0.416, 1.517)	0.486	0.748	(0.388, 1.004)	0.385	0.541	(0.327, 0.893)	0.016**
Q3: 36,001-60,000	0.769	(0.416, 1.423)	0.404	1.479	(0.847, 2.582)	0.169	0.647	(0.405, 1.031)	0.067*
Q4: 60,001-1,000,000	1.000			1.000			1.000		
The frequency of exposure to secondhand smoking									
Almost every day	2.097	(1.262, 3.483)	0.004***	2.575	(1.602, 4.139)	0.000***	3.977	(2.711, 5.835)	0.000***
>=3 days per week	2.446	(1.081, 5.536)	0.032**	2.188	(0.945, 5.063)	0.067*	1.360	(0.598, 3.092)	0.464
1-2 days per week	1.226	(0.493, 3.051)	0.661	1.019	(0.405, 2.564)	0.968	0.620	(0.251, 1.530)	0.299
<1day per week	0.858	(0.308, 2.395)	0.771	1.017	(0.410, 2.520)	0.971	1.415	(0.712, 2.813)	0.322
Never	1.000			1.000			1.000		

Note: reference= non-smokers

OR= odds ratio, 95% CI= 95% confidence interval

* p-value<0.1

**p-value<0.05

***p-value<0.01

3.2. Results of the Multinomial Logistic Regression

In the model for multinomial logistic regression (Table 2), especially focus on heavy smokers (vs. non-smokers), the possibility of being heavy smokers in male floating population was prominently high (OR: 864.639, 95% CI: 117.821-6345.250) compared to the female floating population. For age, the results indicated that the people who belonged to the 15 – 44 age group category were less likely to be heavy smokers than those within the 55 – 64 years old category. For education, members of the Chinese floating population with junior and senior education level and below were 2 (OR: 2.711, 95% CI: 1.315-5.591; OR: 2.568, 95% CI: 1.465-4.501) times more likely to be heavy smokers compared to the floating population with higher education level (i.e., junior college and above). For occupation, the floating population who worked on managerial positions were more likely to smoke cigarettes heavily (OR: 9.718, 95% CI: 1.537-61.458) compared to other professions. Concerning the impact of the income level, the floating population who got a lower yearly income (i.e., 20,001-36,000 Yuan) were less likely to smoke heavily (OR: 0.541, 95% CI: 0.327-0.893) compared to people who had the highest level of yearly income (i.e., 60,001-1,000,000 Yuan). Furthermore, those who were exposed to secondhand smoking environment almost every day were 4 times more likely (OR: 3.977, 95% CI: 2.711-5.835) to be heavy smokers compared to those who never exposed to secondhand smoke.

4. DISCUSSION AND LIMITATIONS

Tobacco smoking rate of the Chinese floating population is higher than in the general population. Several sub-categories of floating population are more at-risk of being heavy tobacco smokers. Tobacco smoking seems to be a symbol of masculinity in China, which could explain why the smoking prevalence and the average number of cigarettes smoked per day are higher among men than in women (Mao et al., 2012; Shakib et al., 2005; Yang et al., 2016). Furthermore, the degree of nicotine dependence increases with age in any population, which leads older people to smoke heavily and face more difficulty in quitting smoking (Wu et al., 2011). Glanz and colleagues (2015) reported that there was a strong relationship between education and health awareness. In other words, the less-educated floating population could underestimate the risks of tobacco smoking harms and receive less information about hazards of smoking for health, which might lead to heavy smoking behavior. Additionally, cigarettes are generally considered as popular gifts in Chinese society, gifting and exchanging of cigarettes seems to be very common (Rich & Xiao, 2012). Gifting cigarettes may help build interpersonal relationships to facilitate business and cooperation through interactions and social occasions (Wang et al., 2018). Therefore, managers are more likely to receive cigarette gifts from business partners or subordinates, resulting in heavy smoking behavior. Heavy smokers who smoke 20 cigarettes and above daily are at greater risk than light and moderate smokers to suffer from smoking-related diseases (Kim et al., 2015; Wang et al., 2018). Moreover, persistent long-time heavy smokers are more likely to develop nicotine dependence, which increases the difficulty for heavy smokers to quit tobacco smoking (Belsky et al., 2013). Furthermore, the Chinese floating population were facing unequal health care conditions and social welfare compared to the general population, which affect the chance for the floating population to access equal rights on health. Therefore, serious tobacco usage conditions and the unequal chance of getting treatment might lead to health inequalities and tobacco-related diseases among the Chinese floating population. the floating population exposed to secondhand smoking environment frequently are more at-risk of being heavy smokers. The behavior of imitating peers is not unusual among the floating population, because they spend lots of time together, especially in their workplaces. There are some recommendations to decrease the prevalence of heavy tobacco smoking behavior among the Chinese floating population. Enhancing awareness of

smoking cessation among male floating population (Mao et al., 2012; Mao et al., 2014; Yang et al., 2016). Strengthening smoking cessation interventions for the older floating population (Eckert et al., 2001; Stead et al., 2013; Zwar et al., 2014). Adopting more strict anti-smoking norms in workplaces (Suzuki et al., 2010; Liu et al., 2014).

Although CLDS 2016 was a nationwide survey data, this investigation focused primarily on Chinese labor forces, the Chinese floating population were only a part of investigative sample. Therefore, CLDS 2016 was not aiming at specifically investigate the smoking behavior of the Chinese floating population. Hence, several factors that may affect the smoking behavior in this population, such as taste preferences and migrant history, were not available in CLDS 2016. Moreover, there were no data related to the smoking status before migration in CLDS 2016, thus, whether the floating population have caused an aggravation of heavy smoking behavior due to migration cannot be studied here.

5. CONCLUSION

Some features are statistically related to heavy smoking behavior among the floating population. These features are: being male, in the older age category (i.e., 55–64 years old), with a lower education level (i.e., junior and senior high school or below), managers of organizations and enterprises, with higher yearly income (60,001 – 1,000,000 Yuan), exposed to secondhand smoking environment almost every day, and felt unhappy frequently. These factors need to be considered when developing tobacco control interventions among floating population to target the most at-risk members of this population.

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