Effects of Unhealthy Lifestyle Factors on Healthcare-seeking Behavior in China

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Research Article

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Abstract

Background: People with unhealthy lifestyles may experience omitted or delayed healthcare, leading to severe sickness and higher healthcare expenditures in the future. Hence, the current study aims to ascertain the effects of current smoking, regular drinking, and physical inactivity on healthcare-seeking behavior among the sick in China.

Methods: The data used in this study was obtained from the China Family Panel Studies (CFPS). The final sample consisted of 44,362 individuals in all five waves of data collection. Logistic regression models were used for the analysis.

Results: Based on the tests, the fixed effects estimation was the preferred method for panel data in this study. The current study found that sick adults who currently smoked cigarettes were 0.73 times less likely to seek healthcare than those who never smoked or stopped smoking. Compared to non-drinkers, sick adults who regularly drank alcohol decreased the likelihood of seeking healthcare. Sick adults who never participated in physical exercise decreased the odds of seeking healthcare by 24% compared to those who participated in physical exercise.

Conclusions: Current smoking, regular drinking, and physical inactivity decreased the probability of seeking healthcare among sick adults. Therefore, screening and brief advice programs should be delivered by primary level care and pay more attention to those who have unhealthy lifestyles, reducing the burden of diseases.

Background

In 2015, a Chinese national nutrition and chronic disease report presented that the prevalence of current smoking, harmful drinking, and physical inactivity among adults were 28.1%, 9.3%, and 71.3% [1], and these preventable risk factors have contributed to the increased rise in chronic diseases. Chronic diseases now account for an approximated 80% of total deaths and 70% of total disability-adjusted life years lost in China [2].

Unhealthy lifestyles have proven to be independently or synergistically a cause of diseases, such as hypertension, dyslipidemia, diabetes, and obesity [3]. Most people make unhealthy lifestyle changes due to the health concerns and illnesses they experienced. For example, among Chinese smokers who make a quit attempt in the past 12 months, 38.7% of smokers worried about their future health status, and 26.6% smokers who experienced severe sickness in 2018 [4]. Therefore, ex-smokers are associated with higher healthcare utilization and increased healthcare expenditures [5–8]. People with unhealthy lifestyles may not care about their health status or maybe risk-tolerant individuals. They may experience omitted or delayed healthcare, leading to severe sickness and higher healthcare expenditures in the future.

To our knowledge, little is known about the association between unhealthy lifestyle factors and healthcare-seeking behavior. Hence, the current study aims to ascertain the effects of current smoking,

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regular drinking, and physical inactivity on healthcare-seeking behavior among the sick in China using the five-waves of longitudinal panel dataset. This knowledge will help better understand the underlying causes of healthcare-seeking behavior by current smoking, regular drinking, and physical inactivity, thus helping the government make healthcare resource allocation decisions and improve health education programs for target populations.

Methods

Data Source and Study Sample

The data used in this study was obtained from the China Family Panel Studies (CFPS), conducted by the Institute of Social Science Survey of Peking University. The CFPS is a nationally representative, biennially survey designed to collect Chinese community-, family-, and individual-level longitudinal data, covering twenty-five provinces and their administrative equivalents, representing about 95% of the total population in Mainland China. The CFPS uses multistage probability proportional-to-size sampling and includes community, family, adult, and child questionnaires. The first wave in 2010 successfully interviewed 33,600 adults (above 16 years old), and four waves of full sample follow-up surveys in 2012, 2014, 2016, and 2018 interviewed 35,719, 37,147, 36,892, and 32,201 adults, respectively. More details about the CFPS are available from Xie and Hu [9] .

From the datasets, only the adults (16 years old or older) who reported themselves to have health problems in the past two weeks prior to the survey interview were selected. The final sample consisted of 44,362 individuals in all five waves of data collection.

Measures

Dependent Variable

Healthcare-seeking behavior was set as a binary variable, denoting the decision to consult a doctor (or not) of the adults reporting themselves to have health problems in the past two weeks. The two questions in CFPS that represent this variable was: 'During the past two weeks, have you ever had health problems?' and 'Have you seen a doctor?'.

Independent Variables

The respondents completed a face to face interview about unhealthy lifestyle factors, including current smoking, regular drinking, and physical inactivity. In the CFPS, each respondent was asked: 'Have you smoked in the past month?'. The adults reporting 'Yes' were considered current smoking. Second, regular drinking was defined as a binary variable. The CFPS question supporting this variable was: 'Have you often drunk alcohol (at least three times a week) in the past month?'. The respondents reporting 'Yes'

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were coded as 1 and 'No' coded as 0. In the CFPS, respondents were asked how often did you participate in physical exercise in the past week. The adults were categorized as physical inactivity if they answered "Never".

The other independent variables were selected based on the previous studies, including the respondent's age, gender, marital status, urban residency, household income, medical insurance, educational attainment, employment status, self-reported health status, and chronic conditions. Definitions of all relevant variables are provided in Table 1.

Table 1
Definitions of variables

Variable	Description
Dependent variable	
Healthcare-seeking behavior	Coded: 1 if the individual self-reported to consult a doctor; 0 otherwise
Independent variable	
Current smoking	Coded: 1 if the individual who currently smokes cigarettes; 0 otherwise
Regular drinking	Coded: 1 if the individual drinks alcohol at least 3 times a week in past month; 0 otherwise
Physical inactivity	Coded: 1 if the individual never participates in physical exercise in the past week; 0 otherwise
Age group	
15–24	Coded: 1 if the individual is 15–24 years old; 0 otherwise
25–64	Coded: 1 if the individual is 25–64 years old; 0 otherwise
>=65	Coded: 1 if the individual is > = 65 years old; 0 otherwise
Male	Coded: 1 if the individual is male; 0 for female
Educational attainment	
Illiterate	Coded: 1 if the individual is illiterate; 0 otherwise
Elementary school	Coded: 1 if the individual attends elementary school; 0 otherwise
Middle school	Coded: 1 if the individual graduates from middle school; 0 otherwise
High school	Coded: 1 if the individual graduates from high school; 0 otherwise
Above three-year college	Coded: 1 if the individual graduates from above three-year college; 0 otherwise
Married	Coded: 1 if the individual is married; 0 otherwise
Urban residency	Coded: 1 if the individual is urban resident; 0 for rural resident
Medical insurance	

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Variable	Description
GMI	Coded: 1 if the individual is enrolled in Government Medical Insurance; 0 otherwise
UEMI	Coded: 1 if the individual is enrolled in Urban Employee Medical Insurance; 0 otherwise
URMI	Coded: 1 if the individual is enrolled in Urban Resident Medical Insurance; 0 otherwise
NRCMI	Coded: 1 if the individual is enrolled in New Rural Cooperative Medical Insurance; 0 otherwise
Other Insurance	Coded: 1 if the individual is enrolled in supplementary medical insurance; 0 otherwise
No Insurance	Coded: 1 if the individual does not have medical insurance; 0 otherwise
Household income	Net household income (10,000 Yuan)
Economically active	Coded: 1 if the individual reports participating agricultural jobs, working with wages for an employer, or working for oneself rather than an employer; 0 if the individual reports being temporary worker, retirement, unemployment, or student;
Health status	
Poor	Coded: 1 if the individual reports health status to be poor; 0 otherwise
Fair	Coded: 1 if the individual reports health status to be fair; 0 otherwise
Good	Coded: 1 if the individual reports health status to be good, very good, or excellent; 0 otherwise
Chronic conditions	Coded: 1 if the individual has had doctor-diagnosed chronic diseases in the past six months; 0 otherwise
Severity of health problems	
Mild	Coded: 1 if the individual perceives himself/herself to have mild health problems in the past two weeks; 0 otherwise
Moderate	Coded: 1 if the individual perceives himself/herself to have moderate health problems in the past two weeks; 0 otherwise
Serious	Coded: 1 if the individual perceives himself/herself to have serious health problems in the past two weeks; 0 otherwise

Statistical Analysis

Bivariate analyses were used to examine differences between adults who consulted a doctor (seeking healthcare) and those who did not consult in each wave. Pearson's chi-square test was used to analyze the categorical independent variables.

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Logistic regression was performed to analyze the association of the unhealthy lifestyle factors on healthcare-seeking behavior in China. The first step in the analysis could be to pool all available information from 2010 to 2018 for all adults and treat them as independent information for N = 44,362 adults. Hence, pooled logistic regression could be employed here. This study treated the data as a panel structure and made a choice between the fixed effects and random effects logistic model. In this study, a possible unobserved variable is health literacy, which is correlated with the time-varying explanatory variables in the model (e.g., regular drinking, smoking, or physical inactivity). With such correlated heterogeneity, the fixed effects logistic model should be preferred over the random effects logistic. However, when estimating the fixed effects logistic model, many pieces of information are lost. The random effects logistic model was also presented in this study [10, 11].

Results

A descriptive summary of all variables over time is shown in Table 2. The proportions of people seeking healthcare increased from 68.76% in 2010 to 76.05% in 2018. About one in four adults currently smoke tobacco products from 2010 to 2018. Approximately 12.00% of adults regularly drink alcohol from 2010 to 2018. The proportion of physical inactivity was 71.97% in 2010. This proportion decreased to 52.78% in 2018.

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Table 2
Description of selected variables in five waves (percentage)

	2010 N = 8,358	2012 N = 9,061	2014 N = 8,774	2016 N = 9,021	2018 N = 9,148
Healthcare-seeking behavior	68.76	65.41	72.29	74.94	76.05
Current smoking	28.82	27.44	26.15	24.94	25.66
Regular drinking	12.92	13.18	13.06	11.68	12.47
physical inactivity	71.97	56.87	63.20	58.80	52.78
Age group					
15−24	6.81	7.38	6.39	7.27	6.43
25−64	76.00	74.45	73.66	70.89	69.90
>=65	17.19	18.17	19.95	21.84	23.68
Male	42.71	43.41	42.31	41.97	42.82
Educational attainment					
Illiteracy	36.05	35.43	35.43	34.50	30.38
Elementary school	21.49	21.62	22.24	21.49	21.59
Middle school	24.97	23.79	24.40	24.38	26.10
High school	11.79	12.37	11.65	11.65	12.47
Above three-year college	5.71	6.79	6.28	7.98	9.46
Married	82.52	82.54	82.32	80.42	79.85
Urban residency	44.81	45.37	47.13	47.52	47.72
Medical insurance					
GMI	4.74	3.66	2.93	1.87	2.37
UEMI	9.48	12.15	12.55	12.35	13.05
URMI	6.96	7.59	8.19	8.04	7.91
NRCMI	58.06	64.58	67.49	68.23	67.70
Other Insurance	0.53	0.32	0.60	0.39	0.35
No Insurance	20.23	11.7	8.24	9.12	8.62

Note. RMB: 1000 Chinese Renminbi about 150 US$. [a] Values are expressed as mean (standard

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	2010 N = 8,358	2012 N = 9,061	2014 N = 8,774	2016 N = 9,021	2018 N = 9,148
Household income [a]	3.31(5.28)	4.21(5.01)	4.62(6.07)	5.39(12.53)	5.64(8.46)
Economically active	45.42	67.52	71.54	75.26	73.15
Health status					
Poor	38.85	41.02	36.08	36.15	36.40
Fair	42.01	22.99	19.48	22.55	16.74
Good	19.14	35.99	44.44	41.30	46.86
Chronic conditions	28.95	22.12	34.61	33.98	32.65
Severity of health problems					
Mild	22.23	24.07	20.79	20.93	17.28
Moderate	40.12	39.72	47.21	42.28	44.36
Serious	37.65	36.21	32.00	36.79	38.36

Note. RMB: 1000 Chinese Renminbi about 150 US$. [a] Values are expressed as mean (standard deviation).

Table 3 compares sick adults who sought healthcare and those who did not seek across a variety of unhealthy lifestyle factors. Adults who currently smoke had a lower proportion of seeking healthcare from 2010 to 2018, and a similar trend was observed for adults who regularly drink alcohol. Physically inactive adults had a lower ratio of seeking healthcare between 2014 and 2018. There were statistical differences between sick adults who sought healthcare and those who did not seek in current smoking, regular drinking, and physical activity in partial or all the five waves.

Table 3
Unhealthy lifestyle choices of adults who sought healthcare and those who did not seek

	2010		2012		2014		2016		2018	
	N = 8,358		N = 9,061		N = 8,774		N = 9,021		N = 9,148	
	Seeking healthcare		Seeking healthcare		Seeking healthcare		Seeking healthcare		Seeking healthcare	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Current smoking (%)										
Yes	67.70	32.30	61.26	38.74	69.57	30.43	72.71	27.29	73.11	26.89
No	69.19	30.81	66.98	33.02	73.26	26.74	75.68	24.32	77.06	22.94
P value	0.185		0.000		0.001		0.005		0.000	
Regular drinking (%)										
Yes	62.31	37.69	56.95	43.05	64.92	35.08	69.73	30.27	69.76	30.24
No	69.72	30.28	66.70	33.30	73.40	26.60	75.62	24.38	76.95	23.05
P value	0.000		0.000		0.000		0.000		0.000	
Physical inactivity (%)										
Yes	68.68	31.32	65.53	34.47	71.83	28.17	74.17	25.83	74.21	25.79
No	68.97	31.03	65.25	34.75	73.09	26.91	76.03	23.97	78.10	21.90
P value	0.795		0.778		0.204		0.045		0.000	

Table 4 presents the results of regression analysis for the pooled logistic, random effects logistic, and fixed effects logistic model. The likelihood ratio test and the Hausman's specification test showed highly significant test statistics (LR = 568.26 and $\chi^2(24)$ =162.86). These results further demonstrated that the fixed effects logistic model should be preferred over random effects logistic. The results of the logistic regression analysis are showed in Table 3 as odds ratios. An odds ratio (OR) greater than one indicates a positive effect on the likelihood of seeking healthcare; an odds ratio less than one indicates a negative effect.

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Table 4
Logistic regression analysis of healthcare-seeking behavior

	Pooled logistic	Random effects logistic	Fixed effects logistic
	(i)	(ii)	(iii)
	Odd Ratios (95% CI)	Odd Ratios (SE)	Odd Ratios (SE)
Current smoking	0.91***(0.85, 0.97)	0.89***(0.82, 0.96)	0.73***(0.59, 0.91)
Regular drinking	0.76***(0.71, 0.82)	0.73***(0.67, 0.79)	0.77***(0.65, 0.91)
physical inactivity	0.76***(0.72, 0.79)	0.73***(0.69, 0.77)	0.76***(0.69, 0.83)
Age group			
15−24 (ref.)			
25−64	1.19***(1.08, 1.32)	1.24***(1.10, 1.40)	0.98 (0.70, 1.37)
>=65	1.58***(1.41, 1.77)	1.76***(1.54, 2.02)	1.75***(1.18, 2.60)
Male	1.01 (0.95, 1.07)	1.01 (0.94, 1.09)	1.01 (0.31, 3.32)
Educational attainment			
Illiteracy (ref.)			
Elementary school	0.99 (0.93, 1.07)	1.01 (0.93, 1.10)	1.15 (0.86, 1.54)
Middle school	0.98 (0.91, 1.06)	0.99 (0.92, 1.08)	1.22 (0.83,1.81)
High school	0.79***(0.73, 0.86)	0.76***(0.68, 0.84)	1.18 (0.71, 1.96)
Above three-year college	0.59***(0.53, 0.66)	0.53***(0.47, 0.61)	1.22 (0.67, 2.21)
Married	1.25***(1.16, 1.34)	1.30***(1.20, 1.41)	0.92 (0.72, 1.16)
Urban residency	0.83***(0.79, 0.88)	0.80***(0.75, 0.86)	1.25**(1.00, 1.56)
Medical insurance			
GMI	1.25***(1.08, 1.44)	1.25**(1.05, 1.48)	1.01 (0.74, .139)
UEMI	1.14***(1.03, 1.26)	1.14**(1.02, 1.28)	1.08 (0.87, 1.35)

Note: Likelihood ratio test in random effects logistic model:$LR = 568.26, p = 0.000$

Hausman's specification test is significant at 1% level:$\chi^2(24) = 162.86, p = 0.0000$

Loading [MathJax]/jax/output/CommonHTML/fonts/TeX/fontdata.js   evel, ** at the 5% level, and * at the 10% level

	Pooled logistic	Random effects logistic	Fixed effects logistic
URMI	1.14***(1.03, 1.27)	1.17**(1.04, 1.32)	1.19* (0.97, 1.46)
NRCMI	1.51***(1.40, 1.62)	1.57***(1.44, 1.71)	1.09 (0.94, 1.28)
Other Insurance	0.93 (0.68, 1.27)	0.88 (0.60, 1.27)	0.89 (0.52, 1.55)
No Insurance (ref.)			
Household income	1.00***(1.00, 1.01)	1.01***(1.00, 1.01)	1.01** (1.00, 1.02)
Economically active	1.01 (0.96, 1.07)	1.03 (0.97, 1.10)	1.03 (0.92, 1.16)
Health status			
Poor	1.38***(1.29, 1.47)	1.46***(1.36, 1.58)	1.42***(1.26, 1.59)
Fair (ref.)			
Good	0.94** (0.89, 0.99)	0.94**(0.87, 1.00)	1.04 (0.93, 1.16)
Chronic conditions	2.43***(2.29, 2.57)	2.69***(2.51, 2.88)	2.04***(1.85, 2.25)
Severity of health problems			
Mild	0.58***(0.55, 0.61)	0.52***(0.48, 0.55)	0.52***(0.47, 0.58)
Moderate (ref.)			
Serious	1.87***(1.76, 1.98)	2.09***(1.95, 2.24)	1.94***(1.76, 2.15)
Constant	1.29***(1.13, 1.46)	1.38***(1.19, 1.61)	
Observations	44,362	44,362	13,036
Note: Likelihood ratio test in random effects logistic model:$LR = 568.26, p = 0.000$			
Hausman's specification test is significant at 1% level:$\chi^2(24) = 162.86, p = 0.0000$			
Asterisks*** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level			

Column (iii) of Table 4 presents factors affecting healthcare-seeking behavior using the fixed effects logistic model. Sick adults who currently smoked cigarettes were 0.73 times less likely to seek healthcare than those who never smoked or stopped smoking (OR = 0.73, p < 0.01). Compared to non-drinkers, sick adults who regularly drank alcohol decreased the likelihood of seeking healthcare (OR = 0.77, p < 0.01). Sick adults who never participated in physical exercise decreased the odds of seeking healthcare by 24% compared to those who participated in physical exercise (OR = 0.76, p < 0.01).

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Irrespective of the estimation method, sick adults who currently smoked cigarettes, regularly drank alcohol, and never participated in physical exercise were less likely to seek healthcare (see Column (i)- (iii) of Table 4).

Discussion

In the current study, we examined the association between unhealthy lifestyle factors and healthcare-seeking behavior among a Chinese adult general population using a five-wave of longitudinal dataset. This study found that the proportions of seeking healthcare increased from 68.76% in 2010 to 76.05% in 2018. This result is not unexpected due to easy access and availability of healthcare facilities and improved insurance coverage since the launch of the new health reform of 2009. However, people with unhealthy lifestyle (current smokers, regular drinkers, and physical inactivity) had a lower proportion of seeking healthcare compared to those with health healthy lifestyle.

The fixed effects logistic regression model was used to identify the unhealthy lifestyle factors affecting healthcare-seeking behavior. The results indicate that among the sick, adults who currently smoked cigarettes, regularly drank alcohol, and never participated in physical exercise were less likely to seek healthcare. Similar results have been discovered in China, England, and Australia. For example, Zhou et al. [12] presented that people who are physically inactive decrease the probability of seeking healthcare in China. Smith et al. [13] found that smokers are less likely to seek help than non-smokers in England. Feng et al. [14] uncovered that people with unhealthy lifestyles are less likely to see general practitioners in Australia.

Three possible reasons may explain the inverse relationship between unhealthy lifestyles and healthcare-seeking behavior: first, people with unhealthy lifestyles are more risk-tolerant, and they may more willingly bear disease risk [15, 16]. Higher willingness to bear risk decreased the probability of seeking healthcare [17]. Second, unhealthy lifestyles, like smoking, drinking, and physical inactivity are linked with poor health conditions. People in poor health conditions are more likely to have negative experiences in the healthcare system and be less satisfied with it [18]. Lower patient satisfaction tends to have decreased the probability of seeking healthcare [19]. Last, unhealthy lifestyles contribute to productively losses at work and reduced ability to work [20, 21]. People with unhealthy lifestyles may sacrifice some of their leisure time to perform unfinished work. Time constraints may delay some people from seeking healthcare [22]. Reduced ability to work may affect people's ability to afford healthcare.

Although the present study used a national survey to analyze the unhealthy lifestyle factors affecting healthcare-seeking behavior among the sick, several limitations should be emphasized. First, the CFPS survey does not collect information on self-medication practice, so this study defined healthcare-seeking behavior as professional help sought. Previous studies have shown that individuals who perceive themselves to have mild health problems are more likely to select self-medication in China [23, 24]. Second, data were obtained via a nationally representative survey, and thus shares the limitations of all self-reported data: recall bias and unreliability of responses under pressure. Last, we could not exclude ex-

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smokers who quit smoking in the past 30 days from the group of current smokers and ex-drinkers from non-regular drinkers.

Conclusions

Current smoking, regular drinking, and physical inactivity decreased the probability of seeking healthcare among sick adults. People with unhealthy lifestyles experience omitted or delayed healthcare, leading to serious health problems and higher healthcare costs on society in the near future. Therefore, screening and brief advice programs should be delivered by primary level care and pay more attention to those who have unhealthy lifestyles, reducing the burden of diseases.

Declarations

Ethics approval and consent to participate

For this research, we have used publicly available secondary data set with all individual identifiers removed prior to making the data set available publicly. No ethical approval was required due to the type and nature of data set used.

Consent for publication

No applicable.

Availability of data and materials

The datasets generated and/or analysed during the current study are available in the Peking University Open Research Data Platform repository, https://opendata.pku.edu.cn/dataset.xhtml?persistentId=doi:10.18170/DVN/45LCSO.

Competing interests

The authors declare that they have no competing interests.

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Authors' Contributions

JS designed the study and made important contributions to the revision of the manuscript. CL led the data analysis and wrote the manuscript. All authors read and approved the final manuscript.

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