



RESEARCH ARTICLE

The Relationship between Self-Treatment and Outpatient Visits: Findings from a National Survey in China

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Abstract

Emerging large number of patients with chronic diseases, present special challenges for modern health system. Self-treatment may be an alternative approach to meet the healthcare demand, and currently of great interest in many countries. However, whether self-treatment can decrease the use of formal health care, especially outpatient visits, is still not clear. No empirical study has been conducted to examine the relationship between self-treatment and outpatient visits of individuals with chronic diseases under China's unique bifurcated health-care system. The baseline data of a national survey of Chinese Health and Retirement Longitudinal Study (CHARLS) conducted in 2011-2012 among respondents aged 45+ was used in this study. Survey logistic regression models were applied to explore the association between self-treatment and outpatient visits under the framework of the Anderson Behavior Model among 11,673 respondents. Results showed that Over-the-counter (OTC) medicines consumption was the main mode of self-treatment in China. Respondents with OTC medicines consumption had fewer outpatient visits in the previous month than their counterparts (30.1% vs. 41.0%, $p < 0.01$). After controlling socio-demographic factors, lifestyles, number of chronic diseases, self-reported health status, depressive symptoms and health insurance, the negative association between OTC medicines consumption and outpatient visit remained significant (OR = 0.45, 95% CI: 0.39, 0.53). These findings suggest that self-treatment, especially OTC medicines consumption, may decrease outpatient visits for adults with chronic diseases in China.

Keywords

Self-treatment, Over-the-counter medicine consumption, Outpatient visit, National survey

Introduction

Current health care system in China is facing mounting challenges due to an increasing number of aging population suffering from chronic diseases [1,2]. The fourth Chinese National Health Services Survey estimated that the total number of individuals with chronic disease reached 260 million in 2008, with rural residents accounting for 163 million [3]. The challenges caused by chronic diseases are also predicted to increase in severity in the foreseeable future [4,5].

While there is a tremendous demand for treatment and care management, China is facing a severe shortage in healthcare workforce [6]. Furthermore, the geographical and rural-urban disparities in healthcare workforce distribution exacerbate the shortage of healthcare providers and have further impact on health outcomes of different populations [7,8].

Self-treatment, as defined by the Merriam-Webster medical dictionary, is medication of oneself or treatment

of one's own disease without medical supervision or prescription. Self-treatment follows basic medical principles and is potentially good for health may serve as an alternative approach to meet the healthcare demands, particularly in areas with limited health care resources [9]. Self-treatment products account for approximately 20% of the total international pharmaceutical market in the early 21 century [10] and widely used in western countries [11-13]. Self-treatment in China has also increased rapidly [14]. According to the third Chinese National Survey of Health Services, 31.4% of the rural residents used self-treatment within two weeks after they were sick, while the proportion was even higher for urban residents [15].

Self-treatment, especially OTC medications consumption, was found to reduce outpatient visits for some specific medical conditions like asthma [16,17], bleeding disorder [18] and heartburn [19]. However, its relationship with formal healthcare utilization, such as outpatient visits is still inconclusive. A report by the Consumer Health Product Association (CHPA) estimated that approximately 75% of OTC users in the United States (or 180 million) would seek treatment if OTC medicines were not available. It also stated that on average every dollar spent by consumers on OTC medicines saves \$6-7 for the U.S. healthcare system as a whole [20]. A study in Korea also found that as hospital outpatient visits increased, the purchase of OTC drugs for self-treatment decreased [21]. But some other studies found that in some cases OTC medicines are a supplement to formal medical care, rather than a substitute for it [22,23] which means formal healthcare visits and OTC medicines consumption increase at the same time.

China has a unique bifurcated healthcare system with both Western Medicine (WM) and Traditional Chinese Medicine (TCM). In addition to use of western OTC medicines many Chinese use TCM without prescription to treat health problems [24-27]. Thus, it will be interesting to explore the relationship between self-treatment and outpatient visits among Chinese adult population with chronic disease.

Methods

Data source and sample

This study used data collected from the baseline survey of the China Health and Retirement Longitudinal Study (CHARLS). Details on the design and sample of the CHARLS can be found in a paper published by Zhao, et al. [28]. In brief, CHARLS is a four-stage, stratified, and cluster sampling survey that was conducted in 150 counties from 28 provinces in China. It is a nationally representative survey of residents in China aged 45 years or above and their spouses. The baseline survey was conducted between June 2011 and March 2012 and involved 17,708 respondents [28,29].

The current study included respondents who were diagnosed with chronic diseases including hypertension, dyslipidemia, diabetes mellitus cancer, chronic lung diseases and liver disease, heart attack, coronary heart disease, angina, congestive heart failure or other heart problems, stroke, kidney disease, stomach or other digestive disease, emotional, nervous, or psychiatric problems, memory-related disease, arthritis or rheumatism, asthma. Respondents with missing data in age, self-reported health status, self-treatment and outpatient visits were excluded. A total of 11,673 respondents were included in the present study.

Measurement

Self-treatment and outpatient visits: Self-treatment was determined according to the question: "How did you treat yourself during the past month?" in the CHARLS baseline questionnaire. Respondents chosen any of the following mode of self-treatment: "Consumed over-the-counter modern medicines", "Consumed traditional herbs or traditional medicines as treatment", "Tonic/Health supplement", "Use health care equipment" and "Other" were regarded as conducting self-treatment. Respondents chosen 'Consumed prescription medicines' or checked 'Yes' in another question ("In the last month have you visited a public hospital, private hospital, public health center, clinic, or health worker's or doctor's practice, or been visited by a health worker or doctor for outpatient care?") were regarded as having had outpatient visits.

Predisposing factors: Predisposing factors included age, gender (male vs. female), marital status (married vs. other), education, household income, health status, chronic disease and health insurance. Educational level was categorized on the basis of respondent's highest level of education into four categories: illiterate (no formal education), elementary school (did not finish primary school but capable of reading and/or writing, home school, elementary school), high school (middle school, high school, vocational school), and college and above (two-/three-year college/associate degree, four-year college/bachelor's degree, master's degree and doctoral degree/Ph.D.). Annual household income was a sum of wage income, self-employment income, agricultural income, pension income, and transfer income. All values are in Yuan (Chinese currency). Self-reported health status was categorized as excellent, very good, good, fair, poor or very poor. Depressive symptoms were assessed by the 10-item Center for the Epidemiological Studies of Depression Short Form (CES-D-10) [30,31]. Health insurance was categorized as urban employee medical insurance, urban resident medical insurance, new cooperative medical insurance, and no insurance [32].

Statistical methods

Data were analyzed using SAS 9.3 (SAS Institute Inc., Cary, NC, USA). Continuous variables were expressed as

Table 1: Demographic, socioeconomic and health status by outpatient visits in the past month of the respondents with chronic disease of CHARLS baseline survey.

		Outpatient visits N = 4146	No outpatient visit N = 7527	Stat	P value
Gender	Male	42.2%	49.2%	20.1599	< 0.0001
	Female	57.8%	50.8%		
Age	Mean ± SE	60.9 ± 0.4	60.0 ± 0.2	-2.258	0.0246
Education level	No school	27.3%	26.5%	1.8926	0.595
	Primary school	39.5%	38.6%		
	Middle school	29.7%	31.7%		
	College and above	3.4%	3.2%		
Marital status	Married	84.1%	84.9%	0.6322	0.4265
	Others	15.9%	15.1%		
Place of residence	Rural	49.90%	51.50%	0.6555	0.4182
	Urban	50.10%	48.50%		
Household income	< 1500	27.9%	25.8%	3.3667	0.3385
	1500-12500	20.6%	21.8%		
	12500-35000	24.9%	24.7%		
	> 35000	26.6%	27.7%		
Health insurance	No insurance	6.2%	6.9%	2.7123	0.4381
	Urban employee medical insurance	17.6%	15.3%		
	Urban resident medical insurance	11.6%	11.7%		
	New cooperative medical insurance	64.7%	66.0%		
Smoking	Smoking	17.2%	25.9%	27.554	< 0.0001
	Quitted	8.5%	7.8%		
	Never	74.3%	66.4%		
Drinking	More than once/month	24.4%	31.2%	29.2278	< 0.0001
	less than once/month	11.0%	9.0%		
	Never	64.6%	59.8%		
N of chronic diseases	Mean ± SE	2.4 ± 0.04	1.9 ± 0.02	-12.68	< 0.0001
Self-reported health status	Good and above	381 (9.4%)	1398 (19.7%)	229.141	< 0.0001
	Fair	1665 (42.1%)	3803 (50.7%)		
	Poor or very poor	2100 (48.5%)	2326 (29.7%)		
Depressive symptoms (CESD-10)	Mean ± SE	11.0 ± 0.1	9.8 ± 0.1	-9.58	< 0.001

*SE: Standard Error.

the mean and Standard Deviation (SD), and categorical variables were expressed as frequencies (%). Statistical methods for survey data were applied in the present study considering the sampling strategy employed in the CHARLS baseline survey. The sampling weight used was individual weight with household and individual non-response adjustment. Community ID was used for the Probability Sampling Unit (PSU). Province and city were used to designate the strata for the SAS survey commands. The survey logistic regression model was used to examine the association between self-treatment and outpatient visits. Risk was presented as Odds Ratio (OR). Model 1 was a univariate model. Model 2 adjusted for gender, age, education level, marital status and place of residence (urban/rural). Additional variables were added in Model 3 that included household income, lifestyles (smoking, drinking), self-reported health status, number of chronic diseases and depressive symptoms. All of the p values and 95% Confidence Intervals (CIs) were estimated in a two-tailed manner.

Differences were considered to be statistically significant at $p < 0.05$.

Results

Of the 11673 respondents with chronic diseases in the baseline survey of CHARLS, 4146 (35.5%) had at least one outpatient visit in the previous month prior to the survey (Table 1).

Compared with their counterparts, respondents who had outpatient visits in the previous month had higher proportion of female (57.8% vs. 50.8%, $p < 0.001$) and were older (60.9 vs. 60.0, $p = 0.0246$). Respondents with outpatient visit had higher proportions of non-smoker (74.3% vs. 66.4%, $p < 0.001$) and non-drinker (64.6% vs. 59.8%, $p < 0.001$). They had higher number of chronic diseases (2.4 vs. 1.9, $p < 0.001$), higher proportion of self-reported poor or very poor (48.5% vs. 29.7%, $p < 0.001$), and with higher score of CESD-10 (11.0 vs. 9.8) (Table 1).

Table 2: Self-treatment conducted in the past month by the respondents with chronic disease of CHARLS baseline survey.

		Whole sample	Outpatient visits	No outpatient visit	Stat	P value
Self-treatment	Yes	5063 (43.2%)	30.1%	69.9%	65.6825	< 0.0001
	No	6610 (56.8%)	41.0%	59.0%		
OTC	Yes	4188 (35.3%)	27.1%	72.9%	118.614	< 0.0001
	No	7485 (64.7%)	40.2%	59.8%		
Traditional herbs or Traditional medicines	Yes	870 (8.0%)	43.8%	56.2%	15.6813	< 0.0001
	No	10803 (92.0%)	34.8%	65.2%		
Tonic/Health supplement	Yes	438 (4.3%)	39.7%	60.3%	5.3164	0.0211
	No	11235 (95.7%)	35.3%	64.7%		
Health care equipment	Yes	61 (0.9%)	63.9%	36.1%	14.2299	0.0002
	No	11612 (99.1%)	35.4%	64.6%		
Others	Yes	98 (0.8%)	23.5%	76.5%	6.7061	0.0096
	No	11575 (99.2%)	35.6%	64.4%		

*Self-treatment was determined by 'Consumed over-the-counter modern medicines', 'Consumed traditional herbs or traditional medicines as treatment', 'Tonic/Health supplement', 'Use health care equipment' and 'Other'.

Table 3: Survey logistic regression models for the association between outpatient visits and OTC consumption*.

Effect		Reference	Model 1	Model 2	Model 3
OTC consumption		No OTC	0.62 (0.55,0.70)	0.61 (0.54,0.69)	0.45 (0.39,0.53)
Gender		Female		1.41 (1.24,1.60)	1.05 (0.89,1.25)
Age				1.01 (1.00,1.02)	1.00 (0.99,1.01)
Education level	Primary school	No school		1.19 (1.02,1.38)	1.13 (0.98,1.29)
	Middle school			1.16 (1.00,1.35)	1.16 (0.98,1.36)
	College and above			1.27 (0.79,2.05)	1.35 (0.81,2.25)
Marital status	Others	Married		1.08 (0.92,1.27)	1.03 (0.87,1.23)
Place of residence	Urban	Rural		1.05 (0.89,1.24)	1.13 (0.93,1.38)
Drinking	More than once/month	Never			0.66 (0.54,0.81)
	less than once/month				0.98 (0.74,1.30)
Smoking	Smoking	Never			0.86 (0.74,1.01)
	Quitted				1.14 (0.94,1.39)
Income	1500-12500	< 1500			0.94 (0.81,1.09)
	12500-35000				1.03 (0.88,1.22)
	> 35000				1.16 (0.95,1.41)
Insurance	Urban employee medical insurance	No insurance			1.32 (0.93,1.86)
	Urban resident medical insurance				0.97 (0.73,1.29)
	New cooperative medical insurance				1.14 (0.85,1.53)
Self evaluated health	Fair	Good and above			1.59 (1.37,1.86)
	Poor and worse				2.66 (2.17,3.25)
N of chronic diseases					1.33 (1.25,1.42)
CESD					1.03 (1.02,1.04)

*Model 1 was a univariate model; Model 2 adjusted for gender, age, education level, marital status, and place of residence (urban/rural); Model 3 also included household incomes, life style (smoking, drinking), self-reported health status, number of chronic diseases and depression.

Table 2 showed that respondents who used self-treatment had a lower percentage of outpatient visits than those who didn't (30.1% vs. 41.0%, $p < 0.001$). However, the decrease was largely due to use of OTC medicines. Respondents with OTC medication had a much lower rate of outpatient visits than those without OTC use (27.1% vs. 40.2%, $p < 0.001$). For individuals who used the other types of self-treatment, such as traditional herbs or traditional medicines, tonic/health supple-

ment, or health care equipment, they had a higher rate of outpatient visits than their counterparts.

In the univariate analysis (Model 1), the proportion of outpatient visits was inversely associated with OTC consumption (OR = 0.62, 95% CI: 0.55, 0.70) (Table 3). The association didn't change significantly after adjusting for gender, age, education level, marital status, and place of residence (OR = 0.61, 95% CI: 0.54, 0.69). In model 3, outpatient visits remained inversely associat-

ed with self-treatment (OR = 0.45, 95% CI: 0.39, 0.53) after adding income, lifestyles (drinking and smoking), self-reported health status, number of chronic diseases and depressive symptom in the model.

Discussion

To our knowledge, it is the first study to examine the association between outpatient visits and self-treatment using a national representative sample in China. Our study shows that the use of OTC medicines by Chinese adults with chronic disease was inversely associated with outpatient visits. Whilst the use of other types of self-treatment, such as traditional medicine, tonic/health supplement, or use of health care equipment might have positive associations with outpatient visits.

Our findings are consistent with the results from the CHPA report [20] and the Korea study [21]. However, the Leibowitz's study using the data from the Health Insurance Experiment (HIE) indicated that people with full insurance coverage purchased both types of drugs more, suggesting OTC medicines consumption may be positively associated with the use of formal medical care [22]. Out-of-pocket cost might be an important factor for the choice of OTC medicines or outpatient visits when they are equally effective. As Stuart pointed out, because health insurance policies typically provide no coverage of OTC products, a low-priced OTC medicine may exceed the co-pay of a much higher-priced prescription drug [23]. Under these circumstances, patients with insurance are likely to choose prescribed medicines even if OTCs are equally effective [23].

While previous studies found mixed results [18-21], our study suggests that use of OTC medicines was negatively associated with outpatient visits for adults with chronic disease in China. Patients with minor illness or chronic diseases may choose OTC medicine as an alternative of visiting a physician since they would not see a physical visit as an imminent need [33,34]. In addition, medications would cost more because of the Markup Policy (hospital are normally allowed to add up 15%) for outpatient visits. Thus, patients prefer to purchase the same OTC medicines since it would be less expensive than using prescribed medicines. Additionally, patients in China have poor accessibility to formal medical care due to a shortage of healthcare providers, low level of insurance coverage for patients with chronic diseases, especially in rural areas [35,36], which is different from cases in developed countries [21-23]. Similar phenomenon were also found in another study low income rural population without health insurance only sought medical care when illness was at a severe or acute stage [37].

While self-treatment may reduce formal outpatient visits, we need to be aware that using OTC medicines could cause side effects if a patient does not know the proper dose of the OTC medicine [38,39]. In addition to over dosage, mistreatment and delayed treatment may also occur [40]. Additionally, visit a doctor may not only

include getting prescriptions but also receiving some health education regarding disease management that can't be fulfilled by self-treatment.

The merit of this study is that CHARLS is a national representative survey with a relatively large sample size with high quality data [28]. Nevertheless, one limitation of our study is the cross-sectional nature of the data. Another limitation is that the definition of outpatient visits and self-treatment used in the present study (mentioned in the methods part) may have the possibility of misclassification. However, outpatient visits, self-treatment and OTC are terms that are familiar and easy to be differentiated by Chinese adults. Moreover, OTC consumption accounted for almost 80% of the self-treatment in this study.

Conclusions

The findings suggest that OTC consumption may be negatively associated with outpatient visits for adults with chronic diseases in China. Health policy should be elaborately designed to guide people with chronic diseases to use OTC medicines in a more proper way, such as developing better consumer manual, online guidelines.

Acknowledgements

This work was supported by the National Natural Science Foundation of China (81102183) and the Chinese Medical Board Faculty Development Awards.

Ethics Statement

This study was approved by the Ethics Committee of the School of Public Health, Fudan University, Shanghai, China. We used the publicly published data of the China Health and Retirement Longitudinal Study. Written consent was specifically waived by the approving IRB.

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