

An Investigation into Factors Influencing Healthcare Utilization in Rural Areas

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Abstract - Using field investigation data, this paper attempts to use rural residents' subjective feeling to assess medical services accessibility. Based on empirical models, we put the focus on the relationship between medical services accessibility and healthcare utilization. It is believed that subjective feeling has seriously restrained Chinese rural residents' health care utilization. The high cost of medical services is still a serious issue for Chinese rural residents. In order to solve the expensive and difficult-to-obtain medical services for rural residents, key reforms need to strengthen basic medical care and public-health service systems, allow doctors to work in more than one medical institution, increase investment in rural areas, establish long-term care plan and so on.

Keywords - *The new rural cooperative medical system(NCMS); Medical services accessibility; Healthcare utilization*

I. INTRODUCTION

To increase the accessibility of rural residents' medical service, Chinese government started experimenting the new rural cooperative medical system (NCMS), and it has all covered in the rural by the end of 2013. Predictably, NCMS must profoundly affect Chinese rural residents' medical consumption behaviour [1]. Therefore, most studies tend to focus on using the influencing factors of farmers' medical services at present, especially the effect of NCMS system for farmers' medical consumption behaviour. For example, Wagstaff et al (2009) considers that whether it is a service in hospital or outpatient service, the patients' medical services utilization are improved [2]. However, Yu et al(2010) found that NCMS has only increased the hospital service requirements, so it has little impact on the demand for outpatient utilization. NCMS has improved the efficiency and the fairness of the outpatient service, but did nothing about the hospital service [3,4,5,6,7,8]. Shi et al (2010) also consider that NCMS did not improve residents hospitalized service accessibility, serious illness is still the main reason for the poverty, especially for the impoverished population and patients with chronic diseases[9]. It is clear that the influence of medical consumption behaviour on peasant farmers is still debatable.

Although there were many studies on affecting factors of medical consumption behaviour of farmers, the current literature has ignored a most important explanatory variable, which is the accessible degree of medical service. Health care utilization is an important variable of health capital investment[10], and the accessibility of medical service is an important factor affecting the

utilization of medical service, so it is very meaningful for us to research the accessibility of medical service which plays an important role in the health care utilization. Generally speaking, the higher of medical services accessibility, the higher of health care utilization. The key is to completely understand the medical service accessibility concept. WHO has separated the medical service into economic accessibility, geographic accessibility, cultural accessibility and so on, which considers that income level, the distance to the medical institutions, time, education, medical service price and expenses, medical security system etc. Those are important factors which have deeply influenced on the basic health service accessibility. Wu Changling (2007) and the others focus on geographical accessibility, which manifests the convenience to medical and health institutions that how much health service would meets the medical needs in space[11]. Therefore, the medical service accessibility is subdivided into the convenience of service acquisition, the short region distance, the close relationship between doctors and patient, quick and accurate diagnosis as well as the reasonable price. Wu Yan (2007) focuses on the economic accessibility, thought that the accessibility of health service is mainly reflected in the economic aspect, which higher medical service cost caused heavier financial burden, and then lead to the poor medical service accessibility[12]. Zhao Guangchuan et al (2016) believe that the inequality of healthcare utilization in China has declined but still maintains at a high level of more than 0.86. The socio-economic status is the most important factor except the need variable which accounts for about 15%, so the key to reduce the inequality of healthcare utilization is to decrease the inequality of the socio-economic status, especially income inequality[13].

So how to increase the economic accessibility has become the issues, Zheng Xuhui (2016) suggests that the key of the next step is to reasonably guide and control the utilization of medical high-tech services in order to keep NCMS' sustainable development which is eventually beneficial to farmers[14]. Some scholars make a further understand to the medical service accessibility including the supplier and demander[15,16]. Overall, the accessibility of medical service providers is to provide adequate and equitable health service resources, which usually measures with the distance, the time, doctors and hospital beds per person, namely as absolutely accessibility. Accessibility degree of demanders means that whether medical service demanders have the ability to obtain the provision of medical service, generally with the index of family income, education level and so on. Therefore, we can use two dimensions of suppliers and demanders to analyse its impact on residents' medical consumption behaviours.

Different from the current literature, this paper attempts to measure from the residents' subjective view. In a sense, the subjective feeling is better than the objective index, poor access and high fee are the subjective cognitions that people usually tend to make a basic judgment on the current health service accessibility. High cost focuses on the demanders' accessibility, for example, different income and education have a marked impact on it. However, poor access stresses providers'

accessibility, such as distance, the number of doctors, which have significant effect on it. The reason why we measure the accessibility degree of health service from a subjective view is that residents' feelings can directly influence the action. And this is also the basic assumption in this paper. In reality, we can find that many residents who abandon the medical treatment due to the asymmetry cognition, which lead to a general phenomenon that they are too scared to accept treatment, since patients are easy to be influenced by the cost and the distance. Hence, the main purpose of this paper is to prove the hypotheses, which is whether health care accessibility have an appreciate impact on the consuming behaviour.

II. DATA DESCRIPTION AND MODEL SPECIFICATION

A. Data Description and Variable Specification

The data comes from the investigation in September 2012 by Dongbei University of Finance and Economics. According to the agricultural producing conditions and the economic development, the survey randomly chose villages and farmers, finally we choose three categories, and then randomly select an administrative village in each township. The survey had been distributed 230 questionnaires, in which 201 is valid, accounting 87%. Table1 is the specific variable description.

TABLE I. VARIABLE DEFINITE DESCRIPTION

Explanatory variables	Variable definition	Explanatory variables	Variable definition
Whether or not expensive	not expensive = 1, reasonable = 2, expensive = 3	whether or not difficult	not difficult = 1, reasonable = 2, difficult = 3
Sex	Women = 1	whether or not illness	Suffered = 1
Age	under 18s = 1 above 60 years old = 6	chronic disease	Had = 1
Occupation	at household chores agriculture = 1, migrant labourers = 2, individual and commercial households = 3	seriousness of his illness	not serious = 1, relatively serious=2, very serious = 3
Education standards	primary school and below = 1, junior school = 2, senior school = 3, college graduated or above = 4	health condition	very well = 1, good = 2, kind = 3, bad = 4, very bad = 5
Whether participate or not	Involved = 1	whether recouped or not (Not recouped is the control group)	outpatient reimbursement = 1, inpatient reimbursement = 1, outpatient reimbursement = 1
Income	under 30 thousand = 1, between 30 and 40 thousand = 2, between 40 and 50 thousand = 3, between 50 and 60 thousand = 4, above 60 thousand = 5	the number of people	one person = 1, 2 people = 2, 3 people = 3, 4 people = 4, above 4 people = 5
Outpatient take village clinics as the control group	township health centre = 1, the county hospital=1, city hospital and above = 1	stay in hospital prefer (village clinics as the control group)	township health centre = 1, the country hospital = 1, city hospital and above = 1

B. Model Specification

Put forward the basic empirical analysis model for this paper by using the current theory and empirical research as formula (1).

$$Y = \alpha + \beta X + \lambda Z + \mu \quad (1)$$

Among them, dependent variable Y means that the farmers' medical expenses last year, which represent the health care utilization. X are explanatory variables, including the subjective feelings about the expensive and difficult of farmers. This paper intends to use the farmers' subjective feeling of the difficult to access medical service to measure the providers' accessibility and use the expensive medical service feelings to measure the demanders' accessibility. Since the difficult to access medical service accessibility is due to the unreasonable allocation of medical resources, it would be poorer if it is more difficult, which have the similar basic meaning. And the expensive to access medical service accessibility is due to the high cost which is much more than the residents' income and it would be poorer if it is more expensive, which have the same meaning. So we collected the subjective feelings in this paper by the survey, and measure the accessibility of the medical service. Difficulty is divided into three levels, which is no, general and yes. And high cost is divided into three levels, which is no, reasonable and yes. Z refers to other control variables, including some demanding variables like self-evaluation health, chronic disease, population, education, occupation and other unsolicited variables. μ is random residuals. Because the dependent variable is ordinal variable, so we will use the ordered Probit model for estimation.

In addition, considering that different subjective feeling of NCMS residents' utilization may be different from who they had not participated, so to estimate whether this difference is caused by the health condition or subjective feelings, we introduce the interaction of NCMS and the subjective feelings, health and NCMS to establish the model (2) on the basis of model(1), which in order to investigate the interaction effects between NCMS and the subjective feelings, health and NCMS.

Besides, the medical service utilization is likely regulated by health variables, so different health conditions and subjective feelings may be interaction. So on the basis of model(2), this article introduce self-evaluation health and the accessibility to establish the model(3), which investigate the regulation of health to accessibility.

Since the regression equation is the linear multivariate regression equation, this paper prefers the least squares estimation method. In order to effectively eliminate

heteroscedasticity problem, we deal with equations via White heteroscedasticity test in the model estimation.

III. EMPIRICAL ANALYSIS

Table II is the result of empirical analysis on the accessibility and health care utilization. From Table 2, the main explanatory variable in model(1), we can see that, the expensive to access medical service is significant positive correlation with medical costs. And the difficult to access medical service which negatively correlated with medical expense, which is under 1% level of significance. This suggests that the stronger expensive feelings are, the more medical expenses will spend, and the stronger difficult feelings are, the fewer expenses will spend. Of course, there may has the adversely medical costs impact on the difficult feelings, which the more expenses lead the stronger feelings. However, it is worth noting that the difficult feelings do affect the farmers' health care expense, because it hardly has the reverse effect that the lower cost caused the easier difficulty. Medical service expense is closely related to whether it is NCMS patient and health condition, so the relationship between the two parts still needs to be confirmed.

After introducing health condition as the interaction terms of the difficult and expensive feelings, the expensive variable is no longer significant while the difficult medical service and NCMS enrolment remains to be significantly positive correlated with medical expenses. And other explanatory variables are very significant expect some differences between coefficient, which means that expensive feeling might be subject to effects of health self-assessment. The interaction term of health condition and expensive feeling is negative, while that of health condition and difficult feeling positive. It indicates that people with poorer health and a stronger expensive feeling tend to have lower expenses, while those with a stronger "difficult" feeling have more medical expenses.

Thus we can conclude that a stronger expensive feeling deteriorated the consumption of medical care, for that the reverse effect of an expensive feeling with lower expenses is excluded.

In Model (1), we concluded that a difficult feeling restrains the expenses of medical care, and here, we found that the expenses rises for those with poor health. It is not contradictory, because health condition, as a mediator, makes the poor health residents spend much more even if they find it is difficult to get medical services.

Moreover, attentions should be paid to the influence of other variables. Self-rated health is positively correlated with medical care expenses, the poorer health condition one has, the more expenses he costs, and patients with chronic diseases cost more, which well meets the expectation. Education level is negatively correlated with medical care expenses, residents with higher level of

education tend to spend less on medical care. This may be related to their good awareness of health. They care more about the prevention of health risks, which results in lower morbidity and lower health care expenses. Residents who tend to go to township hospitals to see a doctor have less medical expenses than those who go to the village clinic. And the former ones spend more than those who tend to go to the county hospital. This indicates that with the “new rural cooperative medical system” carrying out, going to township hospitals for treatment has effectively reduced the medical expenses of residents, and hospitals above the county level and the clinics, due to more diagnosis and treatment items, charge more than that

in the village clinic under normal circumstances. It is noteworthy that residents who tend to go to township hospitals and county hospitals actually paid less medical expenses than those in the village clinic, which is difficult to understand. Because, according to common sense, the more people are inclined to a higher level of hospitals, the more their corresponding expenses. This may be related to people's actual doctoring behaviours. As opposed to outpatient services, residents are more cautious in whether to choose inpatient ones. People who tend to go to higher-ranking hospitals spent inversely less, which indicates that hospitals, with higher levels and higher inpatient costs are likely to inhibit the medical service needs of residents.

TABLE II. THE EMPIRICAL RESULTS OF INFLUENCING FACTORS FOR HEALTH CARE UTILIZATION

Variables	Model(1)		Model(2)		Model(3)	
	Coefficient	P	Coefficient	P	Coefficient	P
Expensive medical service	0.6342	0.0000	-2.0477	0.0062	-0.9336	0.1596
Difficult to receive medical service	-0.1734	0.0008	2.4915	0.0000	1.7765	0.0006
Participate	2.1329	0.0000	4.1696	0.0000	2.3935	0.0000
Self-rated health	1.0341	0.0000	2.1155	0.0000	2.7365	0.0000
Chronic disease	0.3177	0.0000	0.4307	0.0000	0.4372	0.0000
Family population	0.2710	0.0000	0.0407	0.1977	0.0674	0.0399
Income	0.0088	0.8204	-0.0520	0.2341	0.0367	0.3926
Education degree	-0.1433	0.0002	-0.2925	0.0000	-0.2585	0.0001
Career	0.0993	0.0328	0.0874	0.1144	0.0419	0.2086
Outpatient service : refer to town clinic						
Township health centre	-0.5789	0.0000	-0.6477	0.0000	-0.7590	0.0000
Country hospital	1.0283	0.0000	1.0215	0.0000	1.0426	0.0000
City hospital and above	2.3337	0.0001	3.1680	0.0006	3.0828	0.0010
Hospital service : refer to town clinic						
Township health centre	-1.7367	0.0000	-1.4790	0.0000	-2.2640	0.0000
Country hospital	-0.9218	0.0029	-0.3829	0.0255	-1.2736	0.0000
City hospital and above	-1.5227	0.0000	-0.7543	0.0007	-1.8139	0.0000
Participate*expensive			2.2752	0.0026	2.2121	0.0005
Participate*difficult			-2.5458	0.0000	-2.0346	0.0001
Participate*self-rate health			-1.3591	0.0001	-1.0531	0.0001
Health*expensive					-0.3773	0.0000
Health*difficult					0.0591	0.0882

IV. MAIN CONCLUSIONS AND POLICY IMPLICATION

This paper took the survey data in Dalian, and considered the farmers' subjective feelings, which is the first attempt to measure the degree of medical services

accessible to farmers. “It’s expensive to see a doctor” represents the availability of the demander, and “it’s difficult to see a doctor” represents the availability of suppliers. On this basis, this paper analyses the impact of the availability of health care services in detail and medical services to residents’ needs. This paper argues

that the availability of medical and health services do affect the actual needs of farmers. Farmers who feel doctoring expensive have inhibited their use of medical services. The relationship between feeling doctoring difficult and utilization of medical services is adjusted by self-rated health conditions. Overall, to feel it difficult to doctor has inhibited demand for medical services, but those who are in poor health still spend more in medical services. Therefore, expensive to see a doctor is still an important factor impeding farmers' demand for medical services. In addition, factors such as health, education and others also affect health care needs of residents significantly.

Health care reform is systems engineering, but the NCMS mainly focused on improving the economic condition of those in demand to improve health care accessibility. Therefore, in order to improve farmers' access to medical services effectively, we not only need to identify the various factors affecting the availability, but also need to harmonize the overall medical and health system, especially the reform in the supply aspect. This paper argues that some factors such as income, health status and medical tendencies which by the demand side is not easy to be adjusted in the short terms. While the government can do a great deal in terms of medical supplies and services. The government should develop a reasonable mechanism to strictly control the growth of unreasonable medical costs to prevent the rapid growth of health care spending before it offsets the compensation effect of the new rural cooperative medical care system. For this purpose, the current research work should focus on collecting and integrating the reform practice of various regions and develop effective ways to control the growth of medical costs as soon as possible.

So In order to solve the expensive and difficult-to-get medical service for rural residents, the key reform should strengthen basic medical care and public-health service systems, allow doctors to work in more than one medical institution, increase the investment in rural areas, establish long-term care plan and so on. In the future, China must construct multi-level medical care and service system, improve the hierarchical medical system. Only in this way can we effectively alleviate farmers' burdens and improve the rural medical service availability at the time when we continuously make demand-side reforms of improving the level of payment and reimbursement.

CONFLICT OF INTEREST

The authors confirm that this article content has no conflicts of interest.

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REFERENCES

- [1] X. J. Wang, C. Zheng, "The impact of health insurance on medical expenditure and health of the elderly", *Journal of finance and economics*, vol. 40, pp.60-74, December 2014.
- [2] A. Wagstaff, M. Lindelow, J. Gao, et al, "Extending health insurance to the rural population: an impact evaluation of China's new cooperative medical scheme", *Journal of Health Economics*, Vol.28, pp.1-29, January 2009.
- [3] B. Yu, Q. Meng, C. Collins, et al, "How does the new cooperative medical scheme influence health service utilization?", *BMC Health Service Research*, pp.116-120, October 2010.
- [4] W. Yip, W. C. Hsiao, "The Chinese health system at a crossroads", *Health Affairs*, vol. 27, pp.460-468, February 2008.
- [5] Y. L. Li, L. Q. Li, "Issues the study on health resource utilization performance of the New Rural Cooperative Medical Scheme: based on the empirical analysis of Propensity Score Matching (PSM)", in *Agricultural Economy*, pp.51-58, October 2009.
- [6] F. T. Zheng, J. Q. Jiang, "The New Cooperative Medical Scheme can really promote peasant go to see doctor?", *Journal of Agrotechnical economics*, pp.26-35, February 2014.
- [7] C. Ma, G. C. Zhao, H. Gu, "The effect of urban-rural integrated medical insurance system on rural residents health care behavior", *Statistical research*, vol.33, pp.78-85, April 2016.
- [8] Y. Mao, B. Zhu, P. P. Jing, H. R. Xin, "Peculiarity, social environmental and in-patient service-based on the perspective of health ecology", *Journal of Northwest University(Philosophy and Social SciencesEdition)*, vol.46, pp.146-157, March 2016.
- [9] W. X. Shi, C. Virasakdi, G. Alan, et al, "The influence of the rural health security schemes on health utilization and household impoverishment in rural China: data from a household survey of western and central China", *International Journal for Equity in Health*, vol. 9, pp.7, May 2010.
- [10] M Grossman, "On the concept of health capital and the demand for health", *Journal of Political Economy*, vol.80, pp.223-255, February 1972.
- [11] C. L. Wu, P. Q. Fang, "Analysis of inequity of health service for rural residents in west China and potential accessibility and countermeasures", *Chinese Health Service Management*, pp.560-562, August 2007.
- [12] Y. Wu, "Analysis of the lack of rural medical and health service in China", *China Pharmaceuticals*, pp.3-4, October 2007.
- [13] G. C. Zhao, H. Gu, J. F. Guo, "Changes in socio-economic status and the inequality of healthcare Utilization in China between 2000 and 2011", *Journal of Public management*, vol.13, pp.107-117, February 2016.
- [14] X. H. Zheng, J. Liu, M. X. Ning, "The impact of new rural cooperative medical system on farmer's decision of high-tech medical utilization: Evidence from supplier-induced demand", *J. Cent. South Univ. (Social Science)*, vol.21, pp.162-167, January 2015.
- [15] Y. Q. Miao, "Accessibility to healthcare resources and farmers health: evidence from rural China", *Chinese Journal of Population Science*, pp.47-51, March 2008.
- [16] L. H. Zhu, Q. Cao, J. Wang, "Residents health , health care, medical care Accessibility-empirical on the CHNS data of 2006", *Economic Research Guide*, vol.13, pp.205-206, March 2009.