FACTORS ASSOCIATED WITH HEALTH SERVICE UTILIZATION BY RURAL ELDERLY PEOPLE IN MAINLAND CHINA

By

LI, Rui

THESIS

Submitted to
KDI School of Public Policy and Management
in partial fulfillment of the requirements
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Committee in charge:

Professor Shun WANG, Supervisor

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ABSTRACT

Factors Associated With Health Service Utilization By Rural Elderly People in Mainland China

By

Li Rui

This study aims to describe the present situation of utilization for elderly in rural areas, and the factors significantly affecting health services utilization. Using descriptive analysis, Chi-square test, single-factor regression and multiple regression to find significantly associated factors influencing use of health services by rural elderly.

Objective: Population aging has become the most important issue in many countries, especially in China. The purposes of this study to find the factors associated with health services utilization and determine the factors which significantly associated with using health services by rural elderly people in mainland China. Provide the policy proposals for improving health services utilization by rural elderly people in the future.

Data and Methods:

1. Source of data: The data came from the China Rural Health Development Project included 40 rural counties in 8 provinces, which involved about 36,000 households (population around 110,000).

2. Methods: Logistic regression analysis is used in order to find the factors significantly associated to health services utilization.

Results: Age, education, income, health self-appraisal, medical insurance,

inhabitancy, health services provide by different health institutions can impact health services utility, health self-appraisal, health insurance and health institutions are most important factors. Chronic diseases is major diseases affected the health of elderly people in rural, the major reason of low treatment rate was financial difficulty.

Conclusion: This study shows that major factors associated with health service utilization by rural elderly people include: region, age, income, health insurance, receipt of medical assistance, chronic diseases, need for care, and self-reported health status. There are large demand of long-term care because of more and more disabilities and handicaps rural elderly people. Government should improve the medical insurance system of rural elderly people, explore long-term care mechanisms, and clarify responsibilities of different level of health institutions to meet rural elderly people's demand, improve household care for elderly.

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Secondly, my sincere thanks also goes to my husband. When I studied in KDI School, he took care our baby and whole family as my strong backing. Also I want to thanks my boss Dr. Zhang Zhaoyang, he supported me got this study opportunity, and gave me a lot of guidance.

TABLE OF CONTENTS

1. Introduction

1.1 Background

Ageing populations around the globe are rapidly increasing. From 2000 to 2050, the proportion of ageing population (over 60 years) will increase from 11 percentto 22 percent, the number of ageing people will increase to two billion in 2050 which will increase more than three times compared with the number in 2000.[1]

Population ageing has become the most important issue in many countries, especially in China. The ageing problem has turned into one of the most urgent social phenomenon in recent two decades. According to the definition of the United Nations on aging population,[2]China entered into the ageing society since 1999. 7.6 percent of its population was 65 years or older in 1999, and the percentage increased to 9.4 percent in 2007. At the end of 2011, about 185 million people were 60 years or older, 13.7 percent of the population.[3]According to predicted trends made by Judith Banister, China's population aged older than 60 will increase to 440 million, and population aged older than 80 will increase to 101 million in 2050.[4]

China's aging population increasing with low fertility. In traditional societies of China, family and community provided social protection for elderly. However, due to one-child policy which dramatically decreased China's fertility rate during the 1980s,

[1]World Health Organiztaion, http://www.who.int/ageing/en/
[2]Department of Economic and Social Affairs Population Division, United Nations. World Population Ageing: 1950-2050 . United Nations Publications,2002:41-42
[3]National Bureau of Statistics of the People's Republic of China (2011).China Statistical Yearbook 2011.China Statistics Press. Beijing.
[4]Judith, Banister, David, E. B. and Larry, R. Population Aging and Economic Growth in China. PGDA Working Paper No. 53, 2010.

the average fertility rates from 5.6 in the 1970s reduced to around 2 children inthe 1980s, in the future, most of the children will not be available to provide support and careto their parents.[5]

China is undergoing urbanization and population increase simultaneously, it spent about 30 years (from 1980 to 2010) to go through urbanization, compared with the United States which experienced about 120 years (from 1840 to 1960), the social safety net for elderly has not been well established, especially for rural areas.[6] In 2003, China launched health insurance program named New Cooperative Medical Scheme (NCMS) for rural residents, the NCMS program has partly decreased the cost of health services deliveries and increased inpatient and outpatient utilization, but the out-of-pocket expenses are still high, both insurance against and pension coverage are still incomplete and not enough to guard against catastrophic healthcare expenditure for elderly.[7]

1.2 Statement of the Problem and Justification

The report of the sixth nationwide population census showed that more than 60 percent of elderly were living in rural areas.[8]Compared with urban elderly people, the rural population aging is more serious. On the one hand, there are large numbers of

[5]Liu Z, Albanese E, Li S et al. Chronic disease prevalence and care among the elderly in urban and rural Beijing, China. BMC Public Health 2009; 9; 394

[6]Zhan, Heying jenny, "Population Aging and Long-Term Care in China", *Generations* ,Spring 2013, Vol.37,No.1

[7]Wagstaff A, Lindelow M, Gao J, Xu L, Qian J. Extending health insurance to the rural population: an impact evaluation of China new cooperative scheme, policy research working paper 4150.Washington, DC: World Bank; 2007.

[8] The report of the sixth nationwide population census, National Bureau of Statistics of China, 2011:4. http://www.stats.gov.cn/tjsj/tjgb/rkpcgb/qgrkpcgb/201104/t20110428_30327.html

"empty-nesters", because of economic development and urbanization, a large number of younger laborers migrating from rural areas to urban areas due to job opportunities, leaves "38""61""99" troops which is composed by children, women and elderly people, which has changed the structure of the rural population, exacerbating the serious situation of rural aging population[9]. On the other hand, because of urban-rural separate policy roles, China has the urban bias of public policy, the high quality public services and facilities resources are concentrated in urban areas, rural areas suffer less access to get health care services.[10]

Rural elderly people are more vulnerable because of having less education, lower incomes, poor health status, low pension coverage and poorer health service accessibility.[11] The survey held by China Health and Nutrition showed a 30% increased mortality for elderly who live in rural areas compared with urban[12]. And the prevalence rates of chronic diseases increased fast from 1993 to 2008, the major chronic diseases increased significantly as well, meanwhile rural elderly have a higher disability rate than urban elderly,[13]the rate of timely medical treatment in rural areas is much lower than urban areas.[14]

[9]Zhang, N., Guo, M., &Zeng, X. (2012). China: awakening giant developing solutions to population ageing. The Gerontologists, 52(5), 589-569.
[10] Zimmer Z, Kwong J. Socioeconomic status and healthamong older adults in rural and urban China. J Aging Health2004; 16: 44–70.
[11]Christine Elnitsky and Betty Alexy (1998).Identifying health status and health risks of older rural residents.Journal of Community Health Nursing, 15, 61-75.
[12]Zimmer Z, Kaneda T, Spess L. An examination of urban versus rural mortality in China using community and individual data. J Gerontol B PsycholSciSoc Sci. 2007;62:S349–S357. doi: 10.1186/1471-2458-8-277.
[13]Hongjing Chen, Research on demand and utilization of Health Service among the Elderly in Rural Areas under the Backgtound of Ageing, 2012.
[14]Qing Yang - hong LIU Jun- xia，Medical Insurance and Medical Care Demand for the Elderly，Shang Hai Journal of Economics, 2013:10, 20-30

According to the impact of urbanization, demographic transition, and geographic mobility increased, adult children are increasingly unavailable to care for their elderly parents, especially in rural areas. In order to make the goal of ageing successfully more realistic, this study focuses on analysis influencing factors of health services utilization for rural elderly people in China, which will provide the basis for making policy to promote the utilization of health service, improve health and life quality, and prolong life of the rural elderly.

1.3 Objectives and Research Questions

Find the factors associated with health services utilization and determine the factors which significantly associated with using health services by rural elderly people in mainland China. Provide the policy proposals for improving health services utilization by rural elderly people in the future.

This study aims to describe the present situation of utilization for elderly in rural areas, and the factors significantly affecting health services utilization. Using descriptive analysis, Chi-square test, single-factor regression and multiple regression to find significantly associated factors influencing use of health services by rural elderly.

1.4 Review of related literature

“Utilization is defined as obtaining the health care provided by the health care

services in the form of health care contact."[15]The most famous model of health services use was "The Andersen Behavioral Model of Health Services Use", which was developed by Ronald M. Andersen in 1968. This model focuses on developing the factors which influence health services utilization from three components. These components include: predisposing factors or socio-demographic characteristics, enabling factors which can impede or enable the use of health care services, and need for services which is understood as the feeling of changing in one's health. Predisposing factors could be gender, age, self-evaluated health condition, etc. Enabling factors could be access to health insurance, family support, one's community etc. Need represents actual need for health care services.[16]

The utilization of health care services for elderly may be associated with a lot of factors such as: sex, age, marital status, educational level, income, health status, and self-reported health status, etc. The relevant studies are listed below:

Chang et al (2010) used the Andersen model as a study framework and hierarchical multiple logistic regression to determine the factors affecting health examinations utilization by elderly in Taiwan. The study showed that elderly people with higher educational level, bodily pain, hypertension and regular exercise habits used health examinations more, and those who had disabilities and handicaps, used alternative

[15] C. Fernandez-Olano, J.D. Hidalgo, R. Cerda-Diaz, M. Requena-Gallego, C. Sanchez-Castano,, et al. Factors associated with health care utilization by the elderly in a public health care system. Health Policy 75 (2006) 131-139

[16]Evash wick Connie, Rowe Genevieve, DiehrPaual, and Laurence Branch, Factors Explaining the Use of Health Care Services by the Elderly, August 1984.

medicine, and current smokers used the services less.[17]

Park (2014) through descriptive analysis, logistic regression and chi-square teststo analyse the utilization of health care services in elderly Koreans, showed that more elderly women thought their health situation as poor than men, and the elderly residents with chronic conditions, poor health status and lower-income were more likely to use primary care services than others.[18]Nie et al (2008) also show that the number of utilization events differs by age, the group of 85+ age use health services more frequently than 65-69 age group(more than 155%).[19]

Fernández-Olano et al (2006) maintain that lower educational level and negative self-reported health status are important affecting factors of utilization of health care service.[20]

Another study made by Gonzalezet al (2011) used descriptive analysis to create a health profile through socio-demographic characteristics, analyzing the relation between ambulatory care, acute morbidity hospitalization and age group, find the important determinant of hospitalization for elderly is chronic diseases.[21]

Wandera et al (2015) a cross-sectional study in Uganda shows that in the last 30 days, the determinants of reducing access to healthcare for elderly include: poor household,

[17]Chang, Wen-Chiunga, Lan, Tsuo-Hunga, and others, "Factors affecting the use of health examinations by the elderly in Taiwan", In Supplement Geriatric Syndrome in Taiwan, Archives of Gerontology and Geriatrics 2010 50 Supplement 1:S11-S16

[18]Ju Moon Park, "Health status and health services utilization in elderly Koreans", International Journal for Equity in Health August 27, 2014, Vol. 13, 73

[19]Nie, Jason X, Wang, Li, and others, "Health care service utilization among the elderly: findings from the Study to Understand the Chronic Condition Experience of the Elderly and the Disabled (SUCCEED project)", Journal of Evaluation in Clinical Practice. Dec 2008, Vol. 14 Issue 6, p1044, 6 p.

[20]Fernández-Olano, C.a, Hidalgo, J.D. López-Torresa, and others, "Factors associated with health care utilization by the elderly in a public health care system", Health policy 2006 75(2):131-139

[21]Gonzalez-Gonzalez, C, Sanchez-Garcia, S, and others, "Health care utilization in the elderly Mexican population: Expenditures and determinants", BMC PUBLIC HEALTH; MAR 29, 2011, 11 10p.

with some or a lot of walking difficulty, while the determinants of increasing access to healthcare for elderly include: people who earned wages, missed work due to illness.[22] Liu et al (2012) used Latent Class Analysis to divide elderly into 4 health profiles and used a two-part model to analyze the utilization of health care services. First is logistic regression model, second is using an OLS-ordinary least-square regression model on log-transformed costs. The results show there was significant relationship between different profiles and utilization and expenditure of health care services: the high co-morbidity group willing to utilize more ambulatory care, the functional impairment group tended to need care assistance, and the frail group's health care expenditures were higher than other groups.

In recent years, some Chinese researchers increased their interests in analyzing rural elderly people's health status and utilization of the health services. Chen Hongjing used the data of the National Health Service Survey to analyze the demand and utilization of health services for the rural elderly to meet their needs.[23]This study focused on the present situation but not on influencing factors. Fan Pan studied on investigating the measures of the Chinese elderly health condition, using a structural equation model to find the main factors that influence elder health. The factors analysis includes confirmatory factor and an exploratory factor. Elderly health condition measures include emotional condition, physical condition, body function

[22]Wandera, Stephen Ojiambo, Kwagala, Betty, Ntozi, James, "Determinants of access to healthcare by older persons in Uganda: a cross-sectional study", International Journal for Equity in Health. 2015, Vol. 14 Issue 1, p1-10. 10p

[23]Hongjing, Research on demand and utilization of Health Service among the Elderly in Rural Areas under the Backgtound of Ageing, 2012.3

and pain. The major influencing effects of each aspect are time exercising, lifestyle and family environment.[24]This study focused on finding influencing factors of elderly health condition, instead of the influencing factors of health services for the rural elders.

Yao Zhaoyu studied on influencing factors of health services for the elders of rural areas in Jiangsu Province, and pointed out elders' health situation was worse than the non-elders'. Health service demand of the elders were higher than the non-elders, however using rate of health service is lower than that of the non-elders. The major influencing factors include health situation felt by themselves, regional variables, disease severity, household income and ownership of health insurance.[25]Niu Tianhua studied on influencing factors of health services utilization for the elders of rural areas in Shandong Province, and pointed out that the health self-appraisal, foster population, medical insurance and inhabitancy can affect the two-week visit rate and health services utilization.[26]PengYufeng implemented a survey of health services which stratified sampling 897 households include 653 elderly rural residents in Yulin City. The study concludes that elderly people in Yulin City have a higher health service demand, the major affecting factor of health service use is economic burden of disease.[27]These studies all focus at the provincial level in mainland China.

[24]PanFan, Influencing Factors on the Health of Chinese Elderly-An Analysis using Structural Equation Models, June 2012

[25]Yao Zhaoyu, Chen Xueling, Wang Yiqiu, Analysis of the Influencing Factors and Utilization of Medical Services for the Elders in Rural Areas—Based on the Survey Data of Jiangsu Province, 2014

[26]Niu Tian-hua, Meng Qing-yue, Wang Guo-dong et al, The study on the status of utilization of the health services of the Shandong rural elders and its influencing factors, Chinese Primary Health Care 2010-05

[27]Peng Yufeng, Feng Qiming, BO Wei, et al. The survey of health services, Demands and utilization for Rural Elderly in Yulin City, Guangxin, Chinese Prinary Health Care, 2013,27(3):4-6.

2. Data Source

2.1 Brief Introduction

This study used a cross-sectional data from the China Rural Health Development Project, which was supported by the World Bank (WB) Loan and the U.K. Government's Grant (DFID), and executed by the Center for Project Supervision and Management, National Health and Family Planning Commission of the People's Republic of China (NHFPC). The project is a pilot project for comprehensive reform of rural health, project provinces and counties can represent different rural regions. The list of provinces and counties where the project is carried out as listed below. [28]

Table 1: List of provinces and counties where the project is carried out

Project Province (Municipality)	Project County
Shanxi	1 Wuxiang County, 2 Zezhou County, 3 Yushe County, 4 Taigu County
Heilongjiang	5 Gannan County, 6 Lindian County, 7 Fujin City, 8 Linkou County
Jiangsu	9 Gaochun County, 10 Liyang City, 11 Haimen City, 12 Gaoyou City, 13 Danyang City, 14 Jiangyan City
Henan	15 Yiyang County, 16 Ruzhou City, 17 Wuzhi County, 18 Qingfeng County, 19 Xixian County
Chongqing	20 Jiulongpo District, 21 Qianjiang District, 22 Yongchuan District, 23 Rongchang County, 24 Liangping County, 25 Shizhu County
Shaanxi	26 Meixian County, 27 Xunyi County, 28 Ningqiang County, 29 Hanbin District, 30 Zhen'an County
Gansu	31 Gaolan County, 32 Huining County, 33 Gangu County, 34 Jingning County, 35 Kangle County
Qinghai	36 Datong County, 37 Huangzhong County, 38 Huangyuan County, 39 Ledu County, 40 Huzhu County
Total	40 counties

[28] Final Survey Reportfor China Rural Health Development Project-internal material of NHFPC

2.2 Survey samples

Household health interview survey held by Statistics Information Center (NHFPC) was conducted in 40 project counties in the 8 provinces, in 2013. 5 sample towns (sub-districts) were randomly selected in each project county, 2 sample villages (neighborhood committees) were randomly selected in each sample town (sub-district), and 90 households were randomly selected in each sample village (neighborhood committee), with a total of 36,000 households (a population of 108786) involved, composed of 22,487 elderly over 60 years of age, 21.14% of all sample population.

2.3 Survey contents

The survey consists of 4 questionnaires: general information on family, information on family members, information on two weeks prevalence of disease and injury, and information on inpatients.

General information on family: household size, the distance and time between home to the nearest health care services institution, household income. Information on family members: gender, age, marital status, education, medical insurance coverage, enjoying the medical assistance, source of income, self-reported health status, two-week morbidity, and who mainly provides help when needed. Disease prevalence of residents, including frequency and duration of diseases developed within two weeks before survey, the prevalence of chronic diseases within six months before the

survey, activity limitation and loss of ability to work due to illness and injury. Number of admissions due to illness or injury within a year prior to the survey, number of days of hospitalization, type of medical care institutions, reasons for failure to get impatient care etc.

3. Variables

3.1 Variables name and meaning

Region: When China's government made the China's seventh Five-Year Plan in 1986, it used regional policy dividing China into eastern, central and western three regions. Eastern regions refer to the provinces where earliest implemented coastal open policy and economic development level is higher than other provinces. Central regions refer to the provinces where economic growth secondly developed. Western regions refer to the provinces where economic growth is less developed.[29]

Sex: Male and Female

Age: We chose people from sample whose aged 60 year old and above. In order to find different health services utilization of different age levels, we grouped the three groups, form 60 to 69, 70 to 79 and 80+.

Distance: How far is the nearest health care provider from your house

Household size: How many people recorded on the household register

Marital status: married, widowed and divorced

Income(RMB): How much was the previous year income of your family (in terms of

[29]Chinese regional development and policy, Michael Dunford and Thomas Bonschab，University of Sussex and Institute of Geographical Sciences and Natural Resources Research, Chinese
Academy of Sciences, Beijing, PR China，Deutsche Gesellschaft für InternationaleZusammenarbeit, Beijing, PR China

RMB)? (Urban residents: cash income; rural residents: net income)

Source of income

What is your main source of finance?

⑴ Himself/Herself/Spouse ⑵ Children/grandchildren ⑶ Relative/Friend ⑷ Social relief/other

Education

What is the highest level of education that you have completed?

⑴ None or Primary school ⑵Middle school ⑶High school or more

Medical assistance:

Are you a receiver of government medical relief? Yes or No

Health insurance:

Have you enrolled in Medical insurance for urban employees? Yes or No

Have you enrolled in Medical insurance for urban residents? Yes or No

Have you enrolled in New rural cooperative medical scheme? Yes or No

Have you enrolled in Cooperative medical insurance for urban or rural residents? Yes or No

Do you have commercial medical insurance ? Yes or No

Do you have other medical insurance ? Yes or No

Chronic diseases

Have you ever been diagnosed with hypertension by a medical doctor? Yes or No

Have you ever been diagnosed with diabetes by a medical doctor？ Yes or No

During the last six months, have you had any other chronic disease that diagnosed by

a medical doctor？ Yes or No

Need take care

During the past 30 days, do you need someone take care of your life? Yes or No

Self-reported health status

Please indicate on the scale how good or bad your own health is today, in your opinion.(from 0 to 100, 0 representative Worst imaginable health state, 100 representative Best imaginable health state)

3.2 Summary statistics

Table 2:

Variable	Obs	Mean	Std. Dev.	Min	Max
Region					
Eastern	22487	0.196	0.397	0	1
Central	22487	0.288	0.453	0	1
Western	22487	0.515	0.500	0	1
Sex					
Male	22487	0.495	0.500	0	1
Female	22487	0.505	0.500	0	1
Age					
60～69	22487	0.626	0.484	0	1
70～79	22487	0.285	0.451	0	1
80+	22487	0.090	0.286	0	1
Distance					
Less than 15 minutes	22487	0.801	0.399	0	1
More than 15 minutes	22487	0.199	0.399	0	1
Household size					
3 people or below	22487	0.617	0.486	0	1
4～5 people	22487	0.276	0.447	0	1
6 people or above	22487	0.106	0.308	0	1
Marital status					

Variable	Obs	Mean	Std. Dev.	Min	Max
Married	22487	0.763	0.425	0	1
Widowed	22487	0.233	0.423	0	1
Divorced	22487	0.003	0.057	0	1
Income (RMB)					
0-5000	22487	0.232	0.422	0	1
5001-6666	22487	0.197	0.398	0	1
6667-10000	22487	0.185	0.388	0	1
10001-14000	22487	0.189	0.392	0	1
14001-65000	22487	0.197	0.398	0	1
Source of income					
Himself/Herself/Spouse	22487	0.462	0.499	0	1
Children/grandchildren	22487	0.490	0.500	0	1
Relative/Friend	22487	0.002	0.039	0	1
Social relief/other	22487	0.047	0.212	0	1
Education					
None or Primary school	22487	0.829	0.376	0	1
Middle school	22487	0.136	0.343	0	1
High school or more	22487	0.035	0.183	0	1
Medical assistance	22487	0.053	0.223	0	1
Health insurance					
UEBMI	22487	0.065	0.246	0	1
URBMI	22487	0.211	0.408	0	1
NCMS	22487	0.719	0.449	0	1
None	22487	0.005	0.071	0	1
Chronic diseases					
Hypertension	22487	0.305	0.460	0	1
Diabetes	22487	0.048	0.213	0	1
Other Chronic	22487	0.103	0.305	0	1
Need take care	22487	0.103	0.305	0	1
Self-reported health status					
Poor	22487	0.091	0.287	0	1
Fair	22487	0.373	0.484	0	1
Good	22487	0.536	0.499	0	1

3.3 Basic information

There was no information missing for any of the variables.

The Scio-demographic characteristics are presented in summary statistic table X including: region, sex, age, marital status, income, education, self-reported health status. The Enabling characteristics are presented in the table 2 including: household size, distance from home to hospital, health insurance and medical assistance. The need characteristics are presented in the table X includes: need take care and chronic status.

The total elderly population of the sample is 22,487 individuals, 49.5% male individuals. 19.6% individuals from eastern region, 28.8% individuals from central region, 51.60% individuals from western region. The number of elderly aged 60 to 69, 62.6%, is larger than those aged 70 and over. There is widespread low education levels among elderly in rural areas, 82.9% of elders had low education, at or below the primary school level. The majority of elderly, 76.3%, are married. The roles played by the spouses of rural elderly are critical, both in terms of providing care and offering emotional support. Elderly people's family sizes are shrinking, 61.7% of elderly people's families have 3 people or below, the function of family supporting for the elderly is weakening. The rural elderly people have low income, 80.3% elders' total annual income lower than 14,000 RMB (USD 2,300), with 53.85% of elders' income coming from others such as, children, grandchildren, relatives, friends, and social relief. The shrinking family unit and the rise in life expectancy lead to the

ability to care for the elderly has lessened and the burden on families has increased due to. This can in turn lead to conflict between family members, even resulting in the phenomenon of ageism.

In mainland China, there are 3 important health insurance include: New Rural Cooperative Medical Scheme (NCMS), Urban Resident Basic Medical Insurance (URBMI) and Urban Employee Basic Medical Insurance (UEBMI). 99.5% of rural elders have health insurance, NCMS is the major health insurance in rural areas, in our samples, 71.9% of elderly have NCMS insurance, the payment of NCMS is lower than URBMI and UEBMI. URBMI and UEBMI are mainly used in urban areas. On the one hand, there are some people who worked in urban areas when they were young, and went back to rural areas when they were old, but they still are covered by UEBMI. On the other hand, in order to increase the payment level, some provinces (such as Chongqing Municipality) merged NCMS and URBMI. So, 21.1% of elderly have URBMI insurance, 6.5% of elderly have UEBMI insurance. In order to provide a safety net for the low-income people and poorest of the poor, Medical Assistance (MA) was established by the State Council in 2003, which contributes towards a share of the remainder of a medical bill that is not reimbursed by the NCMS and URBMI. There are 5.3% of elderly covered by medical assistance.

The elderly people have large health service demand and long-term care needs. From the self-reported health status we can see, 37.3% of elders rated their health status as

fair, and 9.1% of elders rated poor. What's more, 10.3% of elders cannot care for themselves, they need to be taken care of by others. 45.6% of elders suffered chronic, 30.5% of them suffered hypertension.

NCMS-New Rural Cooperative Medical Scheme which is organized, guided and supported by Chinese government, voluntarily participated by rural residents. The scheme is managed by the Ministry of Health at the central level and is pooled and managed at the local level by the Bureau of Health. NCMS focuses on pooling the cost of major diseases, reducing rural residents' economic burden caused by diseases, and minimizing the chances that people will fall into poverty or return to poverty because of illness. Financing combined individual, collective and government subsidies; the Government has increased the input. Premiums are determined by per capita standard, government subsidies accounted for two-thirds at the beginning and now have increased to four-fifths. Pooling at the county level, in 2012, the NCMS total fund increased to Y300(USD 48) per capita with the ratio for central government, local government and individual contributions set at Y120: Y120: Y60. From 2006 to 2012, government subsidies increase from Y40 to Y240.[30]

URBMI- Urban Resident Basic Medical Insurance covers urban residents who are not covered by the Urban Employee Basic Medical Insurance, the main target groups are students, children, elderly people without previous employment, and the unemployed,

[30] Langenbrunner C John, 2013, The Long March to Universal Coverage: Lessons from China

it is a voluntary health insurance program. This program is in order to gradually establish an inpatient and catastrophic outpatient expenses medical insurance system for the poverty-stricken urban resident, it has the same policy framework with UEBMI, managed by Ministry of Human Resource and Social Security, but has no Medical Saving Account and consists of only social pooling. [31] In order to increase the insurance level, some provinces (such as Chongqing Municipality) merged NCMS and URBMI, so the UEBMI is not only used in urban, but also used in rural areas.

UEBMI-Urban Employee Basic Medical Insurance covers urban staff and workers, employers contribute about 6% of local workers' average salary and employees contribute about 2% of their salary to the scheme. UEBMI scheme has two parts, one is integrated social pooling fund, another one is individual Medical Saving Accounts (MSAs), about 30% of employer contributions go to Medical Saving Accounts which is controlled by individuals, the rest of employer contributions go to the social pooling fund which is used for inpatient care. The highest payment is limited to about 4 times local worker's average salary.[30] There are some people who worked in urban areas when they were young, and went back to rural areas when they were old, but they still are covered by UEBMI.

Medical Assistance (MA) was established by the State Council in 2003 to provide a safety net for the low-income people and poorest of the poor. MA contributes towards a share of the remainder of a medical bill that is not reimbursed by the NCMS

[31]Comments On the Establishment of Urban Medical Assistance System Pilot Work
关于全面开展城镇居民基本医疗保险工作的通知 http://www.gov.cn/zwgk/2009-08/05/content_1383950.htm

and URBMI, managed by the Ministry of Civil Affairs and pooled at the county level by the Bureau of Civil Affairs. There are no uniform standards for MA recipients, different regions have different standards, applicants should apply to their Community residents committee, committee street office and country level of bureau of civil affairs to be reviewed and confirmed. [32]

4. Research methodology and models

4.1 Research methodology

This study uses logistic regression analyses to find the factors significantly relative with health services utilization. The odds ratio (OR) was reported within 95% confidence interval (CI), all tests were implemented at 5% level of significance.

4.2 Research models

Logistic regression analysis is used in order to find the factors significantly associated to health services utilization. The research model is listed below:

$$\mathbf{Y_i = \alpha + \beta X_i + u_i}$$

The dependent variables include use of inpatient services, use of outpatient services, and medical institutions chosen for the inpatient and outpatient. The dependent variables Y_i include:

Y_1=Outpatient within a period of two weeks

[32]Notice on comprehensive basic medical insurance for urban residents 关于建立城市医疗救助制度试点工作的意见, 2005http://www.gov.cn/gongbao/content/2005/content_63211.htm

Y_2=Inpatient during last one year (hospitalization)

Y_3=Chose medical institution below the county level to get outpatient services(include village clinic/village health station, community health service centre, township hospital)

Y_4= Chose medical institution below the county level to get outpatient services(include village clinic/village health station, community health service centre, township hospital)

The independent variables X_i include: Region, Gender, Age, Marital status, Education, health insurance, medical assistance, income, household size, self-reported health status, prevalence of chronic diseases within six months before the survey, need take care and distance between home to the nearest health care services institution.

5. Research Results

The 95% confidence interval (CI) was used to estimate the precision of the odds ratios (OR). In this thesis, odds ratios are the value which used to compare the relative odds of the health service utilization.

5.1 L**ogistic regression analysis of using outpatient and inpatient services by rural elderly people**

Table 3:

Variable	**Outpatient**		**Inpatient**	
	OR	SE	OR	SE

Variable	Outpatient			Inpatient		
	OR	SE		OR	SE	
Region (Ref: Western)						
Eastern	0.755	0.044	**	0.649	0.041	**
Central	0.979	0.049		0.922	0.048	
Distance less than 15 minutes (Ref: >15 mins)	1.013	0.050		1.070	0.056	
Household size (Ref: 6 people)						
3 people or below	1.047	0.071		0.914	0.064	
4～5 people	0.987	0.072		0.887	0.066	
Male (Ref: Female)	1.027	0.042		1.070	0.046	
Age (Ref: 80+)						
60～69	1.436	0.115	**	1.033	0.082	
70～79	1.312	0.105	**	1.097	0.087	
Income (RMB, Ref: 14001-65000)						
0-5000	0.923	0.059		0.832	0.055	**
5001-6666	1.077	0.070		0.891	0.062	
6667-10000	1.081	0.071		0.971	0.066	
10001-14000	1.105	0.071		1.112	0.073	
Marital status (Ref: Divorced)						
Married	1.855	0.852		0.725	0.230	
Widowed	1.939	0.893		0.582	0.187	
Education (Ref: High school or more)						
No or Primary school	1.049	0.128		1.134	0.135	
Middle school	0.961	0.125		1.203	0.151	
Medical Assistance (Ref: non MA)	1.135	0.093		1.441	0.116	**
Health insurance (Ref: non insurance)						
UEBMI	0.912	0.321		2.998	1.257	**
URBMI	1.885	0.641		2.425	1.007	*
NCMS	1.525	0.514		2.017	0.832	
Chronic diseases (Ref: non chronic)						
Hypertension	2.394	0.098	**	1.598	0.069	**
Diabetes	1.697	0.141	**	1.983	0.160	**
Other Chronic	2.603	0.109	**	2.800	0.121	**
Need take care (Ref: self-care)	1.251	0.080	**	1.603	0.099	**
Self-reported health status (Ref:good)						
Poor	1.661	0.115	**	2.158	0.150	**
Fair	1.449	0.063	**	1.626	0.075	**

*P<0.05 ** P<0.01

From table 3, we can see the elderly people who reported their health status was poor or fair, need others to take care of them, and those who suffered chronic diseases were more likely to use outpatient and inpatient services. The eastern elderly people with higher level of health status use outpatient and inpatient services less than elderly living in the central and western part of China.

Due to significant improvement of health services accessibility and elders' health consciousness, different gender groups, different marital status, different income groups, different education groups, and different family size groups all had no statistical difference in getting health services.

Those who were covered by MA were low-income people and poorest of the poor, had worse health status, and were more likely to use health services than others.

Those who were covered by UEBMI and URBMI get payment more than elderly people covered by NCMS, and used inpatient services more.

5.2 logistic regression of outpatient and inpatient in below the county level medical institutions by rural elderly people

Table 4:

Variable	**Outpatient in below the county level medical institutions**		**Inpatient in below the county level medical institutions**	
	OR	SE.	OR	SE.
Region (Ref: Western)				

Variable	Outpatient in below the county level medical institutions			Inpatient in below the county level medical institutions		
	OR	SE.		OR	SE.	
Eastern	0.991	0.146		1.730	0.291	**
Central	1.376	0.174	*	2.165	0.290	**
Distance less than 15 minutes(Ref: >15 mins)	1.030	0.126		0.779	0.099	
Household size (Ref: 6 people)						
3 people or below	1.155	0.190		1.359	0.203	*
4～5 people	1.144	0.204		1.438	0.234	*
Male (Ref: Female)	0.969	0.099		0.881	0.090	
Age (Ref: 80+)						
60～69	0.594	0.128	*	0.672	0.131	*
70～79	0.733	0.159		0.767	0.149	
Income (RMB, Ref: 14001-65000)						
0-5000	1.681	0.251	**	1.729	0.267	**
5001-6666	1.740	0.266	**	1.297	0.197	
6667-10000	1.301	0.196		1.604	0.245	**
10001-14000	1.073	0.153		1.141	0.155	
Marital status (Ref: Divorced)						
Married	0.807	0.836		0.359	0.390	
Widowed	1.084	1.130		0.341	0.372	
Education (Ref: High school or more)						
No or Primary school	1.242	0.329		1.165	0.291	
Middle school	1.166	0.326		0.926	0.242	
Medical assistance	0.754	0.137		0.983	0.173	
Health insurance (Ref: non insurance)						
UEBMI	0.717	0.426		8.384	5.347	**
URBMI	3.082	1.785		15.499	9.790	**
NCMS	2.132	1.219		11.730	7.379	**
Chronic diseases (Ref: non chronic)						
Hypertension	1.940	0.197	**	1.173	0.116	
Diabetes	0.583	0.085	**	0.874	0.142	
Other Chronic	0.563	0.057	**	0.975	0.095	
Need take care (Ref: self-care)	0.544	0.069	**	0.910	0.116	

Variable	Outpatient in below the county level medical institutions			Inpatient in below the county level medical institutions	
	OR	SE.		OR	SE.
Self-reported health status (Ref: Good)					
Poor	0.672	0.101	**	0.764	0.106
Fair	0.805	0.090		1.171	0.130

*P<0.05 ** P<0.01

From table 3, we can see, the medical institutions below the county level including: village clinics, village health stations, community health service centers and township hospitals, which are close to rural elderly people's homes, the technical level of medical staff and medical condition poorer than medical institutions over the county level.

The technical level of medical staff and medical condition of the central and eastern regions are better than the western region, elderly people are more likely to use inpatient services in medical institutions below the county level.

Those elderly people aged under 70 have better health status than elderly people aged over 80, and are more likely to use county hospital or provincial hospital to get inpatient and outpatient services.

Low income elderly people are more likely to go to medical institutions below the county level, in order to save money.

The elderly people who suffered chronic disease are more likely to go to medical

institutions below the county level to get outpatient services, but if the chronic disease get worse and need inpatient services, elderly people are more likely to go to county hospital or provincial hospital.

Those who need taking care of and have poor health status are more likely to go to county hospital or provincial hospital to get outpatient services

Those elderly with low incomes, of advanced age, with low reimbursement of health insurance, from small families, and in need of assistance, are more likely to use health care institutions below the county level. Comparatively, those elderly with high incomes, of younger age, from larger families, and able to take care of themselves are more likely to use health care institutions at or above the county level.

6. Discussion & Conclusions

This study shows that major factors associated with health service utilization by rural elderly people include: region, age, income, health insurance, receipt of medical assistance, chronic diseases, need for care, and self-reported health status.

Following the one-child policy, family sizes shrunk, and China's traditional system of relying on the family unit for taking care of the elderly no longer suited the demographics. Given this reality, we require a new system of elderly care, such as home-based care for the aged.

For the health service providers, they should focus more on low income elderly, as well as those in poor health, and of advanced age. As the majority suffered from

chronic diseases, those health service providers below the county level should focus on their prevention and treatment. The government should also give greater benefit to those elderly requiring the help of MAs.

Given that the current health insurance system provides only limited reimbursement to the elderly, we require a unified system that offers greater payment and lessens their financial burden. Furthermore, under the current system those elderly with higher incomes and better health situations are more likely to use the high quality health services at the county or provincial level, thus drawing more funds from the collective health insurance pool. This means that those elderly with the poorest health and lowest income and getting the least benefit. Consequently, we should pay more attention to creating a balanced system that protects the most vulnerable elderly.

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