FACTORS AFFECTING HEALTH SEEKING BEHAVIOR OF PEOPLE IN EJIN HORO COUNTY, CHINA

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A Thesis Submitted in Partial Fulfillment of the Requirements

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ปัจจัยที่มีผลต่อพฤติกรรมการแสวงหาบริการสุขภาพของประชาชนในเขตอิจินฮัวะลัวะ สาธารณรัฐประชาชนจีน

นางสาวหยวน หยวน

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต
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หยวน หยวน : ปัจจัยที่มีผลต่อพฤติกรรมการแสวงหาบริการสุขภาพของประชาชนในเขตอิจินฮัวะลัวะ สาธารณรัฐประชาชนจีน (FACTORS AFFECTING HEALTH SEEKING BEHAVIOR OF PEOPLE IN EJIN HORO COUNTY, CHINA) อ.ที่ปรึกษาวิทยานิพนธ์หลัก: ผศ. ดร.กรรณิการ์ ดำรงค์พลาสิทธิ์, 148 หน้า.

การศึกษาครั้งนี้มีจุดมุ่งหมายเพื่อสำรวจพฤติกรรมสุขภาพของประชากรในมณฑลอิจินฮัวะลัวะ ประเทศจีน โดยเฉพาะการประเมินปัจจัยทางด้านเศรษฐกิจและสังคมและความรู้ความเข้าใจด้านสุขภาพที่มีผลต่อการตัดสินใจใช้บริการดูแลสุขภาพและการเลือกใช้บริการจากสถานบริการสามระดับของประชากรในมณฑลอิจินฮัวะลัวะ ประเทศจีนในช่วงปี พ.ศ. 2559 ผู้ทำวิจัยให้ความสนใจในการทำวิจัยครั้งนี้ในด้านของอุปสงค์ เนื่องจากมณฑลอิจินฮัวะลัวะ เป็นมณฑลที่มีอำนาจมากที่สุดในมองโกเลีย และการให้บริการด้านสุขภาพในเขตนี้ค่อนข้างครอบคลุมทั่วถึง ส่วนสำคัญของการศึกษาเกี่ยวกับพฤติกรรมการแสวงหาสุขภาพจะช่วยลดความคาดหวังของประเทศในการลดความแออัดในการเข้ารับบริการด้านการดูแลสุขภาพในระดับทุติยภูมิและระดับตติยภูมิ

การศึกษานี้ใช้การสำรวจแบบภาคตัดขวางที่เรียกว่า "Community Ejin Horo County 2016" วิธีการทางเศรษฐมิติที่ใช้ในการศึกษาครั้งนี้ประกอบด้วยการใช้แบบจำลองทางเศรษฐกิจแบบ binary logit และ ordered logit รวมทั้งวิธีทางสถิติเชิงพรรณาในขั้นแรกของการวิเคราะห์ จากนั้นจะมีการคำนวณค่า marginal effect ที่สอดคล้องกับแต่ละปัจจัยเพื่อให้รู้ผลกระทบของปัจจัยทางสังคมและเศรษฐกิจและปัจจัยด้านประชากรศาสตร์และความรู้ความเข้าใจด้านสุขภาพต่อความน่าจะเป็นในการเข้ารับบริการทางสาธารณสุขแบบผู้ป่วยนอกและความน่าจะเป็นในการเลือกเข้ารับบริการในสถานบริการสุขภาพแต่ละแห่ง

ผลการวิจัยพบว่าการเป็นชาติพันธุ์ฮันและการมีความรู้ความเข้าใจในด้านสุขภาพที่ดีเพียงพอจะช่วยลดการใช้บริการแบบผู้ป่วยนอก ในขณะที่คนที่มีอาการป่วยเฉียบพลัน และผู้ที่มีระดับการศึกษาอยู่ในระดับประถม มีแนวโน้มที่จะใช้บริการแบบผู้ป่วยนอกมากกว่าในช่วงสองสัปดาห์ก่อนการสัมภาษณ์ และในผู้ที่เข้ารับการรักษาแบบผู้ป่วยนอกพบว่ามีคนที่มีการศึกษาในระดับวิทยาลัยหรือสูงกว่า คนในวัยเกษียณ คนที่มีรายได้สูงสุดของควอไทล์ คนที่มีความรู้เรื่องสุขภาพ คนที่มีอาการเจ็บป่วยฉุกเฉิน มักจะเข้ารับบริการจากสถานบริการในระดับตติยภูมิและระดับทุติยภูมิมากกว่าเมื่อเปรียบเทียบกับกลุ่มเปรียบเทียบอื่นๆที่เกี่ยว ในขณะที่คนที่มีความเชื่อหรือมีความรู้ความเข้าใจด้านสุขภาพระดับมักจะเข้ารับบริการจากสถานบริการการดูแลสุขภาพปฐมภูมิเมื่อพวกเขาเจ็บป่วยในช่วงสองสัปดาห์ที่ผ่านมา

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ปีการศึกษา 2560

6085611129 : MAJOR HEALTH ECONOMICS AND HEALTH CARE MANAGEMENT
KEYWORDS: HEALTH SEEKING BEHAVIOR / HEALTH LITERACY / ORDERED LOGISTIC REGRESSION / BINARY LOGISTIC REGRESSION

YUAN YUAN: FACTORS AFFECTING HEALTH SEEKING BEHAVIOR OF PEOPLE IN EJIN HORO COUNTY, CHINA. ADVISOR: ASST. PROF. KANNIKA DAMRONGPLASIT, Ph.D., 148 pp.

This study aims to explore health seeking behavior in Ejin Horo county, China, specifically it tries to assess how socioeconomic-demographic factors and health literacy affect the decision to use formal outpatient care and conditioning on use the choice among the three-tiered health care facilities visited by people in Ejin Horo county, China during the period of 2016. Our attention is placed on the demand side because Ejin Horo county is the most powerful county in Inner Mongolia and the supply of health services in this county is quite comprehensive. In essence, the study on health seeking behavior will be able to shed some light on the prospect of the country in reducing the overcrowding in secondary and tertiary health care facilities.

A cross-sectional data called “Community Survey of Ejin Horo County 2016” is used for the study. The econometric methods employed for this study consist of binary logit and ordered logit regressions as well as descriptive statistical approach at the initial stage of the analysis. Thereafter, marginal effect corresponding to each factor is calculated to give the magnitude of the impact of each socioeconomic and demographic factors and health literacy on the probability of seeking formal outpatient care and the probability of choosing each health care facilities.

The results indicate that being Han ethnic and having adequate health literacy will reduce the use of formal outpatient care. While the people with emergency disease and people with primary education level have the tendency to use more of formal outpatient care when sick during the two weeks prior to the interview. And among those who seek formal outpatient service, people with college education or above, retired, being in the highest income quartile, having knowledge-based health literacy, or having emergency diseases are more inclined to visit tertiary and secondary health care facilities comparing to their relevant counterparts. While people with belief or behavioral components of health literacy are more likely to visit primary health care facilities when they were sick during the last two weeks.

Field of Study:	Health Economics and Health Care Management	Student's Signature	.....
		Advisor's Signature	.....
Academic Year:	2017		

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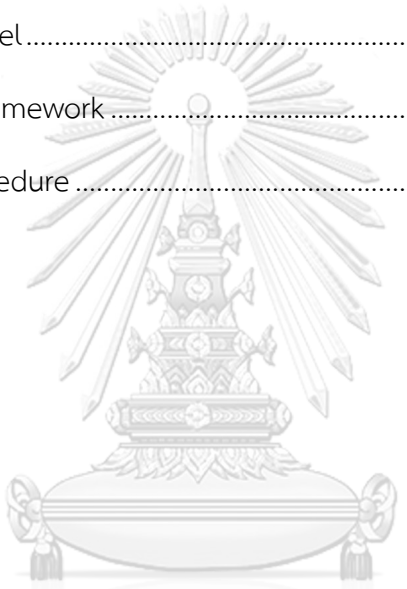

CHAPTER I

BACKGROUND

1.1. Motivation and Significant

Health care is related to people's health and it is a major issue for the people's livelihood. In April 2009, the Chinese central government launched new health guidance, namely the "Opinions of the CPC Central Committee and the State Council on Deepening the Reform of the Medical and Health Care System" (the State Council of the People's Republic of China, 2009). These opinions argued that the short-term goal of health care services is effectively reducing the burden of medical expenses on residents and easing the difficulties of seeing a doctor and expensive medical care. The long-term goal of health care services is to establish and improve the basic medical and health system to cover both urban and rural residents to provide safe, effective, convenient, and affordable medical care for the people. In 2012, the State Council promulgated the "Twelfth Five-Year Plan" of the National Primary Health Service System in accordance with the requirements of "treating major illnesses in county hospitals" and "treating minor ailments in primary facilities". The plan aims to strengthen the construction of a three-tier rural health service network based on county hospitals, township hospitals and village clinics. At the same time, our government has set a goal to build a relatively complete medical service system by 2020.

The Constitution of the People's Republic of China stipulates that the administrative areas in Inner Mongolia are divided into four levels, as shows in figure 1. Firstly, as an autonomous region, Inner Mongolia is directly under the central government which is regarded as the first level. Secondly, Inner Mongolia is divided into autonomous prefectures and cities. Thirdly, the autonomous prefectures and cities are divided into counties. These are the third level. Fourthly, counties are divided into townships and

villages which are seen as the fourth level. The first and second levels are considered urban areas and the third and fourth levels are rural areas. Ejin Horo is the county of the city of Ordos in Inner Mongolia, an autonomous region. It belongs to the third level, so it is a rural area.

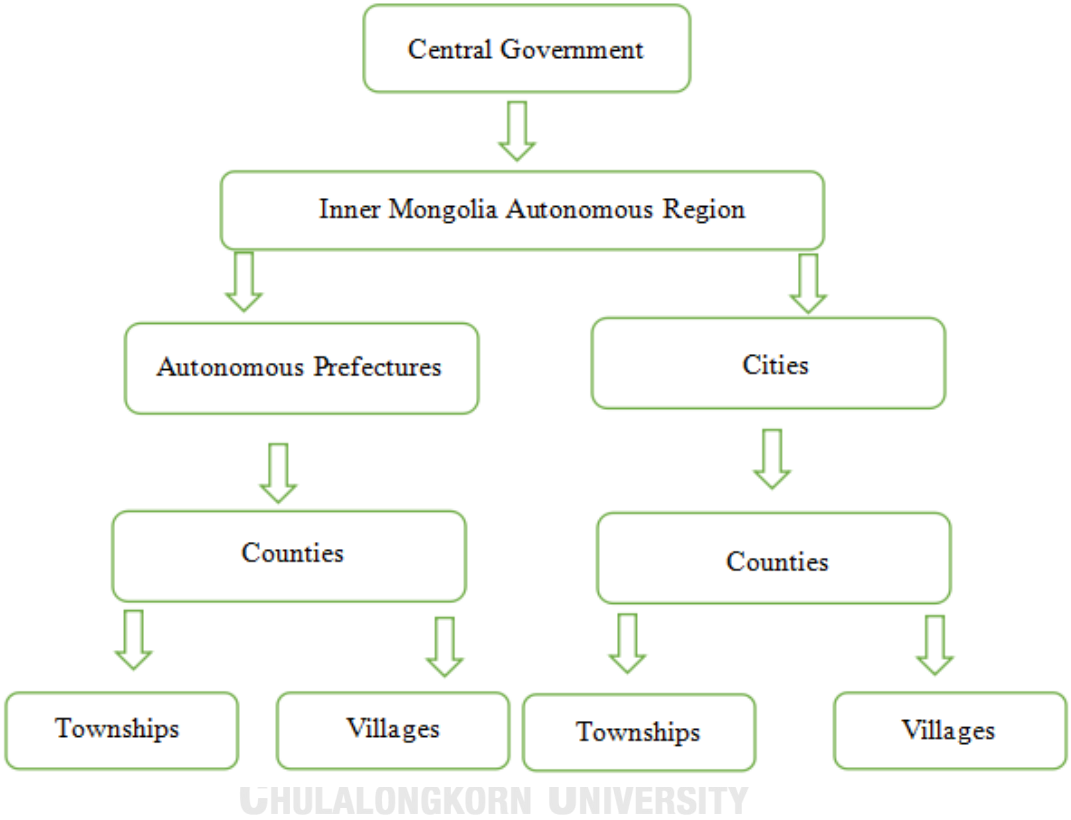

Figure 1: The administrative areas in Inner Mongolia

Since 1993, China has conducted a survey of health services every five years and has conducted five surveys so far. Figure 2 shows the two-week morbidity rate and two-week outpatient visit rate of rural residents among the overall population of China in these five surveys. The two-week morbidity rate of residents in rural areas in China was 12.8%, 13.7%, 14.6%, 17.7% and 20.2%, respectively, from 1993 to 2013. The trend was an average annual growth rate of 1.85%. During the five surveys, the two-week outpatient visit rate among the ill in rural areas in China was 15.9%, 16.5%, 13.9%,

15.2% and 21.4%, respectively. Although the two-week outpatient visit rate fluctuates, the average is still growing. The trend was an average annual growth rate of 1.375%. The two-week morbidity rate and two-week outpatient visit rate increased to varying degrees over the past 20 years.

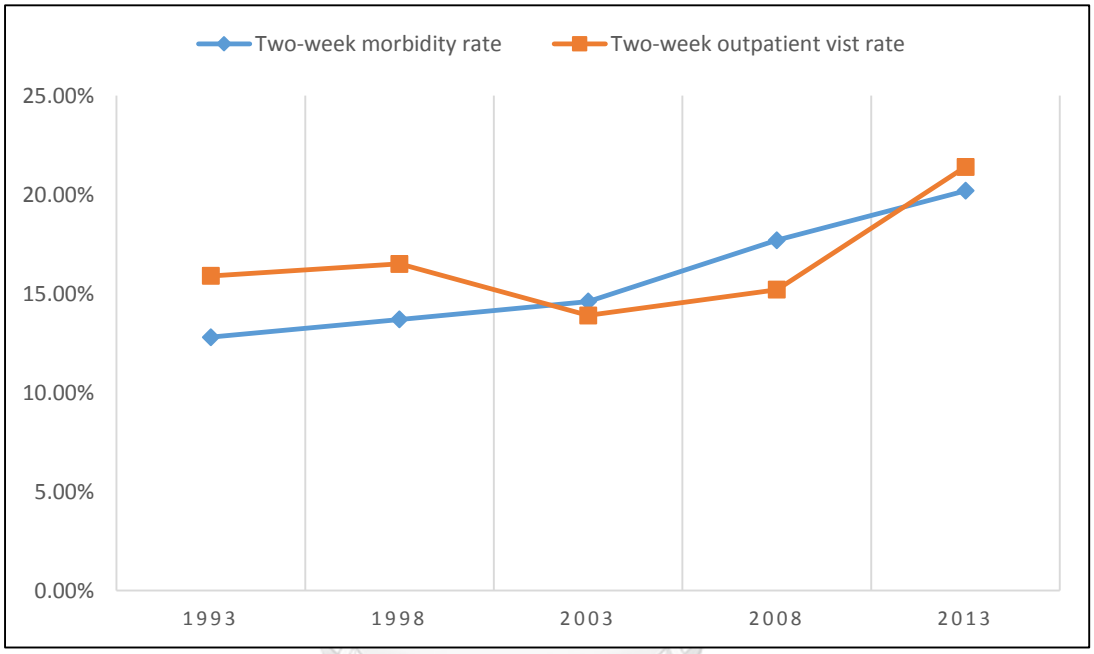

Figure 2: Two-week morbidity rate and two-week outpatient visit rate of rural residents

At the same time, there has also been a change in the choice of health facilities for rural outpatients during these 20 years. Figure 3 shows that the proportion of rural outpatients who chose to go to the village clinic or other health facilities at the same level as village clinics for the first time within two weeks prior to the survey has fallen from 61.9% in 1993 to 56.4% in 2013. The proportion of outpatients who chose to visit the village health center or other health facilities at the same level as the village health center has not changed substantially, which was 23.2% in 1993 and 23.7% in 2013. The proportion of outpatients who chose to visit the county hospital and other

health facilities at a similar tier has increased from 4.0% in 1993 to 19.9% in 2013. Thus, the highest increase in use has been observed at the highest level of care. This phenomenon has also led to overcrowding at the highest level of care, which is becoming the most important issue in the current health system in China.

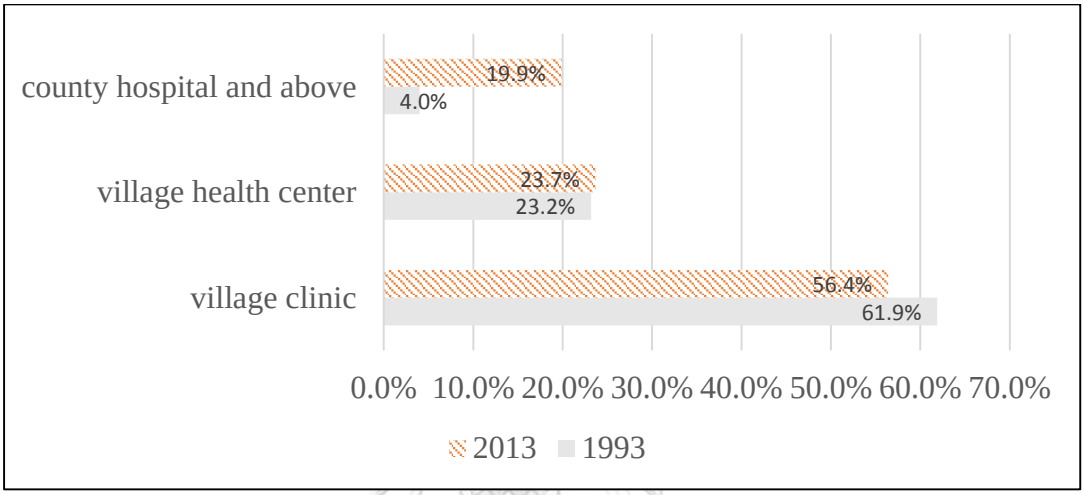

Figure 3: Choice of health facilities

The health seeking behavior of residents is affected by many factors. On the one hand, from the macro perspective, with the development of the social economy and the culture along with the improvement of residents' living standard, the residents' ability to pay and the purchase awareness of medical services have all changed. In addition, the disease pattern has also undergone great changes, from traditional infectious diseases to chronic non-communicable diseases, health services need to change to adapt to modern day challenges. The popularity of the modern medical model (biopsychosocial model) changes people's view of health, which in turn affects the choice and behavior pattern of medical treatment. That is, human health and disease are not only seen as a result of certain biological variables, but also as a result of the coordination and destruction of the relationship between physical, mental, and social well-being. On the other hand, the quantity and quality of medical facilities are

constantly improving. The diagnosis and treatment technology is developing rapidly, and medical expenses are increasing year by year. This also implies that the medical burden of residents increases over time. Under the influence of these factors, people's health seeking behavior has also changed.

Ejin Horo county located in the southeast of the Ordos Plateau, has a total population of 252,712 people. It is a very powerful county in Inner Mongolia. Every time the national health and family planning commission (NHFPC) promulgates a new policy, it is always used as a pilot as the first location to implement the policy. The health facilities in Ejin Horo county are quite comprehensive, meaning that the primary health facilities in this county appear to meet the standards of the HFPC in Inner Mongolia. In addition, Ejin Horo county is conveniently located near the capital city in Inner Mongolia named Hohhot. As a result, the supply of health services in this county is quite well provided. This study aims to investigate the demand side of medical service, specifically by uncovering the factors that affect the health seeking behavior of people there.

1.2. Research Question

1. What are the factors that affect health seeking behavior of people who lives in Ejin Horo county?

2. What are the magnitudes of each factor on the health seeking behavior of people in Ejin Horo county?

1.3. Research Objectives

1.3.1. General objective

To assess how socioeconomic-demographic factors and health literacy affect the decision to use health care and conditioning on use the choice among the three-tiered health care facilities visited by people in Ejin Horo county, China during the period of 2016.

1.3.2. Specific objectives

1. To assess the impact of socioeconomic-demographic factors on the use of health care.

2. To assess the effect of socioeconomic-demographic factors on the choice of three-tiered health care facilities among those who use medical care.

3. To assess how health literacy affects the decision to use health care.

4. To assess how health literacy affects the choice of the three-tiered health care facilities among the user.

1.4. Scope of the Study

This study uses secondary data, namely the “community survey of Ejin Horo county 2016”, which was designed, distributed and recollected by the Faculty of Health Care Management of Inner Mongolia Medical University. This data was based on the survey of Chinese community residents, the five-level version of the EuroQol five-dimensional descriptive system (EQ-5D-5L) and guidelines for Chinese citizens' health literacy. And the questionnaire used in this study is provided in Appendix A.

This study mainly focuses on the health seeking behavior of people who live in Ejin Horo county. The data includes 396 households with a total of 910 individuals. Then,

after cleaning up the data and making observations with complete information, the sample size was adjusted to include 319 households with a total 447 individuals. This study included the use of health care services and the choice of three-tiered health facilities and the factors that affect them including socioeconomic-demographic factors and health literacy.

1.5. Possible Benefits

This is a study of the health seeking behavior in Ejin Horo county, Inner Mongolia, China. This study will provide an overview of people's health seeking behavior, both in terms of decision to seek medical care when getting sick as well as the type of care sought. The study will uncover how socioeconomic-demographic factors influence the use of health care and the choice of health care facilities. In addition, it will demonstrate how health literacy affects the use of health care and the choice of health care facilities.

Thus, policy makers may use the result to adjust and restructure different levels of health care facilities to meet the needs of specific types of people in Ejin Horo county. Although the NHFPC already issued the National Health Literacy Promotion Plan (2014-2020) in 2014, there is no existing program in the Inner Mongolia autonomous region so far. Policy makers may use these results to form policy that will improve the health literacy of people if it is indeed found that health literacy has a positive and significant impact on the use of health care.

CHAPTER II

INTRODUCTION

2.1. Inner Mongolia

The Inner Mongolia autonomous region is located in the northern border of China, with a distance of 2,400 kilometers and a north-south span of 1,700 kilometers. It straddles China's northeast, north and northwest regions. The total land area is 1.183 million square kilometers accounting for 12.3% of the total area of the country (9.65 million square kilometers), ranking third among all provinces, cities and autonomous regions. A total of eight provinces border the east, south, and west, and borders Mongolia and Russia in the north. Most of the autonomous region has an altitude of more than 1,000 meters above sea level, so we also call it the Inner Mongolian Plateau. The Inner Mongolian Plateau is the second largest plateau in China's four plateaus.

In terms of demography, Table 1 shows that the total population of the autonomous region at the end of 2016 was 25.286 million, an increase of 85,000 over the previous year. Among them, the urban population was 15.682 million and the rural population was 9.604 million. The number of new births in the year was 239,000, with a birth rate of 9.47 per thousand. The death toll was 145,000, with a death rate of 5.74 per thousand. The natural population growth rate was 3.73 per thousand. In comparison to overall China, the total population of mainland China was 1,382.27 million, an increase of 8.090 million over the previous year, of which 792.98 million people live in urban areas, accounting for 57.35% of the total population, up 1.25% from the end of last year. In 2016, the number of newborns was 17.86 million, with a birth rate of 12.95 per thousand. The death toll was 9.77 million, with a mortality rate of 7.09 per thousand. The natural population growth rate was 5.86 per thousand.

Thus, compared to overall China, the birth rate, mortality rate and natural population growth rate are all below the national level in Inner Mongolia.

Table 1: Demographics in Inner Mongolia and China in 2016

	Inner Mongolia	China
Population (million)	25.286	1382.27
Urban population (million)	15.682	792.98
Rural population (million)	9.604	589.29
Birth rate per thousand	9.47	12.95
Mortality rate per thousand	5.74	7.09
Natural population growth rate	3.73	5.86

Source: National Bureau of Statistics of the People's Republic of China (NBS).

Table 2 shows the economic indicators of Inner Mongolia and overall China. On the economic front, after preliminary accounting, the Gross Regional Product (GRP) of the autonomous region in 2016 was 1,610.3 billion yuan (or USD 463.5 billion), which was 4.0% higher than the previous year at comparable prices. The per capita GRP reached 63,786 yuan (or USD 18,361.0), an increase of 3.6 % over the previous year. The per capita disposable income of all residents in the whole year was 26,212 yuan (or USD 7,545.2), of which the per capita disposable income of urban residents was 35,670.0 yuan (or USD 10,267.7), and the per capita disposable income of rural and pastoral areas was 12,584.0 yuan (or USD3622.3). The per capita living expenditure of all residents was 18,946.0 yuan (or USD 5,453.7), of which the average living expenses of urban residents were 23,638.0 yuan (or USD 6804.3), and the average living expenses of residents in rural pastoral areas was 12,184.0 yuan (or USD 3,679.9). The Engel coefficient (income elasticity of demand of food) of urban residents was 27.4 %, while that of rural and pastoral areas was 27.8 %. At the end of 2016, the registered urban

unemployment rate was 3.6 %, and the number of unemployed people in the whole year was 57,000.0.

At the national level, China's Gross Domestic Product (GDP) in 2016 was 74,412.7 billion yuan (or USD 21,419.9 billion), an increase of 6.7% over the previous year. The per capita GDP for the whole year was 53,980.0 yuan (or USD 15,538.3), an increase of 6.1% over the previous year. The total national income in 2016 was 742.5 billion yuan (or USD 243.7 billion). The per capita disposable income of residents in the country was 23,821.0 yuan (or USD 6,856.9), with a median of 20,883.0 yuan (or USD 6,011.2). In relation to the usual place of residence, the per capita disposable income of urban residents was 33,616.0 yuan (or USD 9,676.5), with a median of 31,554.0 yuan (or USD 9,082.9). The per capita disposable income of rural residents was 12,363.0 yuan (or USD 3,558.7), with a median of 11,149.0 yuan (or USD 3,209.3). The per capita living expenditure of China's residents was 17,111.0 yuan (or USD 4,925.4), including 23,079.0 yuan (or USD 6,643.4) for urban residents and 10,130.0 yuan (or USD 2916.0) for rural residents. The national Engel coefficient was 30.1%, of which 29.3% were in urban areas and 32.2% were in rural areas. At the end of the year, there were 776.0 million employees nationwide, of whom 414.3 million were urban workers. A total of 13.1 million new urban jobs were created. The registered urban unemployment rate was 4.0% at the end of the year.

When Inner Mongolia is compared with the national level, we found that the per capita GRP, disposable income and living expenditure are above the national level whether in general or in rural areas and urban areas. In addition, the unemployment rate is lower than the national level. However, the gap of per capita disposable income and living expenditure between rural and urban areas are larger in Inner Mongolia.

Table 2: Economic indicators of Inner Mongolia and China in 2016

		Inner Mongolia	China
GRP or GDP (billion yuan)		1,610.3	74,412.7
Per capita GRP or GDP (yuan)		63,786.0	53,980.0
Per capita disposable income(yuan)	Overall	26,212.0	23,821.0
	Urban	35,670.0	33,616.0
	Rural	12,584.0	12,363.0
Per capita living expenditure (yuan)	Overall	18,946.0	17,111.0
	Urban	23,638.0	23,079.0
	Rural	12,184.0	10,130.0
Unemployment rate		3.6%	4.0%

Source: National Bureau of Statistics of the People's Republic of China (NBS).

2.2. Ejin Horo County

Located in the southeast of the Ordos Plateau, Ejin Horo county has a total area of 5,600 km2 and administers seven towns with a total population of 252,712 people, including 16,463 ethnic minorities. It is a minority settlement where the Mongolian as the main body and the Han ethnicity are the majority. Ejin Horo county is located in the golden triangle of Hohhot, BaoTou and Ordos (shown in figure 4), and is an important energy and heavy chemical industry base in China. It has the world-famous Genghis khan cemetery, abundant coal resources (32.5 billion tons of proven reserves) and 89% vegetation coverage and 39.9% forest coverage. In 2011, the basic competitiveness of the county's economy ranked 29th among the top 100 counties in China and second in the western part of Inner Mongolia.

In 2016, it was said that the regional GDP would reach 64.5 billion yuan (or USD 18.6 billion [1]), an increase of 1.5%. The fiscal revenue was 19.43 billion yuan, an increase of 4.2%. The total fixed asset investment was 39.5 billion yuan, an increase of 15.8%. Total retail sales of social consumer goods were 4 billion yuan, an increase of 8.1%. The per capita disposable income of urban residents and per capita net income of farmers and herdsmen reached 37,000 yuan (or USD 10,650.1) and 12,850 yuan (or USD 3698.9), an increase of 7% and 12.2%.

In terms of some health statistics, the number of births in 2016 was 2258, of which 1084 were second children and beyond, accounting for 48% of the total births (41% in 2015). The birth rate of the entire county was 9 per 1,000 people. There were 1159 boys and 1099 girls born, the sex ratio of boys to girls was 1.05:1.

There were 242 health care facilities, including 9 hospitals and 151 health centers. There was no health center that specializes in prenatal and antenatal care. The total number of beds is 1,099. There were 1,514 health workers, including 558 medical practitioners, 173 licensed physicians, 56 registered nurses and 34 pharmacists.

[1] Please note that, throughout this profile, all figures in USD were converted from CNY at a rate of about CNY3.474 per USD, the purchasing power parity conversion rate for GDP in 2016 reported by OECD for China.

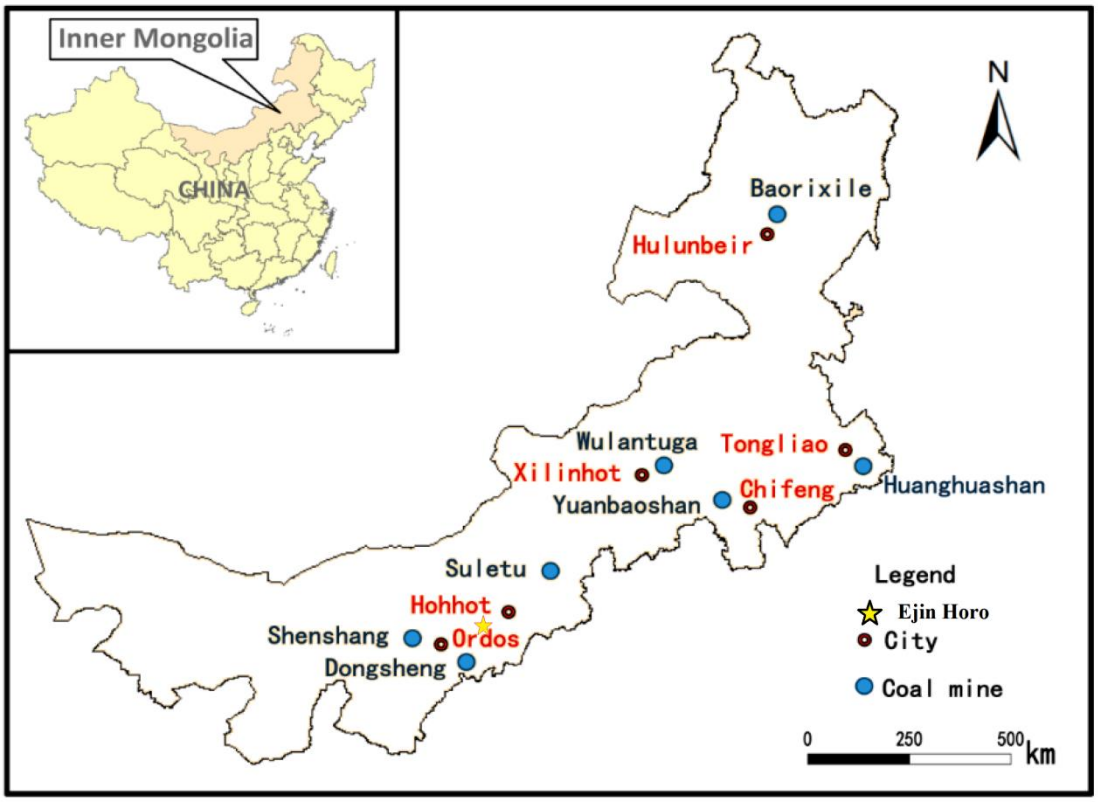

Figure 4: Map of Inner Mongolia, China

2.3. Health Statistics

2.3.1. Health care facilities

China's health care facilities are divided into three levels. The primary health care facilities include primary hospitals, community health service centers, township hospitals, village clinics and private clinics. Primary health care facilities in urban areas mainly refer to primary hospital and community health service centers while in rural areas mainly refer to township hospitals, village clinics and private clinics. Primary health care facilities provide public health services and basic medical services directly to the service coverage areas. The basic medical services include laboratory tests, common medical treatment, home medical treatment and referral. The basic public health services include prevention by vaccination, prevention of infectious diseases, management of chronic diseases and mental diseases, maternal and child health and

health care, health education and health management for the elderly, and six other major categories. The services provided by primary health care facilities are divided into primary, secondary, and tertiary levels of care according to their priorities. The first level of care consists of the services that should be prioritized and guaranteed first, the second level of care is the services that need to be guaranteed and carried out next, and the third level of care are the services that needs to be carried out in regions and facilities that have relatively mature conditions. The first level service means that it can basically meet the basic health needs of residents. The government has the corresponding ability to pay through public fundraising. At present, most primary health care facilities have been generally carried out and the differences between regions are small, and all residents can receive at least minimum standards and appropriate health services. The second level service refers to the appropriate technology that most primary health care facilities should and can carry out at the present stage but may be constrained by local socio-economic conditions and have regional differences. The tertiary level service means that under the conditions of ensuring the implementation of primary and secondary level projects, it needs to be carried out in areas with relatively mature conditions such as economic and social development and health services, and at the same time create and encourage conditions to ensure the quality of services it carries out. Primary health care facilities can be said to be the “gatekeepers” of residents' health and usually the nearest health care facilities to residents. Each health worker in primary health care facilities is responsible for the health education and basic medical services of residents in the service coverage area. Its main function is to provide primary prevention directly to the population, and to manage common-disease patients in the community or township. In addition, only primary hospitals and township hospitals provide inpatient services. Furthermore, it provides accurate referrals to patients with serious problems, assists high-level hospitals to do a good job of post-hospital services, and rationally assigns patients to

the most appropriate health care facilities. According to the definition of primary health care facilities by the World Health Organization (WHO), primary health care facilities usually provide community care and home-care programs for disabled people and people with chronic or terminal illness. Some primary health care facilities may also have a delivery room, a few short stay beds and basic laboratory equipment. And Inner Mongolia's primary health care facilities meet the definition of WHO. In term of primary hospital, based on the definition provided by WHO, it mainly provides internal medicine, obstetrics, gynecology, pediatrics, general surgery, or just general practice and limited laboratory services available for general but not specialized pathological analysis. It includes district hospital, community hospital, rural hospital and general hospital. But for Inner Mongolia, primary hospital mainly refers to community hospital. In addition, Inner Mongolia has implemented the requirements of the new medical system reform, gradually reducing the number of primary hospitals, and transforming primary hospitals into community health service centers or township health centers. As a result, the number of primary hospitals in Inner Mongolia is steadily decreasing, and the number of community health service centers and township hospitals is gradually increasing. Therefore, this study classifies primary hospitals as primary health care facilities at the same level as community health centers and township hospitals.

The secondary health facilities mainly refer to secondary hospitals with 101-500 beds. They are regional hospitals providing health services across several communities or townships and are the technical centers for regional medical prevention. The main function is to participate in guiding the monitoring of high-risk groups, to accept primary-level referrals, to conduct technical guidance to primary-level health facilities, and can carry out a certain degree of teaching and scientific research. The secondary hospital given by WHO is defined as the number of beds between 200 and 800 and

often referred to as a provincial hospital. But in Inner Mongolia, the secondary hospital is basically referred to as a city hospital.

Tertiary health care facilities mainly refer to hospitals with more than 500 beds, which includes hospitals that provide medical and health services across regions, provinces, and cities around the country. It is the center of medical and preventive technology with comprehensive medical, teaching and scientific research capabilities. The main function of tertiary health facilities is to provide specialized medical service, treat critical and difficult diseases, accept second-level referrals, and provide technical guidance to lower health care facilities, as well as training various medical professionals and undertaking scientific research projects above the provincial level. At the same time, tertiary health care facilities such as provincial hospitals must participate in and guide primary and secondary prevention. The tertiary hospital is defined by the WHO as a hospital with a number of beds between 300 and 1500, which can provide teaching activities. And tertiary hospitals include national hospital and central hospital. However, in Inner Mongolia the tertiary hospital is mainly refer to provincial hospitals and university hospitals.

As an example, we use the treatment of gynecological diseases to illustrate the services provided at each level of care. Basic and emergency gynecological diseases can be treated at any level of three-tiered health care facilities. Primary health services can provide the treatment of the most basic gynecological diseases and promote knowledge of gynecological diseases and vaccines to prevent gynecological diseases. However, surgery related to gynecological diseases can only be provided in secondary or tertiary hospitals. Endometrial cancer and related types of gynecological diseases can only be provided in tertiary hospitals.

This study only focuses on the outpatient service that provided in community health service centers, village clinics, private clinics, and the outpatient department of township, primary, secondary and tertiary hospitals.

Table 3 shows the health care facilities of Inner Mongolia and overall China. At the end of 2016, the total number of health care facilities in the Inner Mongolia Autonomous Region reached 21,965. Among them, there are 68 tertiary health care facilities, 272 secondary health care facilities, 22,584 primary health care facilities including 264 primary hospitals, 1,194 community health service centers, 1,321 township hospitals, 6,173 private clinics and 13,632 village clinics. In addition, there are 116 unclassified hospitals. For overall China, the total number of health care facilities is 908,838. Among them, there are 9,282 tertiary health care facilities, 7,944 secondary health care facilities and 881,930 primary health care facilities consists from 2,232 primary hospital 34,327 community health service centers, 37,241 township hospitals, 169,367 private clinics and 638,763 village clinics. There are 9,682 unclassified hospitals as well.

Table 3: Number of health care facilities in Inner Mongolia and China in 2016

		Inner Mongolia	China
Primary health facilities	Primary hospital	264	2,232
	Community health service center	1,194	34,327
	Township hospital	1,321	37,241
	Private clinic	6,173	169,367
	Village clinic	13,632	638,763
Secondary health facilities		272	7,944
Tertiary health facilities		68	9,282

Unclassified hospital	116	9,682

Source: Year Book of China, 2016

2.3.2. Health workers

As shown in table 4, the NHFPC has clearly defined the number of health workers required for each level of health care facilities in the basic standards of the established health care facilities.

In term of primary health care facilities, there are at least three physicians (at least one physician with a title above the attending physician) and five nurses, with at least 0.7 health workers per bed in township hospitals with 20 to 99 beds. For township hospitals with less than 19 beds, there are at least 5 health workers with 1 physician 3 nurses and 1 other health workers such as assisting nurse. Furthermore, the number of health technicians should not be less than 80% of the total number of employees in the township hospital with less than 19 beds, and the number of personnel engaged in the prevention and protection services not less than 20% of the total number of health technicians. For private clinics, there should be at least one registered nurse and one licensed physician who are qualified as medical practitioners and have been registered in medical and health care institutions for at least five years and be in good health. At least one village doctor is required for a village clinic.

For secondary health facilities with 100 to 499 beds, each bed is equipped with at least 0.88 health workers and 0.4 nurses, and there are at least 88 health technicians including 40 nurses, 25 physicians and 23 other positions such as manager, lab technicians and assisting nurses. For the physicians in secondary health care facilities, there should be at least three physicians with the title of associate chief physician or above, and each professional department should have at least one physician who has the title of attending doctor or above.

For tertiary health care facilities with more than 500 beds, each bed is equipped with at least 1.03 health technicians and 0.4 nurses; there are at least 515 health workers including 200 nurses,100 physicians and 215 other positions such as administrator and tab technicians in tertiary health care facilities. The director of each professional department should have the title of associate chief physician or higher. The number of clinical nutritionists shall be no less than two, and the proportion of engineering and technical personnel in the total number of health workers shall not be less than 1%.

Table 4: Standards for staffing of Health Workers in Third-tiered health care facilities

		No. of Health Workers	
		Physician	Nurses
Primary health care facilities	Township hospital (20-99 beds)	3	5
	Township hospital (less than 19 beds)	1	3
Secondary health care facilities		25	40
Tertiary health care facilities		100	200

Source: National Health and Family Planning Committee

Table 5 shows the number of health workers in Inner Mongolia and overall China. At the end of 2016, there were 170,466 health workers, 18,133 country doctors and health workers, 9,147 health technicians, 10,224 managers and 13,368 other technicians. Among health workers, there were 66,435 practicing (assistant) physicians and 66,461 registered nurses. In terms of the whole China, there were 8,454,403 health workers, 1,000,324 country doctors and health workers, 426,171 health technicians, 483,198 managers and 808,849 other technicians. Among health workers, there were 3,191,005

practicing or assistant physicians and 3,507,166 registered nurses.

The ratio of doctors to nurses was nearly 1: 1 in Inner Mongolia, and 1.1: 1 in overall China; the ratio in Inner Mongolia is lower than overall China. However, neither has reached the NHFPC's standard of 1:2.

Table 5: Number of health workers in Inner Mongolia and China in 2016

		Inner Mongolia	China
Health workers	Overall	170,466	8,454,403
	Practicing/ Assistant	66,435	3,191,005
	Registered nurses	66,461	3,507,166
Country doctors and workers		18,133	1,000,324
Health technicians		9,147	426,171
Managers		10,224	483,198
Other technicians		13,368	808,849

Source: Year Book of China, 2016

2.3.3. Health care utilization

In 2016, the total number of visits to health care facilities in Inner Mongolia reached 104.0 million, including both outpatient and inpatient services, and per capita visits to health care facilities reached 4.1 times. Among the total visits in 2016, there were 47.6 million visits using secondary and tertiary health care facilities (46.05% of total visits), 51.6 million visits (49.97% of total visits) were used by primary health care facilities. Furthermore, there were 4.03 million visits in professional public health care facilities (3.89% of the total consultations), and 86,600 visits in other health care facilities (0.08% of the total consultations). Compared to the previous year, the number of secondary

and tertiary health care facility visits increased by 3.6 million, and the number of visits in primary health care facilities decreased by 1.0 million.

In 2016, the utilization rate of hospital beds in secondary and tertiary health care facilities was 74.55% of the total number of beds available, which was 1.34 % higher than the previous year. The average length of stay of discharged patients from secondary and tertiary health care facilities was 9.9 days. It was found that there was an overall decrease of 0.26 days in comparison to 2015. The utilization rate of beds at primary health care facilities was 43.25% of the total number of beds available, and the average length of stay of primary health care facilities for discharged patients was 6.7 days.

Table 6 describes the results of the comparison of hospital bed usage and length of stay of three-tiered health care facilities for discharged patients of Inner Mongolia and China. For overall China, the utilization rate of hospital beds in secondary and tertiary health care facilities was 93.1% of the total number of beds available. The average length of stay of discharged patients from secondary and tertiary health care facilities was 9.3 days. The utilization rate of beds at primary health care facilities was 60.1% of the total number of beds available, and the average length of stay of primary health care facilities for dischargers was 8.2 days.

Through comparison, it was found that the utilization rate of beds in Inner Mongolia was lower than the national average, whether it was secondary or tertiary health care facilities or primary health care facilities. In terms of length of stay at health care facilities, it was found that the duration of length of stay of primary health care facilities was shorter than the national average level, but the length of stay at secondary and tertiary health care facilities was slightly longer than the national average level.

Table 6: Hospital bed usage and length of stay of three-tiered health care facilities for discharged patients of Inner Mongolia and China in 2016

	Inner Mongolia	China
Utilization rate of hospital beds in primary health care facilities	43.25%	60.1%
Utilization rate of hospital beds in secondary and tertiary health care facilities	74.55%	93.1%
length of stay of primary health care facilities	6.7	8.2
length of stay of secondary and tertiary health care facilities	9.9	9.3

Source: Book of Health in the People's Republic of China, 2016

2.3.4. Medical expense

Table 7 describes the medical expenses in Inner Mongolia and China. In 2016, the average cost of medical treatment per person per visit in Inner Mongolia was 151.3 yuan (or USD 43.5), and per capita hospitalization cost was 7,425.0 yuan (or USD 2,137.3) per person. The outpatient cost of secondary and tertiary health care facilities was 223.5 yuan (or USD 64.3) per person per visit, and the average hospitalization cost was 8,460.3 yuan (or USD 2435.3) per person. Among them, outpatient drug charges accounted for 39.2% of outpatient expenses, and inpatient drug charges accounted for 38.1% of the total cost of hospitalization.

For overall China, the average cost of medical treatment per person per visit was 245.5 yuan (or USD 70.7) and the per capita hospitalization cost was 8,604.7 yuan (or USD 2,476.9), of which the per capita drug charges was 2977.5 yuan (or USD 857.1), accounting for 34.6% of the total hospitalization expenses.

Table 7: The medical expenses in Inner Mongolia and China in 2016

	Inner Mongolia	China
Average cost of medical treatment (yuan)	151.3	245.5
Per capita hospitalization cost (yuan)	7,425.0	8,604.7

Source: Book of Health in the People's Republic of China, 2016

2.3.5. Health insurance

Urban employment-based basic medical insurance (UEBMI), urban residents' basic medical insurance (URBMI), new rural cooperative medical insurance (NRCMI), and medical assistance constitute the basic medical insurance system of the Inner Mongolia autonomous region. Table 7 shows the detail of the major health insurance in China.

2.3.5.1. Urban employment-based basic medical insurance (UEBMI)

All the employing organizations in the town, including enterprises, public institutions, social organizations, private non-enterprise organizations and their employees, shall participate in the UEBMI. In other words, the participation of UEBMI is mandatory for employees in urban areas. By the end of 2016, the number of people covered by UEBMI in Inner Mongolia was 4.77 million.

Health insurance premiums are jointly paid by employers and employees. The employer's contribution rate is controlled at about 6% of the total salaries of employees, and the contribution rate for employees is 2% of their salaries, and retirees do not pay individual fees. The proportion of specific contributions will be determined by each pooling area according to the level of economic development. However, in practice, the national average rate of employer payment is 7.37%, and the national average rate of individual payment is 2%. In principle, the city will be the financing

unit.

The fund for UEBMI is composed of pooling funds and personal accounts. The medical insurance premiums paid by employees are all included in personal accounts. The medical insurance premiums paid by employers are divided into two parts, one for the establishment of pooling fund and the other for personal accounts. The proportion allocated to personal accounts is generally about 30% of the employer's contribution, and the specific ratio is determined by the coordinating region based on factors such as the payment scope of the personal account and the age of the employee. Personal accounts mainly cover outpatient expenses and inpatient drug expenses that are not included in the National Essential Drug List, as well as the costs of purchasing drugs at designated pharmacies. The funds are used to pay medical expenses for some outpatient major diseases and inpatient drug expenses in accordance with the provisions of the National Essential Drug List. It is a deductible plan in which an individual pays the first 10% of their salary towards medical bill and the maximum payment limit (seal top line) is about 6 times the average annual salary of the worker in Inner Mongolia. The medical expenses below the standard for payment are paid from personal accounts or paid by individuals. The medical expenses below the threshold of payment (1,800 yuan) are paid from personal accounts or paid by individuals themselves. Medical expenses that are between the threshold of payment and the maximum payment limit (20,000 yuan) are mainly paid from the pooling fund, and individuals should bear a certain percentage. Medical expenses exceeding the maximum payment limit can be resolved through private health insurance or medical assistant.

After the employee went to the hospital for outpatient treatment and emergency treatment, no matter what level of health care facilities that they go, medical expenses above 1,800 yuan can be reimbursed, the reimbursement rate was 50% and the

medical expenses below 1800 yuan need to be paid by personal account. For retirees under the age of 70, medical expenses above 1,300 yuan can be reimbursed, and the reimbursement rate is 70%. For retirees over the age of 70, the reimbursement rate for reimbursement of medical expenses above 1300 yuan is 80%. For inpatient treatment, if the medical expenses of the employee are between 1,300 and 30,000 yuan, 85% can be reimbursed. If it is between 30,000 and 40,000 yuan, 90% can be reimbursed. Those in the range of 40,000 to 100,000 yuan can be reimbursed 95%; only 85% can be reimbursed for 100,000 to 300,000 yuan. If the medical expenses for retirees are between 1,300 and 30,000 yuan, they can be reimbursed 91%. If it is between 30,000 and 40,000 yuan, 94% can be reimbursed. For those in range of 40,000 to 100,000 yuan, 97% of the medical bill can be reimbursed. A total of 90% can be reimbursed for medical expenditure in a range of 100,000 to 40,000 yuan, and the maximum reimbursement limit for employees and retirees is 300,000 yuan per person for a particular year.

2.3.5.2. Urban residents' basic medical insurance (URBMI)

Students (including university students), young children and other non-employed urban residents who are not covered by the UEBMI in urban areas may voluntarily participate in URBMI. By the end of 2016, the number of urban residents in Inner Mongolia participating in medical insurance was 5.31 million.

In 2016, the per capita insurance premium paid by urban residents' basic medical insurance was 220 yuan (or USD 63.3). The peasants and herdsmen shall apply for household registration as a unit in accordance with the principle of household registration management. The students are paid for by the school and the childcare institution, and the insurance premium is 130 yuan (or USD 37.4) per person per year.

For children under 3 years' old who have household registration in Inner Mongolia, the premium is 50 yuan (or USD 14.4) per year.

The URBMI implements a government subsidy policy. In 2016, the government's subsidy standard for insured residents was no less than 80 yuan (or USD 23.0) per person per year. The URBMI does not establish individual accounts. The funds are mainly used to pay for inpatient medical expenses and some outpatient expenses. Within a year, the minimum deduction of outpatient expenses of tertiary health care facilities is 659 yuan, and the reimbursement rate is 50%. The minimum deduction of outpatient service of secondary health care facilities is 300 yuan, and the reimbursement rate is 55%. Primary health care facilities do not set the minimum deduction, and the reimbursement rate is 60%. The outpatient reimbursement ceiling for a particular year is 3,000 yuan per person.

The longer the period of continuous insurance participation, the greater the proportion of reimbursement. For every 5 years of continuous payment by insured residents, the proportion of inpatient reimbursement of medical insurance fund increased by 5%, and the cumulative increase in reimbursement will not exceed 10%. If you have been insured for 10 consecutive years since 2006, the proportion of hospitalization reimbursement in tertiary, secondary and primary health care facilities will reach 70%, 80% and 90%, respectively. Medical expenses exceeding the maximum payment limit can be resolved through private health insurance or medical assistant.

2.3.5.3. New rural cooperative medical insurance (NRCMI)

All rural residents can voluntarily participate in the NRCMI with family units. By the end of 2016, the number of participants in Inner Mongolia was 9.54 million (99.36% of rural residents).

The government provides appropriate subsidies to all participating rural residents. The central government subsidizes 40 yuan (or USD 11.5) per household per year for rural residents. The amount of subsidy from the autonomous region's finances should not less than 40 yuan (or USD 11.5) per household per year, and insurance premium of a household not less than 120 yuan (or USD 34.5). The NRCMI generally takes the county or township as the unit of finance. For outpatient services, the reimbursement rate for medical treatment in village clinics is 60%, the prescription drug fee for each visit is limited to 10 yuan, and the prescription drug fee for temporary transfusion is limited to 50 yuan. The reimbursement rate of medical treatment in the township hospitals is 40%, the limit of each inspection fee and operation fee for each visit is 50 yuan, and the limit of prescription drug fee is 100 yuan. The reimbursement rate of the secondary health care facilities is 30%; each visit inspection fee and operation fee limit is 50 yuan, prescription drug fee limit is 200 yuan. The reimbursement rate of tertiary health care facilities is 20%; the inspection fee and operating fee limit is 50 yuan and the prescription drug fee limit is 3,000 yuan for each visit.

For inpatient service, the reimbursement rate for township hospitals is 60%, secondary health care facilities 40% and tertiary health care facilities 30%. Medical expenses exceeding the maximum payment limit can be resolved through rural medical assistant.

2.3.5.4. Medical assistance

The medical assistance system is the bottom layer of health insurance system, including the urban medical assistance system and the rural medical assistance system. Funds provided by the Ministry of Finance (MOF) are mainly to provide help for the those who are unable to enter the basic medical insurance system including the urban and rural poor who do not have the means to afford self-paid fees after entry, so that

they can enjoy the same basic medical insurance as other members of the society. The targets of social medical assistance are low-income people and poor people who are poor due to illness. The funds are mainly paid for through financial support, as well as from other sources such as social donations.

Table 8: Summary of China's three health insurance programs

Insurance type	UEBMI	URBMI	NRCMI
Target population	Formal sector urban worker	Children, students, elderly people and migrants (in some cities)	Rural residents
Risk-pooling unit	City	City	County
Enrollment	4.77 million	5.31 million	9.54 million
Type	Mandatory	Voluntary	Voluntary
Subsidy	0	80 per person	40 per household
Individual contribution	2-3% of salary	220 yuan for urban residents, 130 yuan for students and 50 yuan for children under age 3	120 yuan per household
Employer contribution	6-8% of salary	0	0

Benefit design			
Inpatient reimbursement rate of each admission (%)	Employee: For medical expense of 1,300-30,000 yuan: 85% 30,000-40,000 yuan: 90% 40,000-100,000 yuan: 95% 100,000-400,000yuan: 85%	Tertiary: 70% Secondary: 80% Primary: 90%	Tertiary: 30% Secondary: 40% Primary: 60%
Outpatient reimbursement rate of each outpatient visit (%)	Employee: For medical expense: Above 1,800 yuan: 50.0% Below 1,800 yuan: personal account	Primary: 60% Secondary: 55% Tertiary: 50%	Village: 60% Township: 40% Secondary: 30% Tertiary: 20%
Inpatient reimbursement ceiling per year (yuan)	300,000 yuan per person	Six-times average disposable income of urban residents per person	Six-times average income of local famers per household
Outpatient reimbursement ceiling (yuan)	20,000 yuan per person for a particular year	3,000 yuan per person for a particular year	3,000 yuan per household for a particular year

Source: Year book of Inner Mongolia, 2016

2.4. Health Literacy

The World Health Organization defined health literacy as the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health (Promotion, 1998). There is another definition which states that health literacy is the ability to obtain, read, understand, and use healthcare information in order to make appropriate health decisions and follow instructions for treatment (Maria & Rapporteur, 2012).

Health literacy can significantly affect our own health. The current health care system is too complicated and has too much health information. To find useful information to help us manage our health, we cannot do it without basic health literacy. Studies in the United States have found that people with low health literacy have a worse overall health status than those with good health literacy. Those with lower health literacy tend to have fewer preventive health services and are more prone to get chronic diseases (DeWalt, Berkman, Sheridan, Lohr, & Pignone, 2004).

In recent years, the issue of health literacy has received wide attention at home and abroad. One of the most important concerns is the health knowledge and health behavior of rural residents. The importance of health literacy was demonstrated in the "Healthy China 2030 Plan Outline" issued by the State Council on October 25, 2016 (State Council, 2016). The report clarifies the strategic goal of a healthy China, which is to establish a basic medical and health system with Chinese characteristics covering both urban and rural residents. That is, to focus on the health conditions of Chinese residents and establish a health system that meets China’s national conditions and the demand of residents, as well as to continue to increase the level of health literacy among the Chinese. Everyone will have access to basic medical and health services in

order to meet the main health indicators such as life expectancy, maternal mortality rate and infant mortality rate that rank at the same level as higher and middle-income countries. It can be said that improving the health knowledge and health behaviors of rural residents, and thus improving the development level of health literacy is one of the important goals of China's medical system reform.

CHAPTER III

LITERATURE REVIEW

3.1. Andersen Model

The Andersen's behavioral model was created in 1968 by Ronald M Andersen, professor of public health at the University of California, Los Angeles, and is the most classic model for researching and analyzing the use of health services (Chen, Wang, & Wang, 2000). It is widely used in health system evaluation and health service research. In order to explain the reasons why people have great differences in the use of health services and health seeking behavior, Anderson put forward a "health service utilization model" in his 1968 doctoral dissertation, which explains how families use health services. He analyzed the influencing factors of health service utilization, and defined and measured the use of health services and service accessibility (R. M. Andersen, 1995). Andersen's model shows that individuals are affected by three dimensions when deciding whether to use health services or not, including predisposing characteristics, enabling resources and need factors. It was suggested that decision makers and health service researchers can optimize the use of health services and reform the health service system from these three dimensions. The Anderson model has been validated by a number of empirical studies since its creation. It has been widely considered by academics and practical departments as the most suitable model for analyzing the utilization of health services and health seeking behavior (Bass & Noelker, 1987; Lemming & Calsyn, 2004).

The Andersen initial model believes that the utilization of health services is mainly affected by three dimensions. The first is the predisposing, which indicates the tendency of the use of health services, and is the characteristic of the individual's socio-cultural orientation before the illness or seeking for the use of health services, and is not directly related to health service utilization. It includes demographic

characteristics and social structure. Among them, demographic characteristics mainly refer to the basic conditions such as age and gender. Social structure refers to the individual's ethnicity, occupation, education, culture, social communication and social networks. The second is enabling resources, which refers to the ability of individuals to obtain health services and the availability of health resources in communities and households. It is an indirect factor affecting the use of health services, including household resources such as income, health insurance, and community resources such as the price of the health care service, the availability of community health resources, waiting time and time for treatment. The third is the need factor, which refers to the individual's characteristics based on health needs and represents the two aspects of the individual's cognitive needs and assessment of health services. Needs are the most direct reason for individuals to decide whether to use health services. Cognitive needs mean that individuals can better understand how to seek medical services and treatment programs. Assessment needs are related to the type, quantity, and quality of the use of health service (R. Andersen & Newman, 1973). The relationship between the three dimensions is the "predisposing characteristics" which in turn affects "utilization of health services" through "enabling resources" and "needs". The Anderson model shows that people's use of health services is determined by the tendency of health care service utilization, factors that promote or hinder health care service utilization, and the need for health care services. The Anderson model initially analyzed and studied health seeking behaviors in the family unit and explored the reasons for differences in the use of health services among different families. Taking into account the heterogeneity of family members in seeking services and utilization of services, the model is ultimately analyzed by individuals (R. Andersen, 1968).

With constant revision, adjustment, extension and extension of the model, the Anderson model is becoming mature and perfect. Some researchers have realized that the medical service system in different countries or regions will have an impact on the

use of personal health services. Anderson later realized that the decision-making and implementation of health policies and the external environment (i.e. natural, economic, and political environment) should be the primary preconditions for his model (Pourat, Andersen, & Marcus, 2015). Therefore, the health care system, the health policy and the external environment have become the factors affecting the use of personal health services. They are collectively referred to as "environmental factors". Environmental factors, predisposing characteristics, enabling resource and need are the four dimensions that constitute the Anderson correction model shown in figure 5.

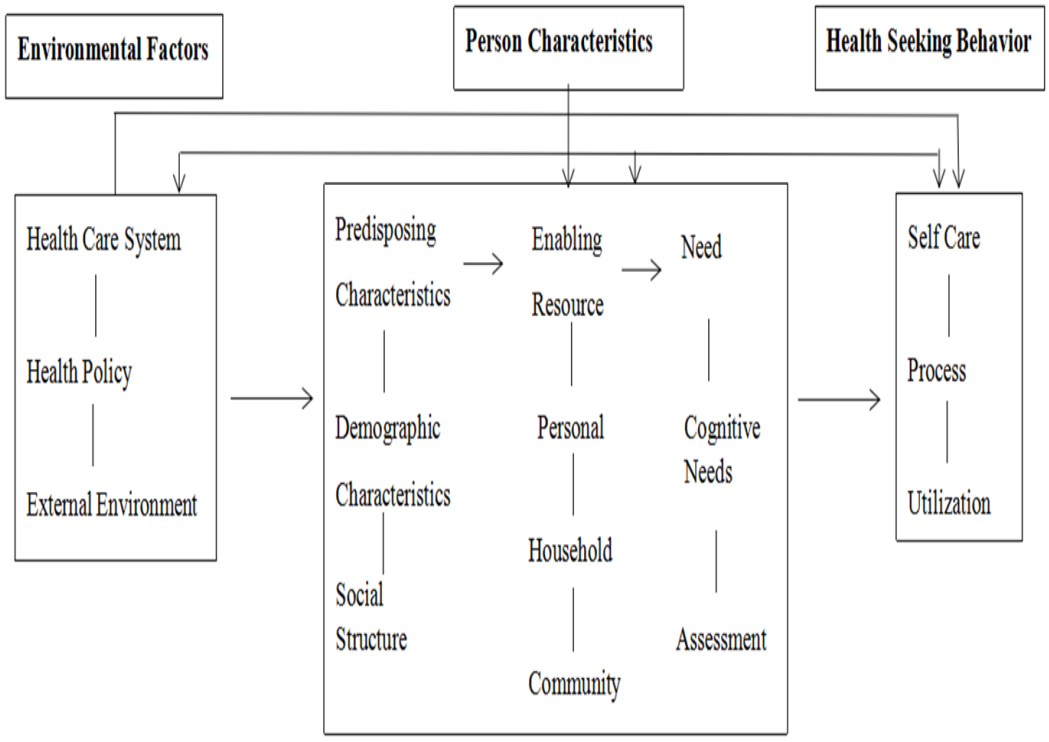

Figure 5: Andersen Model

3.2. Health Seeking Behavior

Health seeking behavior is a very broad concept. At present, there is no unified or authoritative definition. Different researchers have different interpretations. Chrisman

believes that health seeking behavior is a process that includes five parts: symptom definition, illness-related shifts in role behavior, lay consultation and referral, treatment actions, and adherence (Chrisman, 1977). Igun illustrates the stages of the health seeking behavior. These stages include symptoms-experience stage, self-treatment stage, communication to significant others stage, assessment of symptoms stage, assumption of the sick-role stage, expression of concern stage, assessment of the appropriateness of sources of treatment stage, selection of treatment plan stage, treatment stage, assessment of the effects of treatment on symptoms stage and recovery and rehabilitation stage (Igun, 1979). Granovtter mainly uses the health resources utilization (patients to test the body condition, treatment measures and use a variety of formal and informal care resources) and disease response (health seeking behavior refers to the individual's response to the body's symptoms in a variety of ways) perspective to define the health seeking behavior. This definition includes two aspects: the meaning of health services utilization behaviors, illness response and health promoting behavior (Granovetter, 1992). According to the summary of Tipping and Segall, research on health seeking behavior can be divided into studies focusing on outcomes which include utilization of formal health systems or health seeking behaviors, and research on the focus of the process; in other words, the process of illness response or health seeking behavior (Tipping & Segall, 1995).

In China, Huang et al. considers that health seeking behavior refers to the behavior and activities of seeking medical help after people perceive their physical discomfort or have certain symptoms and signs (Huang & L., 2005). Dong believed that the patient's health seeking behavior could be divided into the following behaviors: pre-health seeking, health seeking and post-health seeking behavior (Dong, 1998, 2003).

Pre-health seeking behaviors include self-care, delayed medical visits, and choice of health care facilities. Behaviors in seeking medical treatment include the use of drugs, the cost of prescription drugs, the cost of the entire service, and the selection of services such as designated drugs. The post-health seeking behavior includes the patient's compliance with the doctor’s orders, such as whether to buy medicine or whether to accept the doctor's recommended treatment plan. There are different

health-seeking behaviors at different stages. This study mainly focuses on the first step of the whole decision-making process of seeking health care from the perspective of the use of health services which is comprised of pre-health seeking behavior.

In term of the types of health services, Li defines use of services by outpatients in the last month of using outpatient care and inpatients in the last year of using inpatient car (C. Li, Dou, Wang, Jing, & Yin, 2017). Timothy focuses on general utilization including doctor consultations and hospital admissions (Elwell-Sutton et al., 2013). Li defines health care utilization as the utilization of outpatient visits and inpatient visits (Y. N. Li, Nong, Wei, Feng, & Luo, 2016). Lu and Zeng focus on two-week visits to the clinic and admissions to the hospital during the past 12 months when the respondents were sick or injured (Lu, Zeng, & Zeng, 2017). Dou defines health care utilization as the outpatient and inpatient care utilization rate over the last 12 years prior to the interview (Dou, Liu, Zhang, & Wu, 2015). Qian uses outpatient in the last 2 weeks as the dependent variable (Qian, Lucas, Chen, Xu, & Zhang, 2010). Yu focuses on utilization of outpatient service in the previous 4 weeks and inpatient service in the previous 12 months (Yu, 2010). Gong and Liu focus on the use of community health centers (CHC) during the past one year (Y. Gong et al., 2014; Liu et al., 2017). Li and Zhang choose four outcome variables to operationalize the construct of health care utilization: (1) whether one skipped or delayed outpatient care when ill, excluding those who reported that they were already under treatment; (2) whether one did not seek inpatient care despite being recommended by a physician; (3) number of outpatient visits during the previous month; and (4) number of inpatient visits during the last 12 months (X. Li & Zhang, 2013). Zhang also used four outcome variables to operationalize the construct of health care utilization: (1) whether one skipped or delayed outpatient care when ill, excluding those who reported they were already under treatment; (2) whether one did not seek inpatient care when recommended by a physician; (3) number of outpatient visits during the previous month; and (4) number of inpatient visits during the last 12

months. One article focuses on three aspects of physical examination, outpatient service and inpatient service (Zhang, Shi, Tian, & Zhang, 2016). One article focuses on three aspects of physical examination, outpatient service and inpatient service (C. H. Gong, Kendig, & He, 2016). Another one refers to the access to utilization of health care service which is also the one that utilizes systematic review (Almeida, Nunes, Duro, & Facchini, 2017).

For the outpatient utilization, the only difference between each article is the length of illness without regard to the difference between the databases. There are four articles that use outpatient visits during the prior one-month time frame of the survey date to analyze outpatient service utilization (C. H. Gong et al., 2016; C. Li et al., 2017; X. Li & Zhang, 2013; Zhang et al., 2016). There are two articles that use outpatient visits during the previous two weeks (Lu et al., 2017; Qian et al., 2010) as in this study. One focuses on the utilization of outpatient service in the previous 4 weeks (Yu, 2010), and two focus on the utilization of outpatient service during past one year (Dou et al., 2015; C. Li et al., 2017). The remaining articles devoted to outpatient service use did not discuss specific recalling time (Elwell-Sutton et al., 2013; Y. N. Li et al., 2016). For the inpatient utilization they all focused on inpatient visits during the previous 12 months. Only three of these twelve articles focus on whether to use health services.

3.3. Factors affecting health seeking behavior

3.3.1. Predisposing characteristics

-Health seeking behavior and age

There are three studies (Dou et al., 2015; C. H. Gong et al., 2016; Y. N. Li et al., 2016) indicate how age affects health seeking behavior. All the studies use the general population as the sample and focus on the decision to use outpatient care. Two studies point out that age was positively associated with the utilization of outpatient

care, as people get older, they tend to use more outpatient care (Dou et al., 2015; Y. N. Li et al., 2016). The article explains the reason by arguing that it shows that people aged 65 and above have higher occurrences of doctor visits, which is consistent with age related health deterioration (C. H. Gong et al., 2016).

-Health seeking behavior and gender

There are six studies (Dou et al., 2015; Y. N. Li et al., 2016; Liu et al., 2017; Lu et al., 2017) that tell how gender affects health seeking behavior. They all studied the situation in China. These studies found that females were positively associated with the utilization of outpatient care. The main reason is that females are much more likely to report having poor health.

-Health seeking behavior and marital status

There are three articles (C. H. Gong et al., 2016; Y. N. Li et al., 2016; Liu et al., 2017) on the Chinese situation indicating a relationship between health seeking behavior and marital status. Two studies found that married, divorced or widowed people were positively associated with the utilization of outpatient care compared with never married adults (Y. N. Li et al., 2016; Liu et al., 2017). They group marital status into two groups, there are married people and never married people. Married people include those divorced and widowed people. And this study pointed out that married people were likely to use more outpatient care compare to those never married people. This indicates that partnership may play an important role in maintaining good health among people (C. H. Gong et al., 2016).

-Health seeking behavior and ethnic group

An article written by Cathy discusses the effect of ethnic groups in China. The study points out that the Han ethnic group has a higher probability than other ethnic minorities to utilize outpatient health care (C. H. Gong et al., 2016).

-Health seeking behavior and education level

Three researchers studied the relationship between education and health seeking behavior. Two of them found that education level was negatively associated with outpatient health service utilization; well educated people with college degrees or higher education are much more likely to report good health while they are less likely to utilize outpatient care (C. H. Gong et al., 2016; Y. N. Li et al., 2016). There was only one study conducted in China on the choice of health care facilities. It found that the ratio of deciding whether to seek a provider was very similar for each education level. However, the proportion of people with a junior college education and above who chose to visit a city hospital was relatively high, compared to that of primary or less. The higher the educational level, the lower the use of private clinics (Qian et al., 2010).

-Health seeking behavior and occupation

Only one study (Amin., Shah., & Becker, 2010) demonstrated that there is a significant correlation between occupation and health seeking behavior, and this study used rural residents who live in Bangladesh. Agricultural or skilled labor occupations were more likely to use modern providers for antenatal and postnatal care. Babies whose fathers were skilled laborers were more likely to receive a newborn check-up.

3.3.2. Enabling resources

-Health seeking behavior and income

In terms of income, different approaches have been considered like income, expenditure or assets. However, a very popular method in China is to classify the population into different quartile groups based on income. There are five articles (Dou et al., 2015; Y. Gong et al., 2014; Liu et al., 2017; Lu et al., 2017; Qian et al., 2010) that describe the relationship between income and health seeking behavior. Four articles showed that outpatient care utilization varied across household wealth groups. Rich patients were more likely to use outpatient care, especially traditional Chinese medicine, than the poorer patients (Dou et al., 2015; Y. Gong et al., 2014; Liu et al., 2017; Lu et al., 2017). There is only one article that showcases the impact of income on the choice of health care facilities. It argued that all groups, including perhaps surprisingly those in the highest expenditure category (proxy for income), were somewhat more likely to use a city hospital than a CHC hospital in China (Qian et al., 2010).

-Health seeking behavior and health insurance

Five articles (Almeida et al., 2017; C. H. Gong et al., 2016; X. Li & Zhang, 2013; Qian et al., 2010; Zhang et al., 2016) analyze the relationship between insurance and medical behavior. Two articles argued that for the decision whether to use outpatient care, no health insurance was negatively associated with outpatient care (Almeida et al., 2017; C. H. Gong et al., 2016). In one study conducted in Zhejiang province, China explored the fact that people with UEBMI and URBMI are more likely to have outpatient visit care when compared with people with NRCMI and no insurance (X. Li & Zhang, 2013). Furthermore, a study conducted in China explored the fact that among people who used outpatient care in the previous month, those covered by NRCMI had 2.12 visits

on average, compared with 1.98 visits among the uninsured and the expected number of outpatient visits for NRCMI enrollees was 1.35 (95 % CI: 1.03– 1.77) times that of the uninsured (Zhang et al., 2016). A study focused on the choice of health care facilities found out that more than 77% of those with NRCMI who obtained care used primary health care facilities, almost certainly because these facilities were specified as the provider of first choice by many of these insurance schemes. In addition, the NRCMI variable is negative and statistically significant in the private clinic model (Qian et al., 2010).

-Health seeking behavior and out-of-pocket expenditure (OOP)

It was identified that the out-of-pocket expenditure also impacted health seeking behavior. Out of pocket expenditure is negatively associated with health care utilization; the more people pay themselves, the less likely they are to seek health care (X. Li & Zhang, 2013; Zhang et al., 2016).

3.3.3. Need factors

-Health seeking behavior and self-rated health

Li et al. indicated in their paper that for outpatient visits, there was a strong positive association between self-rated health and utilization (Y. N. Li et al., 2016). Adults who reported poor self-rated health were more likely to use outpatient services and have more outpatient visits (C. H. Gong et al., 2016; X. Li & Zhang, 2013; Lu et al., 2017). This was confirmed by one study conducted on health seeking behavior in China that for the choice of health care facilities, adults who reported worse self-rated health were more likely to use primary health care facilities(Liu et al., 2017).

-Health seeking behavior and disease pattern

According to two studies conducted in China on health seeking behavior, those having chronic diseases were more likely to use outpatient services and have more outpatient visits than those without chronic diseases (X. Li & Zhang, 2013; Y. N. Li et al., 2016)(Li &. Zhang, 2013; Li et al., 2016). Furthermore, another two studies found that multiple chronic diseases could be considered strong need factors for outpatient healthcare utilization (C. H. Gong et al., 2016; Lu et al., 2017).

3.4. Health Literacy

3.4.1. Definition of health literacy

The concept of health literacy was first seen in the American scholar's "Health Education as a Social Policy". Since then, many organizations in the world have given their own definition of health literacy, but so far, the international definition of health literacy is not yet uniform. Parker's proposed functional health literacy was defined as the ability to understand health-related materials such as prescriptions, appointment cards, prescriptions, and home health care (Baker, Williams, & Nurss, 1995). The American Medical Association (AMA) believes that health literacy is a set of skills required to perform basic reading and counting tasks in a medical environment (Committee, 1999). These two definitions limit health literacy to the medical environment and neglect the public's need for health literacy in the social and working environment. They also fail to address the relationship between health literacy and verbal communication, social interaction and behavioral competence. Based on this, the National Library of Medicine proposed a broader concept of health literacy, namely the individual's ability to acquire, understand, and process basic health information or services and make appropriate health-related decisions (Medicine, 2000). Health literacy under this definition not only considers that individuals should have more

complex thinking or understanding to make decisions about health, but also extends the scope of health literacy to all social environments such as family, work, and medical care. From the perspective of health education and health promotion, the WHO gives a definition that includes improving individual ability and improving health behavior. It mentions that health literacy requires cognitive and social skills which determine the motivation and ability of individuals to gain access to, to understand and to use information in ways which promote and maintain good health (Promotion, 1998). Based on the above definitions, Speros proposed a more operational definition: health literacy includes the ability to read, calculate, and understand. It also includes the ability of individuals to use health-related information or services and make appropriate health-related decisions (Speros, 2005).

In early 2008, China released the "Chinese Citizens' Health Literacy—Basic Knowledge and Skills (Trial)" (the State Council of the People's Republic of China, 2008), which was the first government announcement in the field of health education in China and is the only government document in the world that defines citizens' health literacy. According to the "Investigation Report on the First Chinese Citizens' Health Literacy" (NHFPC, 2008), health literacy refers to the ability of individuals to acquire and understand health information and use this information to maintain and promote their own health. This is the definition used in this study.

The definition of health literacy of various international organizations is mainly from the clinical perspective. China's definition of health literacy focuses more on public health. Health literacy in China, based on public health perspectives, focuses more on health literacy as an individual resource, corresponding to health education and health promotion.

3.4.2. Classification of health literacy

Many researchers have analyzed the connotation and dimensions of health literacy from different levels or different aspects. From a clinical perspective, Speros believes that health literacy includes the following rationalities: functional health literacy, knowledge literacy (existing and process knowledge), and cognitive literacy. Functional health literacy refers to the ability to understand health information, including the reading, writing, and calculation of health information. Knowledge literacy refers to the ability to understand and apply health information in a specific environment, including existing knowledge and declarative knowledge. Cognitive literacy refers to the ability to make correct health decisions, and is primarily a correct assessment of health issues (Speros, 2005). Nutbeam dividing health literacy into three levels according to the different stages of continuous development of the connotation of health literacy. The first level is functional health literacy (which is the most basic level of health literacy). It mainly refers to basic literacy such as reading comprehension and the basic ability to obtain and use health-related information or health services. From a clinical perspective, that is, to understand and utilize information such as medical instructions and other health service information. The second level is interactive health literacy (at a higher level), mainly referring to the ability to independently acquire, communicate, and use information, and the motivation and confidence that can stimulate oneself to produce the action that is beneficial to health. This interactive literacy will affect the formation of healthy behaviors. The third level is critical health literacy (the highest level of health literacy), mainly referring to the correct analysis and understanding of health information, and can apply health knowledge to the practice of improving the determinants of health in individuals and society as a whole (Nutbeam, 2008).

The definition of the health literacy among the residents in China defines the four dimensions of health literacy, i.e., knowledge-based health literacy, behavioral health literacy, belief in health literacy, and functional health literacy (the State Council of

the People's Republic of China, 2008). Knowledge-based health literacy mainly includes knowledge of prevention and treatment of hypertension, diabetes, and other diseases, including mental health knowledge, and health knowledge such as nutrition, safe medication, and physiology. Behavioral health literacy is the health literacy that relates to each individual actual behavior mainly covers smoking, physical examination, physical exercise, and eating breakfast. The survey of belief health literacy mainly focused on the participants' opinions and attitudes on health care. Functional health literacy includes health-related operational skills, communication skills, and reading cognitive abilities. Functional health literacy includes the ability to read and understand health materials, have good communication skills with doctors, and engage in health-related analysis and decision-making. In measuring health literacy, China is not much different from other countries. In terms of functional health literacy, China combines the definition of functional health literacy with both Speros (2005) and Netbeam (2008), while removing the need for high-skills capabilities related to calculation of health information. For example, China's health literacy questionnaire involves health knowledge (e.g. diagnostic criteria for patients with hypertension), health beliefs (e.g. views of active participation in health lectures), and health behaviors (e.g. daily vegetable, fruit intake), as well as provides specific cases for respondents to give their understanding of the use of drugs and the ability to make decisions based on given health information.

3.4.3. Measurement of health care literacy

The measurement and evaluation of health literacy is based on the definition of health literacy. Different measurement indicators and evaluation systems correspond to different definitions of health literacy. Common assessment tools abroad include: Rapid Assessment of Adult Medical Literacy (REALM), Test of Functional Health Literacy in Adult (TOFHLA), and Health Activity Literacy Scale (HALS).

REALM was developed earlier as a measure of health literacy. It was developed and designed by Professor Davis of Louisiana State University. REALM is a literacy test that is primarily used to assess adult reading and spelling. REALM does not involve understanding content but is highly relevant to other comprehension tests. It contains common medical terminology, and the difficulty of the word table gradually increases. The subject is required to read aloud, and according to whether the subject's pronunciation is correct or not, a score is given and the corresponding grade is assigned. The literacy level is divided into grades. It usually takes about 3 minutes to complete, making it quite convenient (Davis et al., 1991).

TOFHAL is mainly used to measure the functional health literacy of patients, that is, reading and calculating ability in the medical environment. There are two versions available in English and Spanish. It was developed and designed by Barker, D.W. The reading material for the test is based on contexts within the medical environment, such as the rights and obligations of patients in the treatment program, the booklet for surgical preparation, the standard informed consent and the label on medicine bottles. The actual medical materials, including 50 completed reading tests and 17 mathematical ability tests, took about 22 minutes to complete (Baker et al., 1995).

HALS is a test of health activities prepared by experts from the Harvard School of Public Health of the United States Educational Testing Service Center. It consists of 191 questions and represents five important aspects of health activities: health promotion (60 questions), health protection (65 questions), disease prevention (18 questions), health care and maintenance (16 questions), system search (32 questions). These 191 questions do not reflect the five aspects of health activities in a balanced manner. A total of 32 questions reflected the contents of the system search, and 34 questions belonged to disease prevention, healthcare, and maintenance. Only these

66 questions directly reflect activities related to the health care environment (Rudd, Kirsch, & Yamamoto, 2004).

Based on the survey data of the national health literacy of China, the papers of Dr. Xiao of the Chinese Center for Disease Control and Prevention Health Center had selected indicators and calculated the weight coefficients of each index, and constructed a health literacy evaluation system (Xiao.S, 2008). The evaluation system includes four sub-indexes, namely knowledge-based health literacy index, behavioral health literacy index, belief health literacy index and functional health literacy index. Among them, knowledge-based health literacy mainly includes knowledge of prevention and treatment of hypertension, diabetes, and other diseases, mental health knowledge, and health knowledge such as nutrition, safe medication, and physiology. Behavioral health literacy mainly includes smoking, physical examination, physical exercise, and breakfast. The survey of belief health literacy mainly focused on the participants' opinions and attitudes on health care and other viewpoints. Functional health literacy surveys, including health-related operational skills, communication skills, and reading cognitive abilities.

There are two main types of health literacy levels currently used. The first method is the percentage method, which is mainly based on the correct proportion of the answer to the assessment questions in order to determine the level of literacy (Shen, Hu, Liu, Chang, & Sun, 2015). This can be divided into grades, or a certain ratio of the correct answer is defined as "having" health literacy. The advantage of this method is that the results are easy to understand and are simple. The second method is the synthetical index method, which constructs a comprehensive index of health literacy by assigning different weights to different health literacy evaluation indicators. This method integrates the indicators of different properties, categories, levels, and units of

measurement into a dimensionless number that reflects the relative level of things (Xiao.S et al., 2009). Table 9 shows the weight of each indicator.

Table 9: The weight of each indicator of health literacy

Indicator	Subjective weight	Objective weight	Combine weight
Knowledge-based health literacy	0.253	0.445	0.349
Behavioral health literacy	0.263	0.112	0.188
Belief of health literacy	0.237	0.193	0.215
Functional health literacy	0.247	0.249	0.248

Source: (Xiao.S et al., 2009)

The theoretical range of the comprehensive index of health literacy is 0 to 10. The formula that is used calculate the value of health literacy is as follows:

$$L_{10=\frac{10}{max-min}} \sum_{j=1}^{4} w_j I_j / T$$

Max and min are the theoretical maximum and minimum values respectively comprised of w_j is the weight coefficient of the indicator and serves as I_j is the four indicators of health literacy, and T represents the standard values. The weighted average of each indicator was taken as the standard value. When the value is 5, it shows that the level of health literacy in the studied area is equal to the national average level of public health literacy. When the value is greater than 5, it indicates that the level of health literacy in the studied area is higher than the national average level of health literacy. A value below 5 indicates that the level of health literacy in the study area is lower than the national average. The higher the health literacy value, the higher the level of health literacy.

In this study, the first method was used to evaluate the health literacy level of residents, so as to easily compare the results with other studies. This method was adopted for the first survey of Chinese residents' health literacy, in which a 65% correct answer rate or above was considered as having adequate health literacy, 50%-64% was considered as having marginal health literacy, and a rate below 50% was considered as having inadequate health literacy. Having adequate health literacy means having a good lifestyle. That is, after getting sick, one knows how to use the proper medicine. When a disease is mild, they can correctly understand the instructions of the medicine and take it correctly to treat themselves. People having marginal health literacy indicates that after getting sick, they can treat themselves with drugs, but sometimes they will ignore their symptoms and engage in no treatment. Or in some unnecessary cases, they may choose to take antibiotics. Those who are deemed to have inadequate health literacy are those who normally have bad lifestyles. At the same time, they do not actively acquire health knowledge even if their health knowledge level is very low. After they are sick, only a few people can treat themselves. Almost all questions have the same weight, except “salty taste” and “routes of transmission AIDs” based on the National guideline of health literacy. Because in recent years, the Chinese government has been paying attention to the taste of food consumed by people and the transmission of AIDS, and it was put forward many times in important meetings. The aim is to reduce the number of patients with cardiovascular and cerebrovascular diseases as well as AIDS patients. Moreover, regarding these two issues, a number of related public service advertisements and public interest manuals have also been produced. Table 10 provides the list of questions used in this study to be answered in detail. There are 17 questions in this study to evaluate health literacy; if more than 14 questions were answered correctly, they are considered as having adequate health literacy.

Table 10: Questions that capture health literacy

Indicator	Questions	Score
Behavioral health literacy	1. Frequency of taking physical examination	1
	2. Frequency of outdoor activities	1
	3. Salty taste	2
	4. Daily vegetable intake	1
	5. Daily fruit intake	1
	6. Daily dairy products intake	1
	7. Frequency of eating smoked food	1
Knowledge-based health literacy	8. Average daily salt intake of adults	1
	9. Routes of transmission AIDS	3
	10. Must use antibiotics to treat colds or not	1
	11. Diagnostic criteria for hypertension	1
	12. Risk factors related to high blood pressure	1
	13. Common symptoms of diabetes	1
Belief of health literacy	14. Do you think that participating in health lecture is good for your health?	1
	15. Do you think that hypertensive patients need to be treated by taking medicine?	1
	16. Do you think that diabetes patients need to be treated by taking medicine?	1
	17. Does maternal smoking affect the normal development of the fetus?	1

Source: Author

3.4.4. Health literacy and health seeking behavior

Suri et al. (2016) indicated in their paper that health literacy leads to improved self-reported health status, lower healthcare costs, increased health knowledge, shorter hospitalization, and less frequent use of healthcare services (Suri, Majid, Chang, & Foo, 2016). A study on health literacy found that in terms of individual benefits, functional health literacy leads to an improved knowledge of risks and health services, and compliance with medical prescription; interactive health literacy leads to an improved capacity to act independently, an improved motivation and more self-confidence and critical health literacy is the highest level of health literacy, mainly referring to individuals who can correctly analyze and understand health information, and can use health related knowledge to improve individual and social determinants of health (Nutbeam, 2008). Another study on the quality and safety in health care pointed that health literacy in turn influences health behavior and the use of health services, and thereby will also have the impact on health outcomes and on the health costs in the society. At an individual level, ineffective communication due to poor health literacy will result in errors, poor quality, and risks to patient safety of the healthcare services (Schyve, 2007). A study of health literacy carried out in six provinces (not including the Inner Mongolia Autonomous Region) in China showed that the level of health literacy influences people's decision to use outpatient care but not choice of health care facilities. Lack of health literacy can directly or indirectly affect the medical and health-related outcome. Direct influences include compliance, coordination with doctors, or medications, thereby affecting people's use of health services. Indirect effects may include medical insurance, access to health care, and lifestyle. People with inadequate health literacy are not able to follow medical orders or self-care procedures and do not pay attention to preventative health care. When people with inadequate health literacy are in need of treatment, they cannot effectively use complex health care systems. This creates a vicious cycle. People with inadequate health literacy do not

have health awareness and are not able to use health information and resources properly, resulting in more use of health services. Because they pointed that the level of health literacy is not statistically significant and they did further study to find out what will influence the choice of different health care facilities. They found that people with poor health literacy have poor physical and mental health, self-rated poor health, and are more likely to have serious disease or have emergency cases. For those have serious disease they are more likely to choose tertiary and secondary health care facilities that have advanced medical institutions. But for those have emergency aliments, they are more likely to choose the closest health care facilities which most of them are primary health care facilities. As a result, the impact of health literacy on people's choice of health care facilities is not statistically significant. Because of the definition of health literacy points that health literacy is the ability of individuals to understand health information and use it to maintain and promote their health. In another word, the choice of a health care facility is to make decisions based on all the information about the health care facility that is already known. They believe that health literacy will definitely affect people's choice of different health care facilities. They spent more than a year and continued to investigate with the same sample in the same area. They designed a health literacy questionnaire that is consistent with the health literacy questionnaire used in this study. Initially, they included all four categories of health literacy in the questionnaire based on the country's classification of health literacy. After an initial investigation, they found that the questions on functional health literacy were too difficult, which not only increased the interview time but also made the entire questionnaire more difficult. This will result in a low overall level of health literacy. So, in the end they decided to remove the functional health literacy and keep the other three parts, which are knowledge-base, belief and behavioral components of health literacy (Xiao.S, 2008). However, this study didn’t

include Inner Mongolia, the results of the survey in Inner Mongolia Autonomous Region are not necessarily the same as Xiao's study.

3.5. Type of model

For the articles that focused on health seeking behavior, four papers used the Anderson initial model to examine the factors associated with the usage of outpatient care (C. H. Gong et al., 2016; X. Li & Zhang, 2013; Liu et al., 2017; Qian et al., 2010). Five studies used binary logit model to study the decision to use health care (C. H. Gong et al., 2016; X. Li & Zhang, 2013; Liu et al., 2017; Shen et al., 2015; Zhang et al., 2016). In terms of income, Liu found that income is positively associated with the utilization of formal outpatient care (Liu et al., 2017). For health insurance, three articles pointed out that those who have insurance are more likely to use formal outpatient care compared to those do not have insurance (C. H. Gong et al., 2016; X. Li & Zhang, 2013; Zhang et al., 2016). Furthermore, tow research showed that OOP is negatively associated with the utilization of formal outpatient care (X. Li & Zhang, 2013; Zhang et al., 2016). In terms of health literacy, the study conducted in China using the multinomial logit model found that health literacy was negatively associated with the utilization of formal outpatient care and people who have knowledge-based, beliefs, and behavioral components of health literacy were more likely to choose primary health care facilities (Xiao.S, 2008).

Four studies used the multinomial logit model for the choice of health care facilities (Dou et al., 2015; Y. Gong et al., 2014; Y. N. Li et al., 2016; Qian et al., 2010). Gong (2014) found that income is positively associated with the utilization of formal outpatient care. Qian (2010) concluded that all groups, including perhaps surprisingly those in the highest expenditure category (proxy for income), were somewhat more likely to use a CHC than a city hospital in China. also found that more than 77% of

those with NRCMI who obtained care used the primary health care facilities, and the NRCMI variable was negative and statistically significant in the private clinic model.

And the other two studies employed ordinary least squares (Lu et al., 2017; Yu, 2010) to analyze socio-demographic and socio-economic factors that determined the decision of using outpatient care. They found that income was positively associated with the utilization of formal outpatient care. There is one article using systematic review of the access to use of health care service (Almeida et al., 2017), two papers that examine inequality in the use of health care services, one that uses concentration index (C. Li et al., 2017) and another one that uses the horizontal inequity index to measure socioeconomic-related inequality in health care utilization (Elwell-Sutton et al., 2013).

3.6. Data

Among the articles that focused on health seeking behavior (excluding the study using systematic review), five used the Chinese population as the sample. Three of them used the same dataset, namely the 2013 China Health and Retirement Longitudinal Study (CHARLS) (C. H. Gong et al., 2016; C. Li et al., 2017; Zhang et al., 2016). One used the result of 2014 China Labor Force Dynamic Survey to analyze the factors that affect health seeking behavior (Lu et al., 2017). And one article used wave 1 of the WHO Study on Global Aging and Adult Health (SAGE) (Dou et al., 2015). T They all focus on the people aged 45 and older. There are 6 articles using certain regions as their database. Among those, four (X. Li & Zhang, 2013; Y. N. Li et al., 2016; Liu et al., 2017; Yu, 2010) focus only on the rural population, one focuses not only on the rural population but also on the urban population and one focuses only on women (Wang et al., 2013). The last one focuses on the people who have urinary tract infections (UTI) (Qian et al., 2010). Research that uses the national dataset tends to include more

statistically significant demographic and socio-economic factors than studies that use a regional dataset. And the studies that use a regional dataset are always more inclined to focus on specific factors, such as health insurance and UTI.

3.7. Gap

In terms of the existing research on health seeking behavior or health care utilization for residents in Inner Mongolia, there is no previous study on the relationship between health literacy and health seeking behavior. This study will be the first to focus on the effect of health literacy on the health seeking behavior in Inner Mongolia.

CHAPTER IV
RESEARCH METHODOLOGY

4.1. Conceptual Framework

For the methodology, I would like to use Andersen's initial health seeking behavior model. Typically, there are 3 main factors that influence health seeking behavior in the Andersen model consisting of predisposing factors, enabling resources and need factors. In this study, I add health literacy as the fourth factor. Thus, my modified Andersen model consists of four parts comprising predisposing factors, enabling resources, need factors and health literacy. These factors together affect the decision of whether to seek formal outpatient treatment and the choice of care. For the use of health services, it consists of seeking formal treatment in the health care system, versus no treatment or self-care. Among the users' choice of care are primary health care facilities, secondary health care facilities or tertiary health care facilities. Figure 6 shows the conceptual framework of my study.

Thus, the use of formal health care = f (predisposing factors, enabling factors, perceived need and health literacy).

The choice of health facilities = f (predisposing factors, enabling factors, perceived need and health literacy).

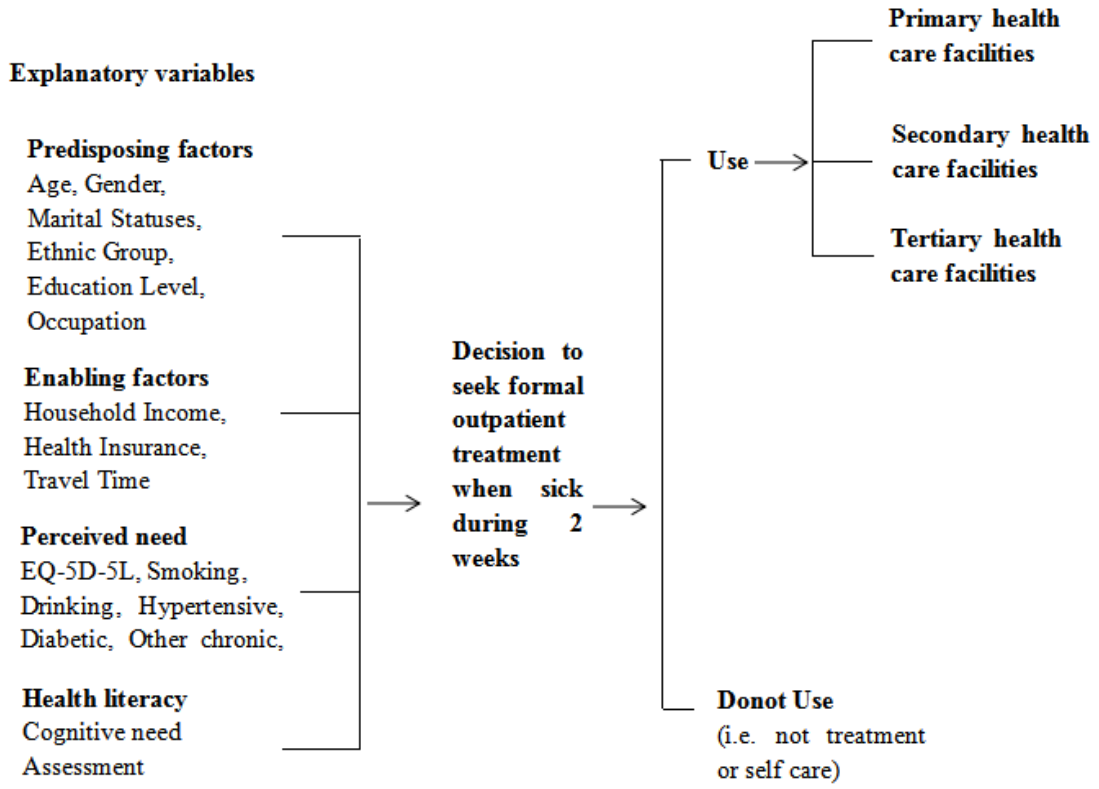

Figure 6: Conceptual framework

4.2. Hypotheses

Health literacy is negatively associated with the utilization of formal outpatient care;

Age was positively associated with the utilization of formal outpatient care;

Females will use more formal outpatient care compared to males;

Married, divorced or widowed people are positively associated with the utilization of formal outpatient care compared to the singles;

The Han ethnic group may decide to use more formal outpatient care;

Educational level is negatively associated with the outpatient health service utilization; however, conditioning the choice of the three-tiered health care facilities more educated people will choose the higher level of health care facilities;

Employed people are positively associated with the utilization of formal outpatient care;

The rich will use more formal outpatient care than the poor;

For the decision to use outpatient care, having no health insurance is negatively associated with formal outpatient care;

There is a negative association between self-rated health and the utilization of formal outpatient care;

Having chronic diseases is associated with greater likelihood of using outpatient services than those without chronic diseases.

4.3. Sources of data

Secondary data was used in this study, namely the "community survey of Ejin Horo county 2016", which was collected by the Inner Mongolia Medical University. The data was collected from 15-18 June, 2016. It consisted of a face-to-face interview and was conducted by trained interviewers. This study also used a questionnaire that included more than 120 questions on socio-demographic factors, economic factors, decision to use outpatient care during the previous 2 weeks, decision to use inpatient care during the previous 12 months, EQ-5 D and health literacy.

4.3.1. Target population

The target population was comprised of all rural residents in Ejin Horo county of Inner Mongolia, China.

4.3.2. Sampled population

The study was conducted in 10 villages of Ejin Horo county of Inner Mongolia, China; altogether 396 households were included. The details are described in Table 11.

Table 11: The situation of sample

Villages	Sampled household
Xincun	53
Ulan Tolgoi	81
Huang Tolgoi	33
Yingpan He	54
Bayingoi	9
Taerhe	43
Songdaogou	53
Huang Ghisli	16
Maogetu	26
Amutu Mura	28
Total	396

Source: Author

4.3.3. Sampling technique

A total 396 households were sampled by using two-stage stratified cluster random sampling. In the first sample stage, seven townships were stratified based on the population size to sample 1 township. Jasagh town was chosen in the first stage. In the second stage 27 villages in Jasagh town were stratified based on population size to sample ten villages. Within those ten villages, 396 households were randomly

selected and all family members in a sampled household were interviewed individually. This study focused on people aged 18 and above, and no upper-age limit was applied. Figure 7 shows this sampling procedure.

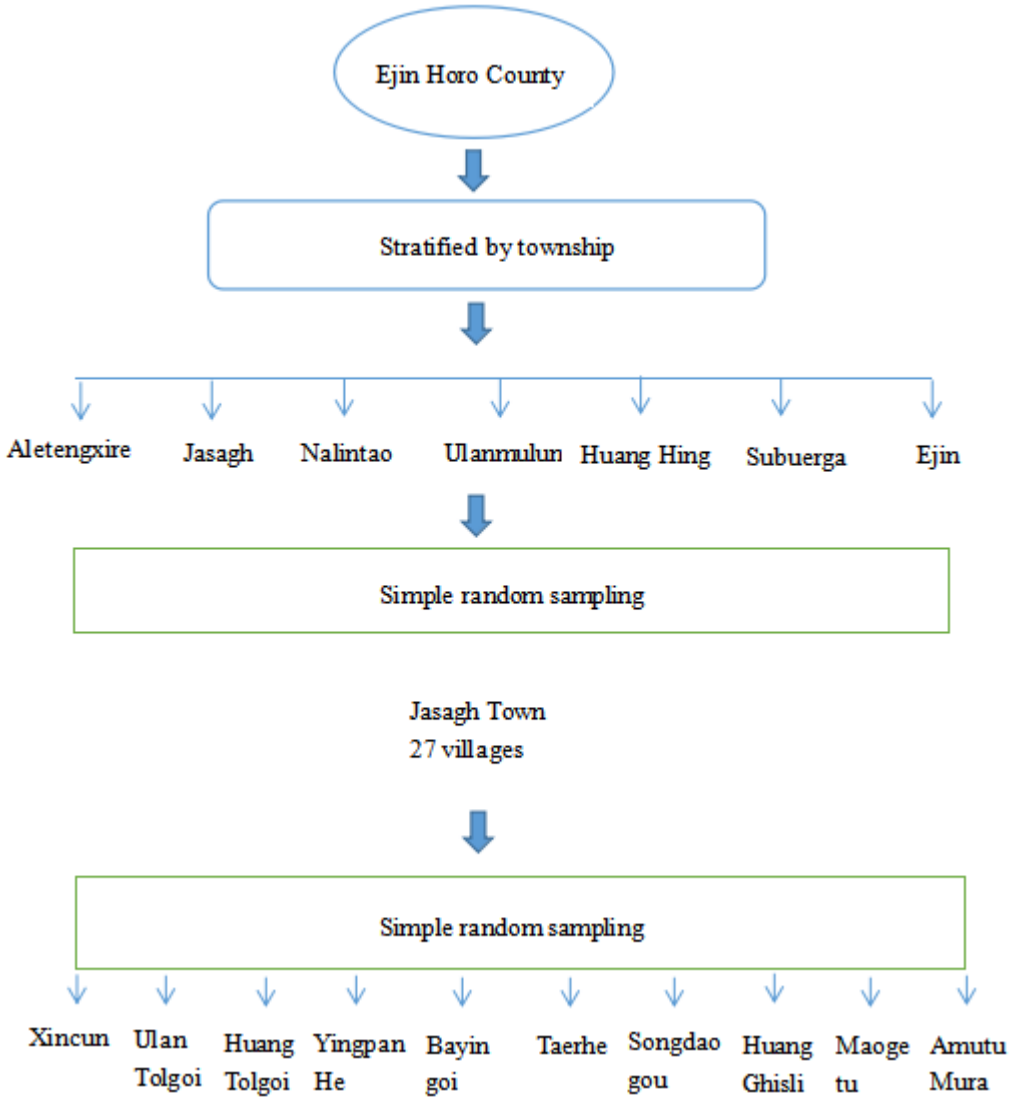

Figure 7: Sampling procedure

4.4. Data Analysis

4.4.1. Definition of dependent variables

Table 12 shows the definition and description of dependent variables. Dependent variable, Y_1, represents the decision to use a health care facility by the residents who live in Ejin Horo county when they felt ill or had other symptoms during the previous two weeks. There were two choices where 1 stood for using health care on an outpatient basis, and 0 if participants did not use health care facilities despite feeling ill over the previous two weeks. Another dependent variable, Y_2, represents the choice of health facilities among those who seek medical treatment. There are three tiers of the health care facilities that people chose a number corresponding to the type of facility they went to: 0 stands for primary health facilities, 1 for secondary facilities, and 2 for tertiary health facilities.

The primary health care facilities include primary hospitals, community health service centers, township hospitals, village clinics and private clinics. The secondary health facilities mainly refer to secondary hospitals with 101-500 beds. Tertiary health facilities mainly refer to hospitals with more than 500 beds.

Table 12: Definition of dependent variables

Name	Variable	Description
Decision to use health care	Y_1	1 if they decide to use health care;0 if do not use.
Choice of health care facilities	Y_2	0 if using primary health care facilities; 1 if using secondary health care facilities; 2 if using tertiary health care facilities.

Source: Author

4.4.2. Definition of explanatory variables

Table 15 provides definition and description of the decision to use formal outpatient care and table 16 provide the expected sign of the coefficient and reason on the decision to use formal outpatient care. Table 17 provides definition and description of the choice of health care facilities and table 18 describe the expected sign of the coefficient and the reason on the choice of three-tiered health care facilities. According to Andersen's model, there are four main types of factors included in the study which are predisposing, enabling, perceived need and health literacy factors. Their detailed definitions are given below.

4.4.2.1. Predisposing factors

-Age

The Chinese government considers people to be adults if they are aged 18 years or older. Thus, this study focuses on people aged 18 and older with no upper-age limit applied. It is a continuous variable. According to literature review, age has a positive association with utilization of formal outpatient care. As people's health declines with age, more formal outpatient care is generally used.

-Gender

The samples of Ejin Horo county were grouped into two mutually exclusive outcomes by gender. Gender was a dummy variable, of which 1 stands for male and 0 stands for female. Based on the literature review, females would be more likely to use formal outpatient care than men.

-Marital status

For this study, marital status is grouped into two broad categories, which are married and others. It is a dummy variable, of which 1 stands for married and 0 for others. Based on the literature review, being married, divorced or widowed is positively associated with the utilization of formal outpatient care compared to being never-married.

-Ethnic group

Because the Han are the majority of residents in Ejin Horo county, in terms of this study, samples were divided into two broad groups consisting of Han and all others. This dummy variable was assigned 1 for Han and 0 for Mongolian. According to the literature review, those of the Han ethnic group are more likely to use formal outpatient care than others.

-Education

The largest proportion of the sample had education below the primary school level, and the second largest education category was primary school. This study regroups the education level into four categories. The variable edu1 is assigned for those who have no school education, edu2 for those who completed primary school, edu3 for those whose education level was below college. In addition, I use edu4 to stand for those whose education was at the college level and above. I treat edu1 as an omitted category. Based on the literacy review, for the decision to use formal outpatient care, those with higher education make greater use of outpatient care. Furthermore, people with higher education are likelier to use more tertiary and secondary health care facilities compared to those with lower education levels. In terms of the choice of

health care facilities, the proportion of people with junior college education and above who chose to visit a city hospital is relatively high, compared with that of primary or less. The higher the educational level, the lower the use of private clinics.

-Occupation

Ejin Horo county in located in a rural area, in which the main occupation of the people there is farming. As categorical variables, occupations were classified as farmer, retiree, other employed and unemployed. The variable “farmer” was assigned for farmers, “retiree” for retirees, and “other employed” for those with jobs who are neither farmers nor retirees. Additionally, I use “unemployed” to stand for those who do not have formal work, and I treat unemployed as an omitted category. It is predicted that people who have jobs will use more outpatient care compared to those who are unemployed because the sources of income for those with jobs are more stable, and those without formal jobs are unstable. So after getting sick, people who have jobs have more disposable income than those who don’t have jobs, so they will choose seeking more formal outpatient service.

4.4.2.2. Enabling factors

-Household income

Based on the National Standard, household income was measured as household income per person and grouped into four different quartiles. Q1 stands for the first income quartile which represents the poorest group with an income per person between 0 to 6775 yuan (the lowest 25% of the sample size). Q2 represents the second income quartile with an income per person ranging from 6,775 yuan to 10,160 yuan (those with income in the range of 25%-50% of the sample size). Q3 captures those in

the third income quartile with an income per person ranging from 10,160 yuan to 17,400 yuan (people with income in the 50%-75% of the sample size). Q4 stands for the fourth income quartile which represents the richest group with an income per person ranging from 17,400 to 10,6500 yuan (the highest 25% of the sample size). I treat Q1 as an omitted category. The literature review shows that wealthier people are more likely to use formal outpatient care when they are sick compared to the poor. In addition, they are somewhat more likely to use a city hospital than a CHC in China.

-Out-of-pocket expenditure (OOP)

OOP in this study captures the monthly OOP per person, which is the monthly household out-of-pocket expenditure divided by number of household numbers. It is a continuous variable, and based on the literature review, the higher the OOP, the less likely people ae to use formal outpatient care.

-Health insurance

As an important part of financing, health insurance was included as an enabling factor. As previously mentioned, there are three basic types of health insurance in Inner Mongolia which are NRCMI, UEBMI and URBMI. As a rural area, NRCMI is the main type of health insurance utilized in Ejin Horo county. The health insurance in this study was divided into four categories including the three main types of insurance. In addition, those who did not have insurance were categorized as “no insurance”. I treat NBMI as an omitted category. The literature review revealed that having no health insurance is negatively associated with the decision to use formal outpatient care. And those with NRCMI who obtained care are more likely to use primary health care facilities.

4.4.2.3. Perceived need

Perceived need is defined in Andersen model as health condition of people. In this study, I include two variables that capture individuals' health status including self-rated health and disease patterns.

-Self-rated health

For self-rated health, this study will use EQ-5D-5L as a tool to measure it. The EQ-5D-5L health states are presented in short form using five-digit numbers in which each digit represents the level of functioning for each dimension of health in order of presentation. The first digit "mo" represents mobility such as waling about. If mo=1, there was no problem with mobility; if mo=2, there was a slight problem with mobility; if mo=3, there was a moderate problem with mobility; if mo=4, there was a severe problem with mobility; and if mo=5, there was an extreme problem with mobility. The second digit "sc" represents self-care such as washing or dressing yourself. If sc=1, there was no problem with self-care; if sc=2, there was a slight problem with self-care; if sc=3, there was a moderate problem with self-care; if sc=4, there was a severe problem with self-care; and if sc=5, there was an extreme problem with self-care. The third digit "ua" represents usual activities such as cleaning the room. If ua=1, there was no problem with usual activities; if ua=2, there was a slight problem with usual activities; if ua=3, there was a moderate problem with usual activities; if ua=4, there was a severe problem with usual activities; and if ua=5, there was an extreme problem with usual activities. The fourth digit "pd" represents pain or discomfort such as back pain or infertility. If pd=1, there was no problem with pain or discomfort; if pd=2, there was a slight problem with pain or discomfort; if pd=3, there was a moderate problem with pain or discomfort; if pd=4, there was a severe problem with pain or discomfort; and if pd=5, there was an extreme problem with pain or discomfort. The fifth digit

“ad” represents for anxiety or depression such as feeling unhappy during the whole day. If ad=1, there was no problem with anxiety or depression; if ad=2, there was a slight problem with anxiety or depression; if ad=3, there was a moderate problem with anxiety or depression; if ad=4, there was a severe problem with anxiety or depression; and if ad=5, there was an extreme problem with anxiety or depression. The 5-digit numbers were needed for translation to the self-rated health index through the regression model proposed by Luo et, al. (Luo et al., 2017). The regressions equation is as follows:

$$\text{Self-rated health} = 1 - (0.066 \times \text{mo2} + 0.158 \times \text{mo3} + 0.287 \times \text{mo4} + 0.345 \times \text{mo5} + 0.048 \times \text{sc2} + 0.116 \times \text{sc3} + 0.210 \times \text{sc4} + 0.253 \times \text{sc5} + 0.045 \times \text{ua2} + 0.107 \times \text{ua3} + 0.194 \times \text{ua4} + 0.233 \times \text{ua5} + 0.058 \times \text{pd2} + 0.138 \times \text{pd3} + 0.252 \times \text{pd4} + 0.302 \times \text{pd5} + 0.049 \times \text{ad2} + 0.118 \times \text{ad3} + 0.215 \times \text{ad4} + 0.258 \times \text{ad5})$$

In this regression, a measure of mobility is captured using many dummy variables. If mo=1, then mo2 to mo5 in the regression model are set to 0 simultaneously. If mo=2, then mo2=1 and mo3, and mo4 and mo5 are equal to 0 simultaneously. If mo=3, then mo3=1 and mo2, mo4, and mo5 are set simultaneously. If mo=4, then mo4=1 and mo2, mo3 and mo5 are equal to 0 simultaneously. If mo=5, then mo5=1 and mo1 to mo4 are set at 0 simultaneously. Similarly, for other dimension of health self-care (sc), usual activities (ua), pain or discomfort (pd) and anxiety or depression (ad), we can translate the 5 digits by EQ-5E-5L into health state to the regression model using similar approach. For example, measure of self-care in EQ-5D-5L health state can be interpreted by many dummy variables in the regression model. If sc=1, then sc2 to sc5 are set 0 simultaneously. If sc=2, then sc2=1 and sc3, sc4 and sc5 are equal to 0 simultaneously. If sc=3, then sc3=1 and sc2, sc4, and sc5 are set simultaneously. If sc=4, then sc4=1 and sc2, sc3 and sc5 are equal to 0 simultaneously. If sc=5, then sc5=1 and sc1 to sc4 are set 0 simultaneously.

Table 13 provides the coefficient of EQ-5D-5L in the regression model as provided by Luo (2017). We can see that the magnitude of the coefficient monotonically increasing as the severity of each dimension of health escalates. The highest score in EQ-5D-5L health state is 11111 where there is no problem associated with all five health dimensions. When converting it into self-rated health index based on the above regression, self-rated health will be 1-0 equal to 1. The lowest score in EQ-5D-5L health state is 55555 where there is extreme problem associated with all five health dimensions. When converting it into self-rated health index based on the above regression, self-rated health will be 1-0.345-0.253-0.233-0.302-0.258 equal to -0.391. For example, if a respondent reported EQ-5D-5L health state as "24135", it indicates a slight problem with mobility (mo2=1), severe problems with self-care (sc4=1), no problem with usual activities (all the indicators are equal to 0), moderate problem with pain or discomfort (pd3=0), and extreme problem with anxiety/depression (ad5=1). When converting it into self-rated health index based on the above regression self-rated health will be 1-0.066-0.210-0-0.138-0.258 equal to 0.328.

According to the literature review, self-rated health is divided into 3 levels. Most of the studies I reviewed (Cathy, et al., 2016; Lu & Zeng, 2017; Li & Zhang, 2013) calculated self-rated health using the follow method. The first quartile of self-rated health index represents good health, the second quartile represents fair health, and the third and the fourth quartile represent poor health. As the sample is quite small in this study, I decided to use another method used in the previous literature (Li et al., 2016; Liu et al., 2017) to divide self-rated health into three levels. The first lowest 3.33% of self-rated health index is grouped as poor self-rated health, the second 33.33% is treated as fair self-rated health and the last 33.33% is assigned as good self-rated health. As the result of the literature review, there was a negative association between self-rated health and the utilization of formal outpatient care. What means that people who

report have good self-rated health are more inclined to use less formal outpatient care. People who reported worse self-rated health were more likely to use primary health care facilities.

Table 13: The coefficient of EQ-5D-5L

Model	Coefficient	SE
mo2	0.066	0.006
mo3	0.158	0.008
mo4	0.287	0.012
mo5	0.345	0.012
sc2	0.048	0.005
sc3	0.116	0.007
sc4	0.210	0.010
sc5	0.253	0.011
ua2	0.045	0.005
ua3	0.107	0.006
ua4	0.94	0.009
ua5	0.233	0.010
pd2	0.058	0.006
pd3	0.138	0.008
pd4	0.252	0.011
pd5	0.302	0.012
ad2	0.049	0.005
ad3	0.118	0.007

ad4	0.215	0.010
ad5	0.258	0.011

Source: (Luo et al., 2017)

-Disease pattern

For different disease patterns, people will change their mind to use health care and choose different types of health care facilities. So it is also part of the perceived need. In this study, one dummy variable was used to capture chronic diseases. 1 represents people have a chronic disease and 0 represents people who do not have a chronic disease. The literature review implies that having chronic diseases are more likely to use outpatient services and have more outpatient visits than those without chronic diseases.

4.4.2.4. Health literacy

Health literacy in this study is the categorical variable, and it will be grouped into 3 groups. Knowledge-based health literacy mainly includes knowledge of prevention hypertension, diabetes, and other diseases, and health knowledge such as nutrition, and safe medication. Behavioral health literacy mainly includes physical examination, physical exercise, and food intake. The survey of belief health literacy mainly focused on the participants' opinions and attitudes on health care and other viewpoints. Table 14 below contains the details of each component of health literacy.

Table 14: The indicators to measure health literacy

Indicator	Questions	Correct answer
Behavioral health literacy	1. Frequency of taking physical examination	At least once a year
	2. Frequency of outdoor activities	3 and above per week
	3. Salty taste	Light salt
	4. Daily vegetable intake	300-500g
	5. Daily fruit intake	200-400g
	6. Daily dairy products intake	300g and above
	7. Frequency of eating smoked food	Less than 3 times per month
Knowledge-based health literacy	8. Average daily salt intake of adults	6g
	9. Routes of transmission AIDS	Blood, sexual contact and mother-to-child transmission
	10. Must use antibiotics to treat colds or not	No
	11. Diagnostic criteria for hypertension	Systolic blood pressure more than 140 mm Hg or diastolic blood pressure more than 90 mm Hg
	12. Risk factors related to high blood pressure	Genetic factors, mental and environmental factors, age factors, lifestyle factors, drug effects, and other disease effects

	13. Common symptoms of diabetes	Drink more, eat more, more urine, and lose weight
Belief of health literacy	14. Do you think that participating in health lecture is good for your health?	Yes
	15. Do you think that hypertensive patients need to be treated by taking medicine?	Yes
	16. Do you think that diabetes patients need to be treated by taking medicine?	Yes
	17. Does maternal smoking affect the normal development of the fetus?	Yes

Source: Author

Based on existing research, a 65% correct answer rate is considered as having adequate health literacy, 50% marginal health literacy, and below 50% inadequate health literacy. Adequate health literacy means having a good lifestyle. After getting sick, they can self-prescribe the right medicine. When the disease is mild, they can correctly understand the instructions of the medicine, take the medicine correctly, and treat themselves. People having marginal health literacy means that after they get sick, they can self-treat with drugs, but sometimes they will ignore their symptoms and take no treatment, or in some unnecessary cases, choose to take antibiotics when in fact they should not take them. Those who are deemed have inadequate health literacy likely have a bad lifestyle. For example, they do not undertake physical examination

or they may not believe that maternal smoking may have adverse effects on the fetus. At the same time, they often do not actively acquire health knowledge even though their current health knowledge level is very low. After they are sick, only a few of these people can treat themselves. Similar with existing studies, each question was assigned a score, and there were three types of questions in the scale: yes-or-no, single-answer (only one correct answer), and multiple-answer (more than one correct answer in multiple-choice questions). With multiple-answer questions, a correct response had to contain all the correct answers and no wrong ones. Health literacy is positively associated with the utilization of formal outpatient care. As shown in table 15, there were 11 questions included in our questionnaire with a total score of 19. If the score was higher than 12, they were considered as having adequate health literacy; between 8 and 11 was considered as having marginal health literacy; and lower than 10 was considered as having inadequate health literacy. According to the literature review, the level of health literacy was negatively associated with the decision to use formal outpatient care, however the level of health literacy will not affect the choice of health care facilities. Instead different kinds of health literacy influence the choice of health care facilities. The greater number of points for each component of health literacy, the more likelihood that each person would choose primary health care facilities.

Table 15: Definition of explanatory variables on the decision to use outpatient care

Variable name	Variable	Description
Age	age	Continuous
Gender	male	1 if male, 0 if female.
Marital Status	married	1 for married; 0 if otherwise.

Ethnic group	han	1 for Han; 0 if Mongolia.
Education Level (edu)	1. No school	1 for under primary school this is the reference category and omitted from estimation.
	2. Primary school	1 for primary school; 0 if otherwise.
	3. Below college	1 for above primary school and below college; 0 if otherwise.
	4. College and above	1 for college and above; 0 if otherwise.
Occupation	unemployed	1 for unemployed, 0 if otherwise. This is the reference category and omitted from estimation.
	farmer	1 for farmer; 0 if otherwise.
	retiree	1 for retireer0 if otherwise.
	other employed	1 for other employed; 0 if otherwise.
Household income (income_q)	1. Income quartile 1	1 if the household income belongs to the first income quartile group; 0 if otherwise. This is the reference category and omitted from estimation.
	2. Income quartile 2	1 if the household income belongs to the second income quartile group; 0 if otherwise.
	3. Income quartile 3	1 if the household income belongs to the third income

		quartile group; 0 if otherwise.
	4. Income quartile 4	1 if the household income belongs to the fourth income quartile group; 0 if otherwise.
Health Insurance (hi)	1. No insurance	1 for no insurance; 0 if otherwise. This is the reference category and omitted from estimation.
	2. Urban employee insurance	1 for UEBMI; 0 if otherwise.
	3. Urban residents insurance	1 for URBMI; 0 if otherwise.
	4. Rural residents insurance	1 for NRCMI; 0 if otherwise.
Out of pocket expenditure	Monthly OOP	continuous
Chronic disease	chronic	1 if a person has chronic disease and 0 if otherwise
Emergency disease	emergency	1 if a person seeks health for emergency disease and 0 if otherwise
Self-rated health (sr_health)	1.poor health	1 if poor self-rated health; 0 if otherwise. This is the reference category and omitted from estimation.
	2.fair health	1 if fair self-rated health; 0 if otherwise

	3.good health	1 if average self-rated health; 0 if otherwise.
Health literacy (he_literacy)	1. inadequate_literacy	1 if inadequate health literacy; 0 if otherwise. This is the reference category and omitted from estimation.
	2. marginal_literacy	1 if marginal health literacy; 0 if otherwise.
	3. adequate_literacy	1 if adequate health literacy; 0 if otherwise.

Source: Author

Table 16: Expected sign of coefficient and reasons on the decision to use outpatient care

Variable	Expected sign	Reason
Age	(+)	As people age, people's health condition will become worse and worse, which will increase the probability of seeking outpatient care.
Male	(-)	Compared with men, because of physiological reasons, women are sick more frequently, and because of psychological reasons, women will seek more outpatient services after they got sick.
Married	(+)	In theory, those who are already married are older than those who have never been married, and because of family reasons, they are more likely to seek outpatient care when they are sick.
Han ethnic group	(+)	In China, the Han nationality is the largest ethnic

		group, and the Han nationality in Inner Mongolia still accounts for the majority of the total population. At the same time, Han people are richer than Mongolians, so they are more likely to seek outpatient care.
Education level from no school to college and above	(+)	People with high education levels have relatively high incomes, more attention to their own health, and have a stronger tendency to use outpatient services when they are sick.
Employed	(+)	The income of people with jobs is more stable than those who do not work, and their health insurance compensation mechanism is more perfect, so they are more willing to seek outpatient services when they are sick.
Household income quartile: from 1st to 4th	(+)	People with high income quartile levels have more disposable income, and they are more likely to use outpatient services when they are sick.
Have health insurance	(+)	Compared with those who do not have health insurance, people who have health insurance pay relatively less when they go to see a doctor, so they prefer to seek outpatient services when they are sick.
Monthly OOP	(-)	Higher OOP means you spend more money, as the OOP increasing, people are less likely to use outpatient care.
Have chronic disease	(+)	People with chronic diseases need to go to the clinic regularly to prescribe drugs and undertake physical examinations, and they are more likely to use outpatient care.
Have emergency aliments	(+)	People have emergency aliments must go to hospital to seek care, otherwise they may lose their lives or become disabled.

Self-rated health: from poor to health	(-)	People who report good health have better health and less likely to get sick, so they are less likely to seek outpatient care
Health literacy: from inadequate to adequate	(-)	People with adequate health literacy can treat themselves and they will pay more attention to their health and they will do something to prevent disease, as a result they are less likely to use outpatient care.

Source: Author

Table 17: Definition and description of additional explanatory variables on the choice of three-tiered health care facilities

Name	Variable	Description
Health literacy (hl)	1. knowledge_literacy	Continuous variable, the higher the score, the more they have knowledge-based health literacy
	2. behavior_literacy	Continuous variable, the higher the score, the more they have behavioral health literacy
	3. belief_literacy	Continuous variable, the higher the score, the more they have the belief of health literacy

Source: Author

Table 18: Expected sign and reason on the choice of the highest level of health care facilities (tertiary health care facilities)

Variable	Expected sign	Reason
Education Level: from no school to college and above	(+)	In theory, people with high levels of education have higher incomes than those with lower levels, so even though the

		expenditure at tertiary health care facilities is higher than primary, they are more likely to go to tertiary health care facilities.
Household income quartile: from 1st to 4th	(+)	People with high income quartile levels have a small proportion of the expenditure of daily necessities, so when choosing health care facilities for medical treatment, they are more likely to choose a tertiary health care facility with complete medical service equipment.
Have health Insurance	(+)	People with health insurance will receive certain compensation from the provider of the insurance when they go to the hospital. Therefore, compared with those who do not have medical insurance, they tend to go to tertiary health care facilities more.
Self-rated health: from poor health to good health	(-)	People who report good health have higher level of health and pay attention to the prevention and treatment of diseases. Under normal circumstances, the diseases are lighter and can be cured in primary health care institutions, so they are less likely to go to tertiary health care facilities.
Emergency aliments	(-)	People have emergency aliments should be treated in time, they always choose the closest health care facilities which are primary health care facilities. As a result, they are less likely to choose tertiary health care facilities.

Knowledge-based health literacy	(-)	People have higher score of knowledge-based health literacy can treat themselves and focus on preventing disease. As a result, they are less likely to use tertiary health care facilities.
Belief of health literacy	(-)	People with higher score of belief health literacy know what to do is good for their health, and they attend health related lecture often. As a result, they are relatively healthy and less likely to choose tertiary health care facilities.
Behavioral health literacy	(-)	People with higher score of behavioral health literacy are those who have a healthier lifestyle, and they are relatively healthy. As a result, they are less likely to choose tertiary health care facilities.

Source: Author

After all the explanatory variables have been selected, the correlation between each variable needs to be performed to show if there are confounding factors among the explanatory variables. After performing the correlation matrix of variables, I found that the highest correlation coefficient is found to be equal to -0.84 for inadequate health literacy and marginal health literacy. And the lowest correlation coefficient is found to be equal to 0.00 for monthly OOP and male, the third income quartile group and age, URBMI and age, emergency disease and age, emergency disease and the fourth income quartile group, emergency disease and Han ethnic group, retiree and self-rated poor health, chronic disease and retiree, marginal health literacy and primary school, marginal health literacy and college and above. Furthermore, there are only six pairs

of regressors that have the correlation coefficient greater than or equal to the absolute value of 0.50 out of a total of 394 pairs of regressors. This shows that there is quite low correlation among the regressors in the model, making the concern of confounding factors being less serious in this study. The result of correlation matrix of each variable is shown in the Appendix B.

4.5. Methodology

For dependent variable Y_1, because it is the decision to use health care facilities (whether use health care facilities or not). We observe Y_1 =1 if "use" and Y_1 = 0 if "not use". So I will use binary logit model to analyze the decision to use medical care, the dependent variableY_1. For dependent variable Y_2, it is the choice of using health care facilities conditioning on individual decide to seek formal treatment (i.e. use primary health care facilities, secondary health care facilities or tertiary health care facilities). So ordered logit model is an appropriate model to analyses Y_2 since the choice of care has natural ordering makes ordered logit an appropriate model.

4.5.1. Descriptive statistics

The study will use descriptive statistics to describe the basic situation of Ejin Horo county, demographic characteristics of the sample and the health seeking behavior as the first step.

Then, econometric models will be employed there after to measure the impact of each explanatory variable on outcome of interest.

4.5.2. Binary Logit Model

Assume a latent variable Y_{1i}^{*} which underlines the decision to use health care facilities. We further assume that this latent variable follows a linear structure as follows.

$$Y_{1i}^{*} = X_i \cdot \beta + \varepsilon_i$$

Where X is a vector of observed variables, β is a vector of coefficient estimates and ε is the error term. We further assume that

$Y_{1i} = 1$ if we observe a person use health care facilities, and

$Y_{1i} = 0$ if we observe a person does not use health care facilities.

It is assumed that $Y_{1i} = 1$ if $Y_{1i}^{*} > 0$ and,

$Y_{1i} = 0$ if $Y_{1i}^{*} \leq 0$

If the value of this latent index exceeds a threshold of zero, then the decision to use health care facilities will be observed ($Y_{1i} = 1$). If the value is less than the threshold, the decision to of using health care facilities will be observed ($Y_{1i} = 0$). The threshold is usually normalized to be zero, so we can obtain:

$$\Pr(Y_{1i} = 1) = \Pr(\varepsilon_I \leq X_i \cdot \beta)$$

If ε_i has a logistic distribution, then we can express

$$\Pr(Y_{1i} = 1) = \frac{exp^{X_i \cdot \beta}}{1+exp^{X_i \cdot \beta}} \text{ and}$$

$$\Pr(Y_{1i} = 0) = \frac{1}{1+exp^{X_i \cdot \beta}} .$$

The β in this expression is the coefficient estimates, which we can estimate by using maximum likelihood estimation, as follows:

$$max\ L(\beta) = \prod_{i=1}^{n} \frac{exp^{X_i \cdot \beta}}{1 + exp^{X_i \cdot \beta}} \prod_{i=n+1}^{n} \frac{1}{1 + exp^{X_i \cdot \beta}}$$

Because the estimated coefficient only tells us about the direction of the impact of each regressor on the probability of the use of health facilities. If we would like to find the magnitude of the impact, marginal effect needs to be calculated.

If X is a dummy variable such as gender, marginal effect is captured by

$$\Pr(Y_{1i} = 1 \mid x = 1) - \Pr(Y_{1i} = 1 \mid x = 0)$$

On the other hand, if X is continuous variable like age, marginal effect can be calculated as

$$\frac{\partial\, Pr(Y = 1)}{\partial X}$$

It should be noted that all of the marginal effects will be evaluated at the mean value of X.

4.5.3. Ordered Logit Model

The true underlying outcome of person i is represented by a latent index,

$$Y_2^{*} = X_i\beta + \varepsilon_i$$

With an ordered logit model, if the value of the latent index falls within the range corresponding to a particular choice category, that category will be chosen. If the latent index is either above or below that range, then a different category is chosen.

The probability that person i will be in the j^{th} category is:

$$\Pr(outcome_i = j) = \Pr(C_{j-1} < \beta_1 X_{1i} + \cdots + \beta_k X_{ki} + \varepsilon_i \leq C_j)$$

The cut points c are estimated along with the coefficients β. The intercept is subsumed into the cut points and we normalize the lowest and highest cut points, so we estimate K + j- 1 parameters, consisting of K coefficient estimates and j – 1 cut off points:

Cut points are $C_1, \cdots, C_{j-1}, C_0$ in which is normalized to $-\infty$ and C_j is normalized to $+\infty$. If we assume ε to have logistic distribution, we can get probability expression in

the logit form, which can be inserted into the likelihood function and result in ordered logit model.

The β in this expression is the coefficient estimates, which we can estimate by using maximum likelihood estimation.

Let $P^j = \Pr(Y = j)$, for j=1,2, ⋯,J.

Let $y^j = 1$ if choice j is chosen, and 0 if choice j is not chosen

Likelihood function is:

$$L\,(\beta, C) = \prod_{i=1}^{N} \prod_{j=1}^{J} P^{j^{(Y^j)}}$$

$$ln\,L\,(\beta, C) = \sum_{i=1}^{N} \sum_{j=1}^{J} Y^j\, lnP^j$$

Where β are the estimated coefficients and C are the cut points.

Maximize the log of likelihood:

$$\frac{\partial lnL(\beta, C)}{\partial \beta} = 0$$

and

$$\frac{\partial lnL(\beta, C)}{\partial C} = 0$$

Because the estimated coefficient only tells us about the direction of the impact of each regressor on the probability of using the highest level of health facilities. If we would like to find the magnitude of the impact, marginal effect needs to be calculated.

Marginal effect is:

$$\frac{\partial\, Pr(Y = j)}{\partial X_k}$$

and for discrete change:

$\Pr(Y_2 = j \mid x = 1) - \Pr(Y_2 = 1 \mid x = 0)$

All of the marginal effects will be evaluated at the mean value of X.

The underlying assumption of the ordered logit model is the proportional odds assumption. With ordered logit model we estimate only one set of coefficient estimates, so a change in any x variable moves the latent index the same amount for all outcome categories below. In particular, with an ordered model:

$\Pr(Y_2 \leq 0) = \Pr(\varepsilon_i \leq C_1 - \beta x)$

$\Pr(Y_2 \leq 1) = \Pr(\varepsilon_i \leq C_2 - \beta x)$

$\Pr(Y_2 \leq 2) = \Pr(\varepsilon_i \leq C_3 - \beta x)$

These expressions differ only by a constant term (i.e. C_1, C_2, C_3), the coefficient estimates are the same.

The assumption of proportional odds implies that if we estimated a series of binary regressions for the three outcomes above, that is

$\text{outcome}_i = 1 \text{ if } \Pr(Y_2 \leq 0), \text{ else } 0$

$\text{outcome}_i = 1 \text{ if } \Pr(Y_2 \leq 1), \text{ else } 0$

$\text{outcome}_i = 1 \text{ if } \Pr(Y_2 \leq 2), \text{ else } 0$

The β coefficients of the three outcomes above would be the same,

$\beta_1 = \beta_2 = \beta_3 = \beta$ if ordered logit model is valid. We employ likelihood ratio test to test the proportional odds assumption with the null and alternative hypotheses as follows:

$H_o: \beta_1 = \beta_2 = \beta_3$.

H_1: The coefficients are not equal.

If H_o is not rejected, it implies that ordered logit model is valid. On the other hand, if H_o is rejected, then the ordered logit model is not valid for the study.

We will conduct this likelihood ratio test after presenting the regression result.

CHAPTER V
RESULTS AND DISCUSSION

According to the research methodology discussed in the previous chapter, this chapter illustrates results and discussion with the objectives of the study set in the first chapter.

5.1. Individual's Characteristics for Formal Outpatient Service

In order to get a better understanding of the results, it is important to know the main characteristics of the sample used in the research. It provides a brief description of the sample in terms of different criteria as follows. This study included 396 households and 910 individuals. After cleaning up the data and making observations with complete information needed to study the sample size, the number was reduced to 319 households with a total 447 individuals. Table 17 provides a profile of the 447 individuals in terms of their different characteristics.

As shown in table 19, among the 447 individuals who sought health care during the previous two weeks, the proportion of males was lower than that of females (46% vs. 54%). These individuals were between 18 and 95 years old, with the average age being 58 years old. A total of 88% of them were married and 84% of them were of the Han ethnic group. The education level of most people in this study was no school (45%), followed by primary school completion (29%), and school without degree (23%). The rate of people graduating from college or above is relatively low, accounting for only 3%. Farming (75%) was the main occupation in Ejin Horo county followed by other employed (16%), unemployed (7%), and retiree (2%). The highest monthly out-of-pocket expenditure was 7,222.22 yuan per individual and the lowest was 0 yuan; the average was 422.15 yuan. Households were classified into income quartile groups with all members in one household being classified in the same quartile group. A total of

68% of individuals had a chronic disease. In terms of health insurance, 91.50% of the sample are under NRCMI, 2.24% (10) of the sample are under UEBMI without insurance, and 4.03% (18) of the sample were under URBMI. The main reason for the oversampling of people participating in the NRCMI is that the area we surveyed is a rural area. Although there are some employees and retirees, the residents of rural households still occupy the majority. Therefore, many people participated in the NRCMI, reaching 91.50% for those who were sick during the previous 2 weeks, and 25% for emergency cases. And for self-rated health, after calculating with the EQ-5D-5L index, people are categorized to have three levels of self-rated health: poor, fair, and good. In terms of the main explanatory variable of this study health literacy, most of the sample (75%) had inadequate health literacy, followed by marginal health literacy (19%). Meanwhile, the rate of people who had adequate health literacy was smallest at 6% of the sample.

Table 19: Descriptive statistics for explanatory variables of people who are sick during the past two weeks prior to the interview

Variable	No. of observation	Mean	SD	Min	Max
Male	205	0.46	0.50	0	1
Female	242	0.54	0.50	0	1
Age	447	58.49	12.93	18	95
Married	395	0.88	0.32	0	1
No married	52	0.12	0.35	0	1
Han	376	0.84	0.37	0	1
Mongolian	71	0.16	0.37	0	1
No school	203	0.45	0.50	0	1
Primary school	131	0.29	0.46	0	1

Below college	102	0.23	0.42	0	1
College and above	11	0.03	0.16	0	1
Unemployed	33	0.07	0.26	0	1
Farmer	335	0.75	0.43	0	1
Retiree	6	0.02	0.12	0	1
Other employed	73	0.16	0.37	0	1
Monthly OOP	447	422.15	832.03	0	7222.22
Income quartile 1	112	0.25	0.43	0	1
Income quartile 2	114	0.25	0.43	0	1
Income quartile 3	110	0.25	0.43	0	1
Income quartile 4	111	0.25	0.43	0	1
No insurance	10	0.02	0.15	0	1
Urban residents insurance	18	0.04	0.20	0	1
Urban employee insurance	10	0.02	0.14	0	1
Rural residents insurance	409	0.92	0.28	0	1
Chronic	304	0.68	0.47	0	1
Non-chronic	143	0.32	0.47	0	1
Emergency	112	0.25	0.43	0	1
Non-emergency	335	0.75	0.43	0	1
Poor health	150	0.34	0.47	0	1
Fair health	154	0.34	0.48	0	1
Good health	143	0.32	0.47	0	1
Adequate_literacy	21	0.06	0.24	0	1
Marginal_literacy	78	0.19	0.39	0	1

Inadequate_literacy	209	0.75	0.43	0	1

Note: No. of observation = 447

Source: Author

As shown in table 20, among the 316 individuals who decided to seek formal outpatient care during the previous two weeks, the proportion of males was lower than that of females (45% vs. 55%). Which indicates that female is more likely to use formal outpatient care compare to male. These individuals were between 18 and 93 years old, with the average age being 58 years old. A total of 88% of them were married and 84% of them were of the Han ethnic group. The education level of most people that decided to use outpatient care was no school (43%), followed by primary school completion (32%), and below college (22%). The rate of people who decided to seek formal outpatient care graduating from college or above is relatively low, accounting for only 3%. Farming (74%) was the main occupation among those who decided to seek formal outpatient care after they got sick followed by other employed (16%), unemployed (7%), and retiree (2%). The highest monthly out-of-pocket expenditure was 6,541.67 yuan per individual and the lowest was 4.17 yuan; the average was 400.71 yuan. The monthly out-of-pocket expenditure is a little bit lower compared to the monthly out-of-pocket expenditure of the whole sample. Among those who decided to seek care people in the first and fourth income quartile group, each group accounts for 24% of the total number. And the proportion of people in the second and third income quartile group is the same (26%). A total of 69% of individuals had a chronic disease. In terms of health insurance, 91.00% of those decided to seek care are under NRCMI, 3.00% (8) of the sample are under UEBMI without insurance, and 4.00% (12) of the sample were under URBMI. And 25% the individuals who decided to seek formal outpatient care were because of the emergency aliments. And for self-rated health,

not as we grouped in Table 17, there are 35% of those who decide to use formal outpatient care reported they have poor health, followed by fair health (33%) and good health (32%) In terms of the main explanatory variable for health literacy, this table shows the different components of it instead of the level. For knowledge-based health literacy, the highest score is 8 and the lowest score is 0. In terms of belief of health literacy, the highest score is 4 while the lowest score is 0. For behavioral health literacy, the highest score is 8 while the lowest score is 1. Compare to knowledge-based and belief of health literacy, the lowest score of behavioral health literacy is the highest. And it means that, compare to the other two components of health literacy, the score of behavioral health literacy is a little bit better.

Table 20: Descriptive statistics for explanatory variables of people who are seeking formal outpatient care during the past two weeks prior to the interview

Variable	No. of observation	Mean	SD	Min	Max
Male	143	0.45	0.50	0	1
Female	173	0.55	0.50	0	1
Age	316	58.22	12.80	18	93
Married	279	0.88	0.32	0	1
No married	37	0.12	0.35	0	1
Han	259	0.82	0.38	0	1
Mongolian	57	0.18	0.39	0	1
No school	137	0.43	0.50	0	1
Primary school	100	0.32	0.47	0	1
Below college	70	0.22	0.42	0	1
College and above	9	0.03	0.17	0	1

Unemployed	24	0.08	0.27	0	1
Farmer	233	0.74	0.44	0	1
Retiree	5	0.02	0.12	0	1
Other employed	54	0.16	0.37	0	1
Monthly OOP	316	400.71	753.61	4.17	6541.67
Income quartile 1	75	0.24	0.43	0	1
Income quartile 2	83	0.26	0.44	0	1
Income quartile 3	82	0.26	0.44	0	1
Income quartile 4	76	0.24	0.43	0	1
No insurance	7	0.02	0.15	0	1
Urban residents insurance	12	0.04	0.20	0	1
Urban employee insurance	8	0.03	0.16	0	1
Rural residents insurance	289	0.91	0.28	0	1
Chronic	219	0.69	0.47	0	1
Non-chronic	97	0.31	0.47	0	1
Emergency	94	0.30	0.46	0	1
Non-emergency	222	0.70	0.46	0	1
Poor health	112	0.35	0.47	0	1
Fair health	104	0.33	0.48	0	1
Good health	100	0.32	0.47	0	1
Knowledge_literacy	316	1.21	1.58	0	8
Belief_literacy	316	1.57	1.10	0	4
Behavioral_literacy	316	4.91	1.51	1	8

Note: No. of observation = 316

Source: Author

The table 21 shows distribution of different health literacy levels according to the income quartiles. The income is calculated on an annual basic per person basis which comprises wages and salaries, sale of agricultural products and income earned from performing non-agricultural activities. The cutoff point of income from the first quartile was 6,775 yuan and 17,400 yuan for the highest quartile. Health literacy is divided into three group: a 65% correct answer rate of all the questions was considered as having adequate health literacy, a 50% rate was considered as having marginal health literacy, and below 50% as having inadequate health literacy. The proportion of individuals that have adequate health literacy in the third income quartile group is the highest compared to the other groups, followed by the fourth income quartile group. The proportion of people that have inadequate health literacy in the fourth quartile group is the lowest compared to the other groups, followed by the third quartile group. The higher the income quartile level, the lower the inadequate health literacy. Rich people are usually those with higher education levels, and they are more willing to invest in health. Some even have their own family doctors regularly checking the body and passing on relevant health care knowledge. Therefore, they are better than the poor in terms of knowledge, beliefs and way of life. This is also the reason for their higher level of health literacy.

Table 21: Health literacy group in different income quartiles

	Inadequate_literacy	Marginal_literacy	Adequate_literacy
Income quartile 1	72.22%	26.39%	1.39%
Income quartile 2	78.57%	18.57%	2.86%
Income quartile 3	63.75%	25.00%	11.25%

Income quartile 4	59.30%	30.23%	10.47%

Source: Author

Table 22 shows the distribution of different health literacy according to education level of each individual. The education level is categorized into four groups. The first group is no school which most people in the sample belong to. The second group is primary school completion, which is the second largest group. The third group is below college, which we also refer to as schooling without a degree, and the fourth group is college and above. The no school level had the largest proportion of people with inadequate health literacy compared to other education levels. On the other hand, those who have graduated from college or higher education have the highest level of health literacy. With the increase in education level, the level of health literacy rises as well. People with a high level of education level who know more about health knowledge will take the initiative to pay attention to health information and they also know the importance of having a healthy body. This means that they can better understand the function of medicines and other related products and understand exactly what medicine to take and what diseases require hospitalization for treatment.

Table 22: Health literacy group in different education level

	Inadequate	Marginal	Adequate
No school	79.45%	17.12%	3.42%
Primary school	72.62%	22.62%	4.76%
Below college	43.1%	45.8%	11.1%
College and above	16.67%	16.67%	66.67%

Source: Author

5.2. Overview Health Literacy Awareness

5.2.1. Behavioral health literacy

In theory, behavioral health literacy includes smoking, physical examination, physical exercise, breakfast and so on. In this study, behavioral health literacy contains the frequency of exercise, salty taste, daily diet including daily fruit, vegetable, and dairy products intake. In addition, the frequency of eating smoked food.

All the correct answers about the daily diet are based on "The Chinese Dietary Guidelines". As shown in table 23, the highest correct answer rate (68.90%) was on the seventh question regarding the frequency of eating smoked food. The lowest correct answer rate was for the frequency of outdoor activities, of which only 24.16% got right. The main reason is likely that most people in this area are working mainly in agriculture. They may be very tired all day and thus not take the initiative to exercise.

Table 23: Behavioral health literacy

Indicator	Correct answer	Frequency	Correct answer rate
1. Frequency of taking physical examination	At least once a year	116	25.95%
2. Frequency of outdoor activities	3 and above per week	108	24.16%
3. Salty taste	Light salt	157	35.12%
4. Daily vegetable intake	300-500g	289	64.65%
5. Daily fruit intake	200-400g	143	31.99%

6.	Daily dairy products intake	300g and above	297	66.44%
7.	Frequency of eating smoked food	Less than 3 times per month	308	68.90%

Source: Author

5.2.2. Knowledge-based health literacy

Knowledge-based health literacy covers content on nutrition, chronic diseases, infectious diseases, mental health, and commonly used cognition. In this study, knowledge-based health literacy mainly focused on the main symptoms of hypertension, diabetes, the transmission of AIDS, the intake of salt, and the use of antibiotics.

As shown in table 24, there was no question with a correct response rate of more than 50%. The highest correct answer rate was 37.36% which was related to the routes of transmission of AIDS. Recently, more Chinese people have begun to pay attention to AIDS. There are also more and more public service advertisements on TV to remind people that AIDS will not be easily transmitted. Therefore, we should protect ourselves while still caring more for AIDS patients. And the lowest correct answer rate was related to the average daily salt intake of adults which was only 6.04%. In Inner Mongolia, especially in the western part of Inner Mongolia, people tend to have a fondness for salty food. Although the utensils that we normally use to hold salt will tell us that we cannot consume more than 6 grams of salt per person per day, people usually pay less attention to this aspect. Instead, they care more about the taste of the food.

Table 24: Knowledge-based health literacy

Indicator	Correct answer	Frequency	Correct answer rate
1. Average daily salt intake of adults	6g	27	6.04%
2. Routes of transmission AIDS	Blood, sexual contact and mother-to-child transmission	167	37.36%
3. Must use antibiotics to treat colds or not	No	162	36.24%
4. Diagnostic criteria for hypertension	Systolic blood pressure more than 140 mm Hg or diastolic blood pressure more than 90 mm Hg	48	10.74%
5. Risk factors related to high blood pressure	Genetic factors, mental and environmental factors, age factors, lifestyle factors, drug effects, and other disease effects	99	22.15%
6. Common symptoms of diabetes	Drink more, eat more, more urine, and lose weight	48	10.74%

Source: Author

5.2.3. Belief of health literacy

Belief of health literacy is mainly to evaluate the respondents' views and attitudes on health, money and health care. In this study, the belief of health literacy mainly focused on the attitudes on health care. As shown in table 25, the highest correct answer rate (70.47%) was related to maternal smoking. China has begun to pay closer attention to smoking issues. Each pack of cigarettes is marked with the phrase “smoking is harmful to health”. Many public service advertisements and television programs on TV also tell people that smoking is not good for their health. In many public places, slogans of “no smoking” are posted, and these actions may make people more aware of the harmful effects of smoking. Meanwhile, the lowest correct answer rate was related to health lectures; only 17.23% of the sample thought that participating in health lectures was good for their health. This may indicate that many people do not like to attend health lectures. They may be viewed as a waste of time. Moreover, people generally think that they know a lot about health already and do not need to attend health talks. The fact is that some of the health knowledge they think they know is actually wrong. It is not only bad for health, but sometimes it has a bad effect on health. For some health knowledge, many people are still ambiguous; they know a little but may not have the facts right or may not be able to provide the correct answers.

Table 25: Belief of health literacy

Indicator	Correct answer	Frequency	Correct answer rate
1. Do you think that participating in health lecture is good for your health?	Yes	77	17.23%
2. Do you think that hypertensive patients need to be treated by taking	Yes	184	41.16%

medicine?			
3. Do you think that diabetes patients need to be treated by taking medicine?	Yes	120	26.85%
4. Does maternal smoking affect the normal development of the fetus?	Yes	315	70.47%

Source: Author

5.3. Overview of the Decision to Use Formal Outpatient Care

As shown in table 26, 29.31% of the sample decided not to use formal outpatient care when they were sick, while 70.69% of the sample decided to use formal outpatient care when they were sick during the previous two weeks. Anyhow the proportion of people deciding to use formal outpatient care was much higher than those who decided not to use it.

Table 26: The decision to use formal outpatient care

Y_1	Frequency	Percent
Not use	131	29.31%
Use	316	70.69%
Total	447	100%

Source: Author

5.3.1. Cross-tabulation between the decision to use formal outpatient care and all factors

Table 27 shows the cross-tabulation between the decision to use versus not use formal outpatient care of income, education level, health insurance, self-rated health, and health literacy on the use of formal outpatient care. The highest proportion of people

that do not use formal outpatient care is the first income quartile group. And the lowest is the third income quartile group. People within the higher income quartile decided to use more formal outpatient care. Rich people have more expendable income than the poor, and as mentioned earlier, rich people generally have a relatively higher education level and a greater degree of concern for health, so they are more willing to choose formal outpatient care when they get sick.

The highest proportion of people deciding not to use formal outpatient care is people under the URBMI and the lowest proportion is the people under UEBMI. The main reason for this phenomenon is that the sample size under the URBMI and the UEBMI are too small. Most people in this study are under NRCMI. There is not much difference in the use of outpatient care between the insurer of NRCMI and those without medical insurance. This is because our research of the NRCMI already exceeded sampling and only 2.24% of people did not have health insurance.

The highest proportion of people who decided to use formal outpatient care were those whose education level was college and above and the lowest were those whose education level was no school. Higher educated people use more formal outpatient care compared to those whose education level are no school. People with a higher level of education often have better jobs and higher incomes, and they know the importance of having a healthy body. So when they are sick, they choose to seek formal outpatient care.

For those who decided not to use formal outpatient care, the proportion of those who judge that their health is poor are the lowest. Healthier people decided to use less formal outpatient care. People who have higher levels of self-rated health are often less likely to get sick. They also believe that their resistance can withstand some viruses. Moreover, even if they are sick, they will feel that their illness is not serious

enough to go to see the doctors. At the same time, they have a certain capacity for self-treatment.

The highest proportion of people who decided not to use formal outpatient care were those who have adequate health literacy, and the highest probability that determines whether someone uses formal outpatient care seems to be those who have inadequate health literacy. It seems that the higher level of health literacy, the less likely they are to use formal outpatient care. People with low levels of health literacy usually live without a healthy lifestyle and do not pay attention to disease prevention. Sometimes in the season of high incidence of infectious diseases, they do not take good precautions, so they can easily catch a cold or other infectious disease. People with low levels of health literacy usually live without a healthy lifestyle and do not pay attention to disease prevention. Sometimes in the season of high incidence of infectious diseases, they do not take preventive measures and it is easy to catch colds or other infectious diseases. They also lack health knowledge and are unable to treat themselves when they are ill, so they will choose more formal outpatient services.

Table 27: Main factors and decision to use formal outpatient care

	Not use	Use
Income		
Income quartile 1	33.04%	66.96%
Income quartile 2	27.19%	72.81%
Income quartile 3	25.45%	74.55%
Income quartile 4	31.53%	68.47%
Health insurance		
No insurance	30.00%	70.00%

Urban employee insurance	20.00%	80.00%
Urban residents insurance	33.33%	66.67%
Rural residents insurance	29.34%	70.66%
Education level		
No school	32.51%	67.49%
Primary school	23.67%	76.33%
Below college	31.37%	68.63%
College and above	18.18%	81.82%
Self-rated health		
Poor health	25.33%	74.67%
Fair health	32.47%	67.53%
Good health	30.06%	69.93%
Health literacy		
Inadequate_literacy	28.66%	71.34%
Marginal_literacy	29.41%	70.59%
Adequate_literacy	37.04%	62.96%

Source: Author

5.3.2. Factors affecting decision to use formal outpatient care

For the decision to use outpatient care, table 28 only shows the statistically significant factors as most of the factors are not statistically significant, complete results are shown in the Appendix C. Y_1 is the dependent variable that measures the decision to use formal outpatient care. The column CE shows the coefficient of each factor that affect the decision to use formal outpatient care, the column SE demonstrates the standard error of each factor and the column ME presents the marginal effect of each

factors. For the binary logit model, because the coefficient of every factor does not tell the magnitude of the impact, the marginal effect needs to be calculated. Being in the Han ethnic group, having adequate health literacy, having emergency ailments and having an education level of primary school are all statistically significant. There is a negative and significant coefficient associated with the Han ethnic group. By looking at the marginal effect, being in the Han ethnic group decreases the probability of seeking care by 15.8% in comparison to those Mongolian. There is negative and significant coefficient associated with people who have adequate health literacy, as well. And based on the marginal effect, having adequate health literacy decreases the probability of seeking care by 22.9% in comparison to those who have inadequate health literacy, respectively. The literature review showed that being in the Han ethnic group increases the proportion of using formal outpatient care, but this study is contrary to the conclusion of the literature review. In China, the Han ethic group accounts for the majority, and compared with other ethnic groups, members of the Han ethnic group are richer. In this study, although the Han ethnic group still accounts for the majority, as shown in table 27, the proportion of Mongolian people in the last income quartile group is higher than that of Han people. As mentioned above, people with adequate health literacy usually have a healthy lifestyle and can treat some diseases themselves, so they are less likely to choose to seek formal outpatient care when they are ill.

There is a positive and significant coefficient associated with having emergency ailments. From marginal effect computation, having emergency ailments disease increases the probability of seeking care by 21.4% comparing to those with non-emergency ailments. Patients with emergency ailments may incur very serious physical harm if they are not treated promptly, so they will have more choices for using formal outpatient services.

The main reason that monthly out-of-pocket expenditures do not affect the decision to use formal outpatient care is that the monthly out-of-pocket expenditures of 358 individuals (80.09%) were below the average level (422.15 yuan), and only less than 20% of the people's expenditures were above average. Most people's monthly out-of-pocket expenditures are less than 422.15 yuan, and it quite low. As a result, it will likely not affect the use of health services. There were even 6 individuals who OOP that is equal to 0 1.34% out of the sample.

Table 28: The coefficient estimate (CE) and marginal effect (ME) for decision to use formal outpatient care

Y_1	X	CE	SE	ME	SE
	Han	-0.794	[0.344] **	-0.158	[0.678] **
	Primary school	0.483	[0.289] *	0.958	[0.572] *
	Emergency	1.079	[0.301] ***	0.214	[0.058] ***
	Adequate_literacy	-1.153	[0.521] **	-0.229	[0.103] **

Note: *Significant at 10% **Significant at 5%

***Significant at 1% No. of observation = 447

CE: Coefficient estimated SE: Standard error

ME: Marginal effect

Source: Author

Table 29: Ethnic group grouping in different income quartiles

Ethnic group	income quartile 1	income quartile 2	income quartile 3	income quartile 4
Han	23.94%	26.86%	25.00%	24.00%

Mongolia	30.99%	18.31%	22.54%	28.16%

Source: Author

5.4. Overview of the Utilization at Different Level of Health Care Facilities

As indicated in table 30, 69.30% of the sample decided to seek health care in primary health care facilities, 18.35% of the sample sought health care in secondary health care facilities, and 12.34% sought health care in tertiary health care facilities. Most people chose to go to primary health care facilities when they were ill, followed by secondary health care facilities, and finally tertiary health care facilities.

Table 30: Utilization at different level of health care facilities

Y_2	Frequency	Percent
Primary	219	69.30%
Secondary	58	18.35%
Tertiary	39	12.34%

Source: Author

5.4.1. Cross-tabulation between different level of health care facilities and each factor

The table 31 below indicates that primary health care facilities remain the most preferred choice of using outpatient services by almost all individuals. For the income quartile groups, the highest proportion of people who chose primary health care facilities were the people in the first income quartile group, while the highest proportion of people who chose tertiary health care facilities were the people in the fourth income quartile group. Richer people prefer to go to tertiary and secondary

health care facilities compared to poorer people. Because going to a tertiary care service means spending more money, people with higher income levels prefer to go to tertiary care facilities, while those with low incomes prefer primary health care facilities.

For health insurance, people under NRCMI use primary health care facilities least and the people who do not have insurance use tertiary health care facilities most. Like the decision to use formal outpatient care, the main reason for this phenomenon is that the sample size of these two groups is too small (only 10 observations of UEBMI and 18 observations of URBMI) compared to those who were insured in NRCMI (409) that we cannot get a precise answer on how different health insurance affects the choice of health care facilities. In addition, if people bypass to a higher level of care, the reimbursement from each health insurance scheme that they get does not make a big difference.

In terms of education level, the people whose education level is no school choose to use primary health care facilities most and the people whose education level was at the college level and above chose to use tertiary health care facilities the most. As education increases, the proportion of those choosing tertiary health care facilities increases. The income of highly educated people is generally higher than that of people with lower education levels. Therefore, compared with those with lower education levels, they have more income to spend on outpatient services, so they will choose those tertiary health care facilities that have well-known doctors and better medical equipment.

People who report fair health use more primary health care facilities while people who report poor health use more tertiary health care facilities. The better their health, the more they choose to use primary health care facilities. Those who have rated themselves as unhealthy will think that their diseases are more serious. Therefore,

they are more likely to choose tertiary health care facilities with better medical devices and many well-known doctors.

Table 31: Main factors and utilization at different level of health care facilities

	Primary	Secondary	Tertiary
Income			
Income quartile 1	77.33%	12.00%	10.67%
Income quartile 2	72.29%	19.28%	8.43%
Income quartile 3	70.37%	18.52%	11.11%
Income quartile 4	57.14%	23.38%	19.48%
Health insurance			
No insurance	71.43%	14.29%	14.29%
Urban employee insurance	75.00%	12.50%	12.50%
Urban residents insurance	91.67%	0.00%	8.33%
Rural residents insurance	68.17%	19.38%	12.46%
Education level			
No school	73.53%	17.65%	8.82%
Primary school	71.29%	19.80%	8.91%
Below college	58.57%	20.00%	21.43%
College and above	66.67%	0.00%	33.33%
Self-rated health			
Poor health	66.07%	18.75%	15.18%
Fair health	73.08%	16.35%	10.57%

Good health	66.00%	21.00%	13.00%

Source: Author

In terms of the main explanatory variable health literacy, based on the existing study, the level of overall health literacy does not affect the choice of health care facilities. However, the different components of health literacy have different influence on the choice. As shown in table 32, for knowledge-based health literacy, those who choose to go to tertiary health care facilities have a higher score than those who choose the other two types of health care facilities. For belief of health literacy, those who decided to seek health at primary health care facilities have a higher score compare to those who decide to seek health at primary level. So does behavioral health literacy, the people whose score is higher are more likely to choose primary health care facilities compare to those who choose tertiary health care facilities. Thus, when combing the three dimensions of health literacy together into overall health literacy measure, their effects on the choice of care offset on another. As a result, the overall health literacy does not appear to affect the choice of care. In the choice model, each dimension of health literacy will be controlled for in this study instead of the overall health literacy measure.

Table 32: Each component of health literacy and the choice of health care facilities

	Primary health care facilities (Y_2=0)		
	Knowledge_literacy	Behavior_literacy	Belief_literacy
Mean	1.01	4.91	1.60
Standard deviation	1.42	1.46	1.05
Min	0	1	0

Max	8	8	4
	Secondary health care facilities (Y_2=1)		
	Knowledge_literacy	Behavior_literacy	Belief_literacy
Mean	1.46	5.03	1.34
Standard deviation	1.70	1.62	1.08
Min	0	2	0
Max	7	8	4
	Tertiary health care facilities (Y_2=2)		
	Knowledge_literacy	Behavior_literacy	Belief_literacy
Mean	2.07	4.78	1.45
Standard deviation	1.93	1.64	1.69
Min	0	2	0
Max	7	8	4

Source: Author

5.4.2. Factors affecting choice of different level of health care facilities

According to the literature review, previous studies on health literacy in six provinces in China pointed out that the level of health literacy can only affect the decision to use formal outpatient care and will not affect the choice of health care facilities. Instead, different categories of health literacy will affect the choice of health care facilities. In this part of the study, different types of health literacy are included. But it did not include Inner Mongolia, at the beginning I use the level of health care facilities to capture the impact of health literacy on the choice of health care facilities. And I found that the level of health literacy did not statically significant affect the choice of health care facilities. As a result, I decide to follow the existing study, and use the

different components of health literacy to study the influence of health literacy on the choice of health care facilities.

Most coefficients are not statistically significant, however the main explanatory variables that are related to health literacy are statistically significant. In addition, people whose education level is above primary school, having emergency ailments as retiree and those who are in the fourth income quartile group are also statistically significant affecting the choice of health care facilities used.

Table 33 shows the statistically significant factors, and the full results are shown in the Appendix C. Y_2 is the dependent variable that measures the choice of three-tiered health care facilities. The column CE shows the coefficient of each factor that affect the choice of different levels of health care facilities, the column SE demonstrates the standard error of each factor and the column ME presents the marginal effect of each factors on different levels of health care facilities. For the factors affecting the choice of health care facilities among users, people with secondary school education and above will increase the probability of choosing secondary and tertiary health care facilities. In particular, having secondary education increased the probability of choosing secondary and tertiary health care facilities by 98% and 6.5% at the 10% two-tailed test, respectively. Additionally, having secondary education reduced the probability of choosing primary health care facilities by 16.4%, and the individuals who graduated from college or above also increased the probability of choosing secondary and tertiary health care facilities by 14.1% and 40.6% at the 5% two-tailed test, respectively, and decrease the probability of choosing primary health care facilities by 54.8%. We also refer to people in secondary education who graduate from a school without a degree. We also called secondary education level as school without degree. As mentioned earlier, people with a high level of education are more concerned with their own health, and their income may be higher than those with a relatively low level of education, so they will prefer to choose secondary and tertiary health care

facilities.

Retirees have a tendency to choose secondary and tertiary health care facilities by 8.1% and 53.1% compared to the non-retirees. Meanwhile, being a retiree will reduce the probability of choosing primary health care facilities by 61.2%. This may be because people have more free time after retirement, thus they will choose secondary or tertiary health care facilities that have more skilled doctors, even if they have to queue for a long time. In addition, those retired people can still use the money in the health insurance fund to pay for their medical expenses when they see a doctor. Some retired people think that they are getting older and the chance of using health insurance funds is decreasing; therefore, they will choose more secondary and tertiary health care facilities. For outpatient service, the reimbursement for medical treatment at different levels of health care facilities does not differ too much.

Being in the highest income quartile group reduces the probability for using primary health care facilities by 28.3%, while it will increase the probability for choosing secondary health care facilities by 16.0% and 12.3% for choosing tertiary health care facilities. For wealthier people, the choice of secondary or tertiary health care facilities is more beneficial as they can get a higher level of service, enjoy a better environment, and receive more precise treatment. Therefore, when choosing health care facilities, they would like to choose more secondary or tertiary health care facilities.

Having emergency ailment improves the probability of choosing secondary and tertiary health care facilities by 22.7%, and 21.5%, respectively. At the same time, it will reduce the probability of choosing primary health care facilities by 44.2%. There are two main reasons why patients with emergency ailments do not choose to go to primary hospital. Firstly, the primary hospital closest to the patient's home may not be able to provide inpatient care; instead it only provides outpatient care and the instruments in the primary health care facilities are not very advanced. Secondly, if the family members of patients with emergency ailments call an ambulance, the ambulance

command center will send an ambulance to the secondary or tertiary hospitals to admit patients. This means that sometimes it is not the patient who chooses to go to a secondary or tertiary hospital, but rather external environmental factors.

The main reason why monthly out-of-pocket expenditure does not affect the choice of health care facilities is that since the implementation of the new medical reforms in China, public hospitals have eliminated the additional cost of drugs sold, and at the same time, free-use medicines included in the basic drug list have been added. As a result, for the choice of health care facilities, especially in formal outpatient services, people have similar expenditure on medicines in the different levels of health care facilities. Although the registration fees vary for different levels of health service organizations, the difference in registration fees is only within 100 yuan and it does not seem to affect the selection of different levels of medical and health service institutions.

There are three main types of health literacy for the main explanatory variables - knowledge based, behavioral and belief of health literacy - and they are all continuous variables. Additionally, they were all measured and assigned a score.

Every additional point of knowledge-based health literacy decreases the probability of choosing primary health care facilities by 4.9% and increases the probability of choosing secondary and tertiary health care facilities by 3.1% and 1.8%, respectively. While every additional point of belief and behavioral component of health literacy will increase the probability of using primary health care facilities by 5.17% and 3.1%, respectively. The latter two coefficients are statistically significant at the 10% two-tailed test. Furthermore, every additional point of belief of health literacy will reduce the probability of choosing secondary and tertiary health care facilities by 5.7% and 3.0% respectively, and every additional point of behavioral health literacy will reduce the probability of choosing secondary and tertiary health care facilities by 2.0% and 1.1%, respectively. In theory, knowledge-based health literacy will make people more

aware of the mechanisms of disease occurrence, the mode of transmission of some infectious diseases, and the characteristics of some chronic diseases. People will better manage their own health based on the knowledge they have, and they will choose to go to primary health care facilities for some common diseases. However, in this study the highest correct rate of each question that measured knowledge-based health literacy was only 37.36%. Only one individual answer all questions related to knowledge-based health literacy correctly. Twenty-four people (accounting for 5.37% of the overall sample) had adequate knowledge-based health literacy. This means that most people in the sample did not have much knowledge about health, so they will likely choose secondary or tertiary health care facilities. Those who have more behavioral health literacy will have a healthier lifestyle. They will change their lifestyle according to changes in the environment and ultimately choose a lifestyle that best suits them. They will focus on the prevention of diseases and they will choose the treatment that best suits them according to different levels of their bodily functions. Hence, people who live healthier are more inclined to choose primary health care facilities. Those who have the right belief in health literacy know that their body needs different methods of treatment under different conditions, and that some of the less serious diseases can be self-healing within a certain period of time. For example, the common cold will be healed within a week regardless whether you take medicine or not. They will take the initiative to participate in health lectures and try to avoid behaviors and foods that are harmful to health. They will have an in-depth understanding of the country's health policy, knowing that primary health care facilities can also provide common and frequently-occurring treatments, and it will take more time if they go to secondary or tertiary health care facilities. As a result, when choosing an outpatient treatment, they prefer to choose primary health services.

Table 33: Coefficient estimates and marginal effect for choice of health care facilities

Y_2	X	CE	ME (primary)	ME (Secondary)	ME (Tertiary)
	Below college	0.769	-0.164	0.986	0.065
		[0.429] *	[0.097] *	[0.055] *	[0.044] *
	College and above	2.475	-0.548	0.141	0.406
		[1.207] **	[0.193] **	[0.107] **	[0.294] **
	retiree	2.964	-0.612	0.081	0.531
		[1.280] **	[0.146] **	[0.160] **	[0.01] **
	Income quartile 4	1.293	-0.283	0.160	0.123
		[0.441] ***	[0.100] ***	[0.051] ***	[0.055] ***
	emergency	2.057	-0.442	0.227	0.215
		[0.298] ***	[0.060] ***	[0.037] ***	[0.043] ***
	Knowledge_literacy	0.248	-0.049	0.031	0.018
		[0.096] ***	[0.019] ***	[0.013] ***	[0.007] ***
	Belief_literacy	-0.258	0.051	-0.033	-0.018
		[0.139] *	[0.027] *	[0.018] *	[0.010] *
	Behavior_literacy	-0.158	0.031	-0.020	-0.011
		[0.095] *	[0.019] *	[0.012] *	[0.007] *

Note: *Significant at 10% **Significant at 5%

***Significant at 1% The number in bracket is standard error (SE)

No. of observation = 316 CE: Coefficient estimate

SE: Standard error ME: Marginal effect

Source: Author

We conduct the test of parallel regression assumption in order to find out whether ordered logit model is appropriate for the study. The test statistic from likelihood ratio test is a change in any $\boldsymbol{x}$ moves the latent index the same amount for all outcome categories. The p-value of parallel regression assumption is equal to 0.2969 and larger than 0.05, so we do not reject the null hypothesis ($\beta 1 = \beta 2 = \beta 3$), and it means that it is suitable for us to use ordered model. Therefore, the ordered model was used for this research to study the choice of care.

CHAPTER VI
CONCLUSION AND RECOMMENDATION

6.1. Conclusion

The study investigated the predisposing factors, enabling factors, perceived need and health literacy which influenced the decision on utilization of formal outpatient care and the choice of health care facilities. The health care facilities were classified into primary, secondary and tertiary in conformity with the type of health care facilities visited by the individuals. This study gets data from Inner Mongolia Medical University, and the data were conducted in 18-19 June, 2016. Altogether 396 households and 910 individuals' information were collected, after cleaning up the data and keeping observations with complete information, the sample size becomes 319 households with a total of 447 individuals.

Through data description, this study found that for the Y_1 decision to use formal outpatient care, 29.31% of the sample decide not to use formal outpatient care when they sick and 70.69% of the sample decide to use formal outpatient care when they sick during last two weeks. For income the highest proportion of people that do not use formal outpatient care belong to the first income quartile group. And the lowest proportion of people that do not use formal outpatient care belong to the third income quartile group. People with higher income decide to use more formal outpatient care. In term of health insurance, the highest proportion of people decide not to use formal outpatient care is the people under the URBMI and the lowest proportion of people decide not to use formal outpatient care is the people under UEBMI. In regard to self-rated health, for those who decide not to use formal outpatient care, the proportion of those who judge that their health poor is the lowest. And for the main explanatory variable of the study, health literacy, the highest proportion of people who decide not to use formal outpatient care are those who have adequate

health literacy. And the highest probability that decide to use formal outpatient care are those who have inadequate health literacy.

In term of Y_2 the choice of health care facilities, 69.30% of the sample decide to seek health care at primary health care facilities, 18.35% of the sample seek health care at secondary health care facilities, and 12.34% seek health care at tertiary health care facilities. Most people choose to go to primary health care facilities when they are ill, followed by secondary health care facilities, and finally tertiary health care facilities. With the aspect of income, the highest proportion of people choose primary health care facilities is the people in the first income quartile group, while the highest proportion of people choose tertiary health care facilities is the people in the fourth income quartile group. The rich people prefer to go to tertiary and secondary health care facilities compare to the poor people. For health insurance, people under NRCMI use primary health care facilities the least and the people who do not have insurance use tertiary health care facilities the most. In terms of education level, the people whose education level is under primary choose to use primary health care facilities the most and the people whose education level is college and above choose to use tertiary health care facilities the most. As education increasing, the proportion of choosing tertiary health care facilities increasing. People who report fair health use more primary health care facilities while people who report poor health use more tertiary health care facilities. The better the health the more they choose to use primary health care facilities. In term of the main explanatory variable health literacy, for knowledge-based health literacy, the higher the score the more they use tertiary health care facilities; for belief of health literacy, the higher the score the less they choose tertiary health care facilities; for behavioral health literacy, the higher the score the less choose to use tertiary health care facilities.

This study uses binary logit regression analysis to estimate determinants of seeking outpatient care. And among those who seeking outpatient care during last 2 weeks

before interview the ordered logit regression is used to analyze the choice of three-tiered health care facilities.

After ruing the regressions, the study found that health literacy is a decisive factor for health seeking behavior of people in Ejin Horo county. People have adequate health literacy will use formal outpatient care less (22.9%) compared to those who have marginal or inadequate health literacy. And every additional point of belief and behavioral components of health literacy will increase the probability of using primary health care facilities by 5.1% and 3.1% respectively at 10% two-tailed level among those who decide to use medical care. And reduce the probability of using secondary and tertiary health care facilities.

For the predisposing factors, this study found that people being Han ethnic group will use less formal outpatient care compare to those who are Mongolia. While people who with primary education level will increase the use of formal outpatient care compare to those who have not attend school. Among those who sought care during last two weeks prior to the interview, people with secondary school education and above will increase the probability of choosing secondary and tertiary health care facilities. Retirees have a tendency to choose secondary and tertiary health care facilities. However, age, gender, and marital status did not have a significant impact either on the decision to use formal outpatient care nor the choice of health care facilities. And education level and occupation did not have a significant impact on the decision to use formal outpatient care. Which was different from some research observations.

In term of enabling factors, being in the highest income group will reduce the probability of using primary health care facilities. While health insurance and out-of-pocket expenditure did not significant.

For perceived need factors, people with emergency ailment will increase the use of formal outpatient care and reduce the probability of using primary health care facilities.

6.2. Recommendation

Right now, the biggest problem with the health system in China is overcrowding, especially in tertiary health care facilities. Based on the basic findings in my study, I would like to propose a few recommendations towards reducing overcrowding.

As we pointed out that people with emergency aliments will increase the probability of using secondary and tertiary health care facilities. And the main reason is the ambulance dispatching system. To improve the ambulance dispatching system in the Inner Mongolia Autonomous Region for the emergency ailments, after the patient chooses to use an ambulance, the staff of the ambulance management center should select different health services for the patient according to the severity of the patient's illness. Try to choose a primary or secondary health care facility that is closer to the patient and utilize every minute of treatment.

Health literacy has an important impact on health seeking behavior. Having adequate health literacy is negatively and significantly associated with the decision to use formal outpatient care. It means that having adequate health literacy will reduce the use of formal outpatient care. Therefore, effective health education and health promotion strategies must be formulated to implement multi-faceted health literacy interventions and improve rural residents' health literacy levels in Inner Mongolia. And we can follow the National Health Literacy Promotion Plan (2014-2020) that issued by NHFPC. First of all, we should vigorously carry out the promotion of health literacy. In view of the main factors affecting the health of the people, establish an information publicity system for health knowledge and skills, improve the information and publicity platform, strengthen supervision and management, and timely monitor and correct wrong information. Establish a resource base for the basic knowledge and skills of residents' health literacy, and build a digital health communication platform. Secondly, organize a series of activities for “Healthy Inner Mongolia”. Establish a long-term

cooperation mechanism with the mass media, and make full use of the role of media such as television, internet, radio, newspapers, and mobile phones through the establishment of health columns and special programs. Set up a team of health science experts to organize health training and other activities. Thirdly, improve the health literacy monitoring system. Maintain the stability and continuity of the health literacy monitoring system to ensure the scientific and accurate of residents' health literacy data. Promote the construction of information, gradually establish a direct reporting system for health literacy monitoring network, improve the test database, and promote the health literacy network learning evaluation system.

This study finds that every additional point of belief of health literacy will reduce the probability of choosing tertiary health care facilities. Health education and promotion is one of the main methods to improve the belief of residents' health literacy. In response to the health demand of the rural population, the government should widely publicize the basic knowledge and skills of residents' health literacy, improve the health belief of the rural population, and form good health habits and healthy lifestyles. The government should do a good job in the prevention and control of chronic diseases, infectious diseases and endemic diseases in rural areas, increase the intensity of maternal and child health services, and implement free pre-pregnancy eugenics health check, child nutrition improvement, and neonatal disease screening in poor areas. In addition, the government should strengthen community and family health promotion and education. And there is a project currently existing at the national level, and it has achieved good results in Beijing province and Shanghai province. Therefore, relying on the community, the "Healthy Family Action" program need to be widely carried out in Inner Mongolia. For the family as a whole, the health care facilities provide targeted health guidance services for family members through measures such as improving a healthy family service system, launching a healthy family

box, creating a model healthy family, and focusing on family health assistance. Improve the health belief of family members and advocate a healthy lifestyle for families.

As we point out that every additional point of behavioral health literacy will reduce the probability of choosing tertiary health care facilities and reduce congestion. Meanwhile behavioral health literacy in this study mainly refer to physical examination, outdoor activities and food intake. In term of food intake, we should follow the guideline of “Healthy China 2030”, in developing a nutrition plan for Inner Mongolia residents. In addition, we should further conduct in-depth food nutrition function evaluation research, comprehensively popularize dietary nutrition knowledge, publish dietary guidelines suitable for different population characteristics, guide residents to form scientific dietary habits, and promote healthy food culture construction. At the same time, it is necessary to establish and improve the nutrition monitoring system for residents in Inner Mongolia, implement nutrition interventions for specific areas and focused group, focus on solving the problems of micronutrient deficiencies, excessive intake of high-energy foods such as oils and fats, and gradually solve the problem of insufficient nutrition and excess of residents. There is a program aims to Improve people's nutritional status and food intake existing at the national level, namely “Nutrition into the Family”. We can follow that program, implement clinical nutrition interventions, and strengthen guidance on nutrition and health work in schools, kindergartens, and old-age care institutions. In addition, we should demonstrate the construction of a healthy canteen and a healthy restaurant. For physical examination and outdoor activities, we should develop a fitness program for Inner Mongolia, popularize scientific fitness knowledge and fitness methods, and promote the fitness of the whole Inner Mongolia. Meanwhile, it is necessary for Inner Mongolia to organize social sports instructors to conduct a wide range of fitness guidance services, develop mass fitness and leisure activities according to “National Physical Exercise Standards”.

And it is also important to develop special sports programs suitable for different groups and different geographical characteristics, and promote traditional sports such as Tai Chi and Health Qigong. At the same time, the government should also publish guidelines for physical fitness activities, establish and improve sports prescription libraries for different groups of people, different environments, and different physical conditions. Our government should form a combination of health management and health service models, based on the sports prescription libraries, and let it play an active role in the promotion of health and chronic disease prevention and rehabilitation. In addition, the government should encourage people to carry out regular physical examinations in the community, and strengthen the construction of the fitness technology innovation platform and the scientific fitness guidance service site. Last but not least, we should conduct physical fitness test on residents in community and improve physical fitness monitoring system.

In addition, residents' health literacy education should be gradual and lifelong. Health literacy education should be carried out in all levels of education in school education, including preschool education, primary school, junior high school, high school, and university education. All levels of school education should arrange related health literacy education. However, relying solely on school education is still far from sufficient. Health education should be accompanied by the life cycle of individuals. In terms of the differing characteristics of each stage, the content of health literacy education should be constantly adjusted and improved.

Health literacy is not just a patient's problem. Given the asymmetry of information about doctors and patients, the difficulty and complexity of health-related reading materials, the carriers of health education materials, the familiarity of residents with reading materials, and the level of interest can all influence the level of health literacy of residents. People with low health literacy often have obstacles in understanding

health information, and generally have poor ability to execute health information. In the clinical environment, low health literacy can lead to poor communication between doctors and patients, poor diagnosis and treatment, and then influence the effect of treatment. The long-term health of the patient leads to inefficiency or a heavy social and economic burden on the health system.

Starting from the perspective of health service providers, improving their role in promoting health literacy is of great importance to improving doctor-patient communication, improving patient compliance, and promoting the effective use of health services. Therefore, the understanding of health literacy issues and the role of interventions in health literacy among health services and medical personnel cannot be ignored. How to deal with patients with low health literacy should be an important task facing the clinical field because the individual's effectiveness in obtaining, understanding, and applying health-related information is closely related to the difficulty and complexity of the information and the way in which the health care worker and the patient communicate. Therefore, if the health service providers can effectively extract the difficulty and complexity of appropriate health-related reliability, paying attention to the way and effect of communication between doctors and patients, it will help patients obtain and understand health-related information.

Health care facilities and workers need to raise awareness of the role of health literacy, enhance service concepts, and increase communication awareness and communication skills. On the one hand, health care facilities need to increase their awareness and attention to health literacy. They can use appropriate health-related materials, control information, daily terminology of professional terms, and evaluate health-related information based on the health literacy levels of rural residents in the Inner Mongolia Autonomous Region understand the effectiveness and other methods to promote the acquisition and understanding of health-related information. On the

other hand, medical workers such as clinicians and nurses, should also pay attention to the role of health literacy in communication between doctors and patients, take appropriate measures, strengthen guidance in the communication between doctors and patients, reduce the use of complex terminology, and improve the effectiveness of communication between doctors and patients. The effect of communication ensures that patients can understand and correctly implement the doctor's advice, achieve the desired therapeutic effect, and ensure the effective use of health services.

6.3. Limitation of the study

This study employs cross-sectional data from 2016. Although there is a survey conducted in Ejin Horo in 2009, the questionnaire used was different from the survey in 2016. Furthermore, in 2017, Linxi County used the same questionnaire to conduct research, but the data has not been processed yet. Thus, the data from Linxi county is not available at a time of this study.

The questionnaire on health literacy used in this study is not a complete version of the Chinese Residents Health Literacy Questionnaire. Instead, a short questionnaire was developed after considering the educational level of the local population and the length of the questionnaire.

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APPENDIX A

Part 1. Family general situation questionnaire.

1A-1 The number of people who often live in the home during the first half of the survey (including people who have no household registration but live in your home for more than half a year):

1A-2 How many square meters does your family actually live in? (net area*1.3)

1A-3 The main types of drinking water in your home:

1)tap water 2) barreled water 3) well water

1A-4 Type of toilet in your home:

1)indoor toilet 2) outdoor toilet 3) public toilet

1A-5 In the past year, expenditures in the following items:

1A-6 Among them, basic living expenses (firewood, rice, oil, salt):

1A-7 Expenditure for clothing and daily necessities (washing, household, kitchen &bath):

1A-8 Expenses for water, electricity, heating (fuel), and property expenses:

1A-9 Purchase of communication tools (mobile phone, fixed telephone), communication (mobile phone fee, fixed-line fee, Internet fee):

1A-10 Expenditures for furniture, consumer durables and appliances (TVS, washing machines, computers, Musical Instruments):

1A-11 Expenditure on the purchase, maintenance and accessories of various modes of transport (bicycles, electric vehicles, and automobiles):

1A-12 Education and training expenses:

1A-13 Expenditure on tourism, beauty (cosmetics, beauty care), health (health products, fitness):

1A-14 In the past year, the total amount spent on medicines, medical services and products for your family is:

1A-15 How much you pay out of pocket:

1A-16 What is the approximate percentage of your household's actual expenses in your household's expenditure on medicines, medical services, and products:

1A-17 How many minutes can it take from your home to the nearest medical point:

Part 2. Household member health inquiry questionnaire.

a1 Code:

2A Household member basic survey.

2A-0 Household member code:

2A-1 Name:

2A-2 The relationship between the head of household:

1)The head of household 2) Spouse 3) Children 4) Grandchildren

5) Parent

6) Grandparent 7) Brothers & Sisters 8) Others (Please specify)

2A-3 Whether the question being asked will be answered by yourself:

1) answer the questions yourself 2) Answered by others

2A-4 Gender: 1) Male 2) Female

2A-5-1 Year of birth(YY):

2A-5-2 Month of Birth(DD):

2A-6 Ethnic group

1)The Han nationality 2) The Mongol nationality 3) Others (Please specify)

2A-7 The social medical insurance you are currently participating in is:

1)None 2) UEBMI 3) URBMI 3) NRCMS

4)Medical assistance 5) Free medical service 6) Other social health insurance

2A-8 Have you purchased private health insurance:

1) Yes 2) No 3) I don’t know

2B Survey of previous chronic illnesses among household members.

2B-1 Do you have hypertension:1) Yes 2) No (Skip to 3)

2B-1-1 Hypertension disease code:

2B-2 Where is the disease diagnosed:

1)Private Practice 2) Village Clinic/Village health station 3) Community health service center 4) County hospital 5) County TCM hospital 6) City Hospital 7) City TCM hospital 8) provincial hospital 9) Provincial TCM hospital 10) Others (Please specify)

2B-3 Do you have diabetes: 1) Yes 2) No (Skip to 5)

2B-3-1 Diabetes disease code:

2B-4 Where is the disease diagnosed:

1)Private Practice 2) Village Clinic/Village health station 3) Community health service center 4) County hospital 5) County TM hospital 6) City Hospital 7) City TM hospital 8) provincial hospital 9) Provincial TM hospital 10) Others (Please specify)

2B-5 Do you suffer from other chronic diseases diagnosed by your doctor?

1) Yes 2) No (Skip to 2C)

(If you suffer from other chronic diseases, answer 6 to 11 questions in order of regular medical treatment.)

2B-6 The first other chronic disease (name of disease):

2B-6-1 Disease code:

2B-7 Where is the disease diagnosed:

1)Private Practice 2) Village Clinic/Village health station 3) Community health service center 4) County hospital 5) County TM hospital 6) City Hospital 7) City TM hospital 8) provincial hospital 9) Provincial TM hospital 10) Others (Please specify)

2B-8 The second other chronic disease (name of disease):

2B-8-1 Disease code:

2B-9 Where is the disease diagnosed:

1)Private Practice 2) Village Clinic/Village health station 3) Community health service center 4) County hospital 5) County TM hospital 6) City Hospital 7) City TM hospital 8) provincial hospital 9) Provincial TM hospital 10) Others (Please specify)

2B-10 The third other chronic disease (name of disease):

2B-10-1 Disease code:

2B-11 Where is the disease diagnosed:

1)Private Practice 2) Village Clinic/Village health station 3) Community health service center 4) County hospital 5) County TM hospital 6) City Hospital 7) City TM hospital 8) provincial hospital 9) Provincial TM hospital 10) Others (Please specify)

2C An investigation into two weeks of illness.

2C-1 During the first two weeks of the survey, did you feel any physical discomfort, or acute or chronic illness:1) Yes 2) No

2C-2 What are the major discomforts (can be multiple choices):

2C-2-1 1) thoracalgia 2) bellyache 3) diarrhea 4) headache

5) back and leg pain 6) fever 7) cough 8) palpitation/palsy

9) Others (Please specify) 0) None

2C-2-2 1) thoracalgia 2) bellyache 3) diarrhea 4) headache

5) back and leg pain 6) fever 7) cough 8) palpitation/palsy

9) Others (Please specify) 0) None

2C-2-3 1) thoracalgia 2) bellyache 3) diarrhea 4) headache

5) back and leg pain 6) fever 7) cough 8) palpitation/palsy

9) Others (Please specify) 0) None

2C-3 What is the disease or injury? (fill in the name of the disease, without a doctor's clear diagnosis fill 0):

2C-3-1 Disease code:

2C-4 The disease is:1) Emergency disease occurs within two weeks

2)Two weeks before the acute disease lasted to two weeks

2C-5 How many days the disease lasted 2 weeks before the survey:

2C-6 (If you are at work) Within 2 weeks before the survey, due to this illness, how many days did the work break?

2C-7 (If you are a student) In the 2 weeks before the survey, how many days of school leave will be due to this illness, if you do not attend school to fill in 99:

2C-8 Did you treat (including self-care) after your illness? 1)Yes (Skip to 10)2) No

2C-9 The main reasons for untreated are:

1) I feel that the disease is not serious 2) financial difficulty 3) timeless 4) inconvenient traffic 5) Poor quality of medical service 6) There are no effective measurements 7) Others (skip to 2D)

2C-10 If you have been treated, what method is used:

1) Self-treatment (skip to 2D) 2) go to see a doctor

3) self-treatment+ see a doctor 2C-11 Where do you see the doctor:

1)Private Practice 2) Village Clinic/Village health station 3) Community health service center 4) County hospital 5) County TM hospital 6) City Hospital 7) City TM hospital 8) provincial hospital 9) Provincial TM hospital 10) Others (Please specify)

2C-12 The main reason for choosing this hospital is:

1)nearby 2) low price 3) good quality 4) Designated hospitals

5) Acquaintances 6) Trusted doctor 7) Good service attitude

2C-12-1 8) Others:(Please specify)

2C-13 Whether to dispense medicine at a non-prevention pharmacy according to a doctor's prescription after seeing a doctor:

1) Yes 2) No

2D Investigation of hospitalization in the previous year.

2D-1 In the past year, have you been hospitalized because of illness:

1) Yes 2) No 99) (answer 2 or 99 skip to 2E) 2D-2 Reasons for hospitalization:

1)sickness 2) Injury or poisoning 3) rehabilitation 4) family planning

5) delivery 6) others (Please specify)

2D-3 Names of diseases hospitalized due to illness or injury, poisoning:

2D-3-1 Disease code:

2D-4 How many times have you been hospitalized for this disease in the previous year:

2D-5 How many days have you been hospitalized recently:

2D-6 The type of medical institution that was recently hospitalized:

1)Private Practice 2) Village Clinic/Village health station 3) Community health service center 4) County hospital 5) County TM hospital 6) City Hospital 7) City TM hospital 8) provincial hospital 9) Provincial TM hospital

2D-6-1 Others:(Please specify)

2E The use of family ward of the previous year.

2E-1 In the past 1 year have you used family ward: 1) Yes 2) No 99) (answer 2 or 99 skip to 3A)

2E-2 The reason that you use family ward:

2E-2-1 1) If you are hospitalized, no one will look after your home 2) A family ward is more convenient than hospitalized 3) Family ward is cheaper 4) Others (Please specify)

2E-2-2 1) If you are hospitalized, no one will look after your home 2) A family ward is more convenient than hospitalized 3) Family ward is cheaper 4) Others (Please specify)

2E-2-3 1) If you are hospitalized, no one will look after your home 2) A family ward is more convenient than hospitalized 3) Family ward is cheaper 4) Others (Please specify)

2E-2-4 1) If you are hospitalized, no one will look after your home 2) A family ward is more convenient than hospitalized 3) Family ward is cheaper 4) Others (Please specify)

2E-3 What disease do you have for using the family ward:

2E-3-1 Disease code:

2E-4 How many times that you use family ward during past 1 year:

2E-5 Which type of hospital that you use the family ward for last time:

1)Private Practice 2) Village Clinic/Village health station 3) Community health service center 4) County hospital 5) County TCM hospital 6) City Hospital 7) City TCM hospital 8) provincial hospital 9) Provincial TCM hospital

2E-5-1 Others (Please specify)

Part 3. The questionnaire about the adult that over than 18.

3A. Basic information 3A-1 Marital status:

1)Single 2) Married 3) Divorce 4) Widowed

3A-2 Educational level

1)No education 2) Primary school 3) Junior high school 4) Vocational/High school 5) Polytechnic 6) College 7) Graduate and above 3A-3 Occupation

1) The manager of party and government offices and public institutions 2) The high/middle level manager of large and medium-size enterprises 3) Private entrepreneur 4) Professionals & Technical 5) Office Clerks 6) Self-employed people 7) The worker of Commercial Service Industry 8) Workman 9) Student

10) Retirees 11) Unemployed

3B Health status.

3B-1 MOBILITY

1) I have no problems in walking about

2) I have slight problems in walking about

3) I have moderate problems in walking about

4) I have severe problems in walking about

5) I am unable to walk about 3B-2 SELF-CARE

1) I have no problems washing or dressing myself

2) I have slight problems washing or dressing myself

3) I have moderate problems washing or dressing myself

4) I have severe problems washing or dressing myself

5) I am unable to wash or dress myself

3B-3 USUAL ACTIVITIES (e.g. work, study, housework, family or leisure activities)

1) I have no problems doing my usual activities

2) I have slight problems doing my usual activities

3) I have moderate problems doing my usual activities

4) I have severe problems doing my usual activities

5) I am unable to do my usual activities 3B-4 PAIN / DISCOMFORT

1) I have no pain or discomfort

2) I have slight pain or discomfort

3) I have moderate pain or discomfort

4) I have severe pain or discomfort

5) I have extreme pain or discomfort

6) 3B-5 ANXIETY / DEPRESSION

1) I am not anxious or depressed

2) I am slightly anxious or depressed

3) I am moderately anxious or depressed

4) I am severely anxious or depressed

5) I am extremely anxious or depressed

3B-6 We want to know if your health is good or bad today. We have drawn a scale (much like a thermometer), where you can see that the best health status is marked as 100 and the worst health status is marked as 0.

3C Health Influence Factor

3C-1 Do you smoke:

1)No (Skip to question 5) 2) Yes 3) Have quit smoking (Skip to question 4)

3C-2 How many years have you been smoking:

3C-3 How many cigarettes have you smoked per day in the last year? (Skip to question 5)

3C-4 How many years have you quit smoking 3C-5 Do you usually drink alcohol?

1)Do not drink or drink very little (Skip to question 8) 2) Occasionally drink (Skip to question 8) 3) Often drink

3C-6 How many years have you been drinking

3C-7 On average how many times that you drink a lot in one month? (a drinking more than equivalent to the amount of the two liquors 50 degrees)

3C-8 Do you have the physical examination every year?

1)Yes 2) No

3C-9 How often do you have physical examination per year?

3C-11 How often do you do outdoor activity peer week?

3D Dietary status.

3D-1 How often do you eat breakfast every week (If you do not eat breakfast fill 0):

3D-2 How does your salty taste compare to most people:

1)Salty taste, love saltier food 2) Moderate taste 3) Light taste, love light food 3D-3 How much fresh vegetables do you eat per day (in grams):

3D-4 How much fresh fruit do you eat per day (in grams):

3D-5 How much milk and dairy products do you eat per day (in ml):

1) <200 2)200-400 3)400+ 4) never eat

3D-6 Do you eat bacon and egg products:

1) often eat 2) sometimes eat 3) never eat

3E The condition of self-rated care

3E-1 Do you know your height: 1) Yes 9) No

3E-1-1 Height (cm):

3E-2 Do you know your weight: 1) Yes 9) No

3E-2-1 Weight (kg):

3E-3 Do you know your blood pressure: 1) Yes 9) No

3E-3-1 Systolic pressure (mmhg): 3E-3-2 Diastolic pressure (mmhg) :

3E-4 Do you often get some health knowledge on your own initiative:

1) Yes 2) No

3E-5 Where do you get most of your knowledge about health care (at most 3):

3E-5-1 1) Doctors 2) TV 3) Books or Journals 4) School/workplace

5) Colleagues /relatives 6) Poster 7) Others (Please specify)

3E-5-2 1) Doctors 2) TV 3) Books or Journals 4) School/workplace

5) Colleagues /relatives 6) Poster 7) Others (Please specify)

3E-5-3 1) Doctors 2) TV 3) Books or Journals 4) School/workplace

5) Colleagues /relatives 6) Poster 7) Others (Please specify)

3F Basic health knowledge and belief.

3F-1 Did you think that participated in a lecture on health is good for your health?

: 1) Yes 2) No

3F-2 Do you know that the average daily salt intake of adults cannot exceed the number of grams (if you don't know please fill in 99):

3F-3 Do you know the main route of transmission of AIDS (Multiple choices for this question):

3F-3-1 1) Sexual Transmission 2) Blood transmission 3) Vertical transmission

4) Through the touch of life 5) Airborne transmission 6) Don't know

3F-3-2 1) Sexual Transmission 2) Blood transmission 3) Vertical transmission

4) Through the touch of life 5) Airborne transmission 6) Don't know

3F-3-3 1) Sexual Transmission 2) Blood transmission 3) Vertical transmission

4) Through the touch of life 5) Airborne transmission 6) Don't know

3F-3-4 1) Sexual Transmission 2) Blood transmission 3) Vertical transmission

4) Through the touch of life 5) Airborne transmission 6) Don't know

3F-4 Do you think that you must use antibiotics to treat colds:

1) No 2) Yes 3) Don't know

3F-5 Do you know which of the following is an adult diagnostic criterion for hypertension (if you don't know please fill in 9)

1)Systolic pressure>=160/ Diastolic pressure>=95

2) Systolic pressure>=180/ Diastolic pressure>=100

3) Systolic pressure>=140/ Diastolic pressure>=90

4)Systolic pressure>=120/ Diastolic pressure>=80

3F-6 Do you know which risk factors are related to high blood pressure:

1)Correct answer 2) Wrong answer 9) Don't know

3F-7 Do you think that hypertensive patients need to be treated by taking medicine?

1)Yes 2) No 9) Don't know

3F-8 Do you know which risk factors are related to diabetes:

1)Correct answer 2) Wrong answer 9) Don't know

3F-9 Do you think that diabetes patients need to be treated by taking medicine?

1)Yes 2) No 9) Don't know

3F-10 Does smoking in pregnant women affect the normal development of the fetus:

1) No effect 2) Have effect 9) Don't know

3G Awareness and Utilization of Rural Primary Health Services.

3G-1 The medical institution you usually visit is:

1)Private Practice 2) Village Clinic/Village health station 3) Community health service center 4) County hospital 5) County TCM hospital 6) City Hospital 7) City TCM hospital 8) provincial hospital 9) Provincial TCM hospital

3G-2 The purpose of your visit is (this question can be multiple choice, up to 4 items): 3G-2-1 1) Sickness 2) Prescribing 3) Chronic disease follow-up 4) Consulting 5) Acupuncture-therapy 6) Vaccination 7) Child examination 8) Pregnant woman examination 0) others (please specify)

3G-2-2 1) Sickness 2) Prescribing 3) Chronic disease follow-up 4) Consulting 5) Acupuncture-therapy 6) Vaccination 7) Child examination 8) Pregnant woman examination 0) others (please specify)

3G-2-3 1) Sickness 2) Prescribing 3) Chronic disease follow-up 4) Consulting 5) Acupuncture-therapy 6) Vaccination 7) Child examination 8) Pregnant woman examination 0) others (please specify)

3G-2-4 1) Sickness 2) Prescribing 3) Chronic disease follow-up 4) Consulting 5) Acupuncture-therapy 6) Vaccination 7) Child examination 8) Pregnant woman examination 0) others (please specify)

3G-3 How many minutes will it take for you to walk there:

APPENDIX B

The correlation matrix of variables

	male	age	married	han	no school	primary school	below college	college and above	farmer	retiree	other_employed	monthly oop
male	1.00											
age	0.04	1.00										
married	0.04	-0.05	1.00									
han	0.04	-0.01	0.05	1.00								
no school	-0.36	0.36	0.01	0.05	1.00							
primary school	0.20	-0.01	-0.04	0.04	-0.59	1.00						
below college	0.19	-0.30	0.06	-0.08	-0.50	-0.35	1.00					
college and above	0.06	-0.31	-0.08	-0.05	-0.14	-0.10	-0.09	1.00				
farmer	-0.04	0.29	0.03	0.02	0.22	0.04	-0.21	-0.24	1.00			
retiree	0.05	0.06	0.04	-0.06	-0.03	-0.08	0.12	-0.02	-0.20	1.00		
other_employed	0.10	-0.46	-0.01	-0.04	-0.31	-0.02	0.26	0.32	-0.76	-0.05	1.00	
monthly oop	0.00	0.09	0.03	-0.01	0.03	0.01	-0.04	-0.01	-0.01	0.12	-0.03	1.00
income quartile 1	0.01	0.03	0.02	-0.06	0.08	-0.05	-0.06	0.04	0.11	-0.02	-0.05	-0.20
income quartile 2	0.04	0.09	-0.03	0.07	0.02	0.05	-0.07	-0.03	0.05	-0.02	-0.02	-0.09
income quartile 3	-0.03	0.00	0.00	0.02	0.04	-0.03	0.01	-0.09	0.02	0.07	-0.10	0.00
income quartile 4	-0.02	-0.13	0.01	-0.03	-0.15	0.03	0.12	0.08	-0.18	-0.02	0.17	0.29
no insurance	0.04	-0.01	0.01	0.02	0.01	-0.03	0.03	-0.02	0.02	-0.02	0.02	0.07
urban employee	-0.03	-0.10	0.00	-0.07	-0.07	-0.03	0.08	0.11	-0.14	0.08	0.19	0.04
urban residents insurance	0.13	0.00	0.05	-0.10	-0.08	-0.06	0.03	0.37	-0.12	0.11	0.10	0.01
rural resident insurance	-0.07	0.07	-0.04	0.09	0.08	0.07	-0.08	-0.26	0.16	-0.10	-0.19	-0.07
chronic	-0.05	0.34	0.02	-0.01	0.17	-0.02	-0.12	-0.17	0.18	0.00	-0.25	0.06
emergency	0.01	0.00	-0.03	0.00	-0.08	0.09	-0.01	0.01	-0.14	-0.02	0.07	0.02
adequate_literacy	0.01	-0.12	-0.08	-0.15	-0.10	-0.04	0.04	0.32	-0.20	0.13	0.09	0.06
marginal_literacy	0.06	-0.10	0.07	-0.01	-0.16	0.00	0.18	0.00	-0.13	0.04	0.17	0.04
inadequate_literacy	-0.06	0.15	-0.02	0.09	0.20	0.02	-0.19	-0.17	0.23	-0.11	-0.21	-0.07
poor health	-0.09	0.28	-0.01	0.02	0.19	-0.03	-0.15	-0.11	0.15	0.00	-0.21	0.10
fair health	0.02	0.06	-0.10	0.01	-0.03	0.04	-0.01	0.01	-0.02	-0.04	0.04	-0.08
good health	0.07	-0.35	0.11	-0.03	-0.16	-0.01	0.16	0.11	-0.13	0.05	0.18	-0.02

	income quartile 1	income quartile 2	income quartile 3	income quartile 4	no insurance	urban resident insurance	urban employee insurance	rural residents insurance	chronic	emergecy	adequate_literacy	marginal_literacy
income quartile 1	1.00											
income quartile 2	-0.34	1.00										
income quartile 3	-0.33	-0.33	1.00									
income quartile 4	-0.33	-0.34	-0.33	1.00								
no insurance	0.12	-0.09	0.02	-0.05	1.00							
urban resident insurance	-0.01	0.06	-0.06	0.01	-0.03	1.00						
urban employee insurance	-0.02	-0.02	-0.02	0.05	-0.02	-0.03	1.00					
rural residents insurance	-0.05	0.01	0.04	-0.01	-0.50	-0.67	-0.50	1.00				
chronic	-0.15	0.05	0.01	0.08	-0.03	-0.08	-0.09	0.12	1.00			
emergency	0.01	-0.05	0.04	0.00	0.09	-0.07	-0.02	0.01	-0.07	1.00		
adequate_literacy	-0.10	-0.02	0.05	0.07	0.09	-0.05	0.15	-0.09	-0.05	0.09	1.00	
marginal_literacy	0.08	-0.11	-0.01	0.05	-0.03	0.10	0.04	-0.08	-0.02	0.04	-0.12	1.00
inadequate_literacy	-0.01	0.11	-0.02	-0.09	-0.02	-0.07	-0.12	0.12	0.05	-0.08	-0.44	-0.84
poor health	-0.03	0.02	0.06	-0.05	-0.04	-0.10	-0.08	0.13	0.21	0.05	-0.14	-0.09
fair health	-0.06	0.03	-0.02	0.05	-0.01	-0.08	0.02	0.05	0.02	-0.14	0.03	0.01
good health	0.09	-0.05	-0.04	-0.01	0.06	0.18	0.06	-0.19	-0.24	0.09	0.11	0.08

	inadequate_literacy	poor health	fair health	good health
inadequate_literacy	1			
poor health	0.16	1		
fair health	-0.03	-0.52	1	
good health	-0.13	-0.49	-0.50	1

APPENDIX C

Table C1: The coefficient estimate (CE) and marginal effect (ME) for decision to use formal outpatient care

Y_1	X	CE	SE	ME	SE
	male	-0.182	[0.245]	-0.361	[0.048]
	age	-0.011	[0.011]	-0.002	[0.002]
	married	0.075	[0.349]	0.15	[0.692]
	han	-0.794	[0.344] **	-0.158	[0.678] **
	Primary school	0.483	[0.289] *	0.958	[0.572] *
	Below college	0.081	[0.339]	0.161	[0.672]
	College and above	1.256	[1.026]	0.249	[0.203]
	farmer	-0.062	[0.454]	-0.01	[0.902]
	retiree	1.357	[1.227]	0.269	[0.243]
	others	0.079	[0.565]	0.016	[0.112]
	monthly OOP	0.000	[0.000]	0.000	[0.000]
	Income quartile 2	0.421	[0.316]	0.083	[0.063]
	Income quartile 3	0.468	[0.323]	0.093	[0.639]
	Income quartile 4	0.071	[0.340]	0.014	[0.675]
	Urban residents insurance	-0.644	[0.979]	-0.128	[0.194]
	Urban employee insurance	0.157	[1.210]	0.031	[0.240]
	Rural residents insurance	-0.354	[0.804]	-0.071	[0.159]
	Chronic	0.357	[0.253]	0.071	[0.501]
	Emergency	1.079	[0.301] ***	0.214	[0.058] ***
	Adequate_literacy	-1.153	[0.521] **	-0.229	[0.103] **

Marginal_literacy	-0.092	[0.290]	-0.018	[0.058]
Fair health	-0.277	[0.303]	-0.055	[0.055]
Good health	-0.280	[0.303]	-0.056	[0.600]

Source: Author

Table C2: Coefficient estimates and marginal effect for choice of health care facilities

Y_2	X	CE	ME (primary)	ME (Secondary)	ME (Tertiary)
	male	-0.403	0.078	-0.050	-0.280
		[0.308]	[0.060]	[0.038]	[0.022]
	age	0.004	-0.0009	0.0006	0.0003
		[0.014]	[0.003]	[0.02]	[0.001]
	married	0.186	-0.035	0.023	0.123
		[0.451]	[0.083]	[0.055]	[0.028]
	han	-0.158	0.032	-0.020	-0.012
		[0.345]	[0.071]	[0.044]	[0.026]
	Primary school	-0.220	0.042	-0.027	-0.015
		[0.372]	[0.070]	[0.046]	[0.025]
	Below college	0.769	-0.164	0.986	0.065
		[0.429] *	[0.097] *	[0.055] *	[0.044] *
	College and above	2.475	-0.548	0.141	0.406
		[1.207] **	[0.193] **	[0.107] **	[0.294] **
	farmer	0.315	-0.060	0.039	0.021
		[0.482]	[0.088]	[0.058]	[0.030]
	retiree	2.964	-0.612	0.081	0.531

	[1.280] **	[0.146] **	[0.160] **	[0.01] **
Other_employed	-0.460	0.084	-0.055	-0.029
	[0.610]	[0.102]	[0.070]	[0.034]
monthly OOP	-0.000	0.00005	-0.00003	-0.00002
	[0.000]	[0.00005]	[0.00003]	[0.00002]
Income quartile 2	0.636	-0.133	0.082	0.051
	[0.425]	[0.093]	[0.055]	[0.004]
Income quartile 3	0.504	-0.104	0.065	0.040
	[0.415]	[0.089]	[0.054]	[0.036]
Income quartile 4	1.293	-0.283	0.160	0.123
	[0.441] ***	[0.100] ***	[0.051] ***	[0.055] ***
Urban employee insurance	-1.160	0.170	-0.117	-0.053
	[1.521]	[0.150]	[0.110]	[0.041]
Urban residents insurance	-0.715	0.118	-0.080	-0.038
	[1.458]	[0.193]	[0.137]	[0.057]
Rural residents insurance	0.629	-0.108	0.723	0.036
	[0.943]	[0.139]	[0.096]	[0.043]
chronic	-0.526	0.108	-0.067	-0.041
	[0.340]	[0.072]	[0.044]	[0.029]
emergency	2.057	-0.442	0.227	0.215
	[0.298] ***	[0.060] ***	[0.037] ***	[0.043] ***
Knowledge_literacy	0.248	-0.049	0.031	0.018
	[0.096] ***	[0.019] ***	[0.013] ***	[0.007] ***
Belief_literacy	-0.258	0.051	-0.033	-0.018

	[0.139] *	[0.027] *	[0.018] *	[0.010] *
Behavior_literacy	-0.158	0.031	-0.020	-0.011
	[0.095] *	[0.019] *	[0.012] *	[0.007] *
Fair health	-0.461	0.087	-0.057	-0.030
	[0.353]	[0.064]	[0.043]	[0.022]
Good health	-0.460	0.086	-0.057	-0.030
	[0.353]	[0.068]	[0.045]	[0.023]

Source: Author

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