SOCIOECONOMIC INEQUALITY IN PRIMARY HEALTH CARE UTILIZATION AMONG THE ELDERLY PEOPLE: EVIDENCE FROM MONGOLIA

Zeeshan Zahoor

Master's Thesis

Public Health

University of Eastern Finland

Faculty of Health Sciences

School of Medicine

November 2019

ABSTRACT

UNIVERSITY OF EASTERN FINLAND, Faculty of Health Sciences
School of Medicine
Public health
ZAHOOR, ZEESHAN: Socioeconomic inequality in primary health care utilization among the elderly people: Evidence from Mongolia
Master's thesis, 61pages
Supervisors: Javkhlanbayar Dorjdagva, PhD, Senior Lecturer in Public Health Policy and Economics, Institute of Public Health and Clinical Nutrition, UEF.
Enkhjargal Batbaatar, PhD, Post-Doctoral Researcher. Faculty of Social Sciences and Business Studies, Department of Social Sciences, UEF.
November 2019.

Key words: Elderly people, Primary health care utilization, Concentration Index, Horizontal Inequity, Mongolia

SOCIOECONOMIC INEQUALITY IN PRIMARY HEALTH CARE UTILIZATION AMONG THE ELDERLY PEOPLE: EVIDENCE FROM MONGOLIA

Background: The projection of elderly population in Mongolia by the year 2025 and 2050 is 11% and 25% respectively; However, with such an increase in the number of elderly people, the evidence to socioeconomic inequalities and horizontal inequity is inadequate. A few studies have been conducted on analyzing the socioeconomic inequalities in health care utilization in Mongolia but are focused on specific groups of the population or geographical locations. Thus, the aim of this paper is to evaluate the socioeconomic inequalities in primary health care utilization among the elderly and the contribution of avoidable social determinants of health towards the inequalities in Mongolia.

Methods: The data set used in this study is a nationwide cross-sectional Household Socioeconomic Survey, collected in 2012 by the National Statistical Office of Mongolia. For the measurement of inequality in the primary health care utilization, we used the Erreygers' concentration index.

Results: After controlling for need, pro-poor out-patient primary health care utilization was observed (p-value < 0.005) with significant negative Erreygers' concentration index and the horizontal inequity. This shows that the primary health care utilization is concentrated among the poor elderly, with income and education being the major contributors towards pro-poor inequality, signifying that elderly people with low income or low level of education rely on primary health care more than those with higher income and education.

Conclusion: The socioeconomic inequalities in the utilization of health care have increased especially in the primary health care in Mongolia. A clear pro-poor inequality observed in primary health care utilization among the elderly people in Mongolia, indicates a weak gatekeeping at the primary health care. This has the tendency to increase inequalities in the distribution of health care services at all the delivery levels. Therefore, there is a need to strengthen the primary health care to promote a systematic approach in utilizing the health care services, equity and to achieve the Universal Health Coverage.

ACKNOWLEDGEMENTS

First and foremost, I would like to thank Almighty Allah for his countless blessings upon me. Throughout writing this thesis, I have received a great deal of support and assistance. I would like to acknowledge by thanking my supervisors, Dr. Javkhlanbayar Dorjdagva and Dr. Enkhjargal Batbaatar whose expertise were invaluable in helping me formulate the topic for my research, data provision, methodology and continuous assistance from the start till the end.

The data used in this thesis was conducted by the National Statistical Office of Mongolia in 2012 which Dr. Javkhlanbayar Dorjdagva obtained in 2014 for his research. I would like to express my gratitude to the National Statistical Office of Mongolia for conducting this survey and Dr. Javkhlanbayar Dorjdagva for his permission to use this data for my thesis.

I would like to thank my teacher and examiner Dr. Sohaib Khan for his superior mentorship, guidance and involvement in my thesis. I would also like to thank the whole faculty of Institute of Public Health and Clinical Nutrition of University of Eastern Finland for helping create an opportunity for us to learn and grow as professionals.

In addition, I would like to thank my parents for their prayers, wise advices and sympathetic ear. You are always there for me. Finally, my lovely wife for her great support, help and continuous encouragement. This accomplishment would not have been possible without them. Thank you.

Zeeshan Zahoor,

Kuopio, Finland

November 2019.

ABBREVIATIONS

ADB	Asian Development Bank
EI	Erreygers' concentration index
FGPs	Family group practices
FHC	Family health centers
GOM	Government of Mongolia
MOH	Ministry of Health
OLS	Ordinary least square
OOPs	Out-of-pocket payments
PHC	Primary health care
SDGs	Sustainable development goals
SGBA	Sex and Gender Based Analysis
SHI	Social health Insurance
UHC	Universal health coverage
UN	United Nations
WHO	World Health Organization

Table of Contents

1. Introduction

The Sustainable Development Goals (SDGs) emphasizing the need to "ensure no one is left behind", serve as a universal plan for action (UN 2017). The 17 goals (SDGs) along with 169 imitate targets reflect that a sustainable development in a country is possible through multidimensional and multisectoral policy interventions in the areas of addressing poverty, hunger, malnutrition and food insecurity, protection of environment, a better-quality education, work opportunities and universal health coverage (UHC). Equity framework embraces all the said areas that are related directly to the health (Tangcharoensathien et al. 2015).

Despite nations committing to the SDGs and to achieving the UHC, inequities in the health care services yet prevail in both developing as well as developed nations. Health inequities are the avoidable inequalities in health care that are systematic and socially produced (Whitehead and Dahlgren 2007). In order to ensure the UHC, fundamental policy objective for all the countries is the equitable provision of needed health services, within the frame of financial protection (Kutzin 2013). Health inequities arise as a result of one or many inter-connected factors. The key underlying factors in health inequities are the socioeconomic status, geographical location, education, gender, racial and age.

According to the World Health Organization (WHO) (2019), the population of people with age 60 or over is about 600 million worldwide, which is projected to be 1.2 billion by the year 2025 and 2 billion by the year 2050. As the people age, the WHO believes that they will have a risk of having at least one chronic disease. Thus, the WHO advocates for the preparedness to deal with the forecasted burden in terms of disease prevention, health promotion and disease management strategies. Therefore, in order to deal with the increasing health needs, reinforcing the health delivery network with primary focus on first level health service, which serves the whole society focusing on their health and well-being according to the needs and preferences of the individuals, families and communities, is a vital tactic (WHO 2019).

Primary health care (PHC) is the first level close-to-client service in the health care delivery system, operating at regional level of a country, which permits an equitable access and a key to achieve the UHC (Tangcharoensathien et al. 2015). The main purpose of the PHC is to provide comprehensive and accessible health services including disease prevention and treatment, health promotion, rehabilitation and palliative care to every person in the community to achieve social

justice, equity and fundamental right to the highest attainable standard of health (WHO 2019). PHC also exhibits its importance in terms of availability and accessibility to meet the medical needs and health maintenance of the elderly people (WHO 2019). Thus, the PHC approach is the key focus of all the member states of the United Nations (UN) including Mongolia to meet the health needs of their people and achieve the UHC.

Mongolia is a landlocked country between Russia from the north side and China from south, east and west side. The total land of Mongolian territory is 1,566,460 km^2 (WPRO WHO 2012). According to The World Bank (2018), the total population of Mongolia is estimated to be 3.17 million with 1.45 million people residing in the capital city, Ulaanbaatar (UN 2017). Although Mongolia is world's 18th largest country area wise, it has the top least population density of 2 per km^2 (The World bank 2018). The number of elderly people in Mongolia is about one hundred thousand of the total population in 2017, which is projected to increase to 11 percent of the total population by 2025 and 25 percent by 2050 (Mujahid et al. 2010, UNDP 2017). According to The World Bank report (2019), about 28.4 percent of the total population in Mongolia is living below the poverty line.

The Constitution of Mongolia 1992 and Mongolian health laws (1998, 2006, 2011) protect the rights of citizens, including the elderly people towards their health, medical care including, right to free health services at the PHC level regardless of their socio-economic standings or health insurance coverage and the Ministry of Health (MOH) is responsible to ensure equitable access of people towards these services (WPRO WHO 2012).

But despite the government's commitments, policies and initiatives, inequities in the health care utilization have increased over the time favoring rich at tertiary level hospitals, private clinics and in-patient services (Dorjdagva et al. 2015). Even with a high social health insurance (SHI) coverage at 98.6% of the total population, Dorjdagva et al. (2016) found that 5.5% of the Mongols made out-of-pocket payments (OOPs) for their medical services, pushing them to suffer from catastrophic health expenditure, consequently even at a low threshold of 10% of the total household expenditure. Despite several initiatives by the Mongolian government to improve quality of life for the elderly people, both physically and psychologically, a study by Mujahid et al. (2010) revealed dissatisfaction of the elderly people and that the elderly find the medical treatment inadequate, inequitable and favoring the affluent.

In view of the available literature and studies, it is evident that health system presiding in Mongolia is a two-faced, favoring the affluent and thus generating the inequities in health care utilization. Nevertheless, the available evidence on inequities in the health care utilization is limited to either specific population groups or geographical location and therefore leaving the gap to unveil the inequities among the elderly people in Mongolia. With the projected increase of the elderly population and detrimental disease burden, it is important to understand the nature and extent of inequities in health care utilization among the elderly people in order to bring in social justice and to achieve the UHC. Since, PHC is the important root to accomplish the social justice, equity and fundamental right to the highest attainable standard of health (WHO 2019) so, studying the disparities in PHC level among the elderly people are the logical mean to provide the equitable contemporary health services and for the future preparedness.

Thus, this study is aimed to analyze the socioeconomic inequalities in the PHC utilization among the elderly people in Mongolia. This will enable us to understand the nature and root cause of inequalities that the elderly people face at the PHC. This study will also enable us to identify and measure the contribution of avoidable factors that cause the inequalities, which can prove to help design impactful interventions to ensure the provision of equitable PHC utilization among the elderly people.

2. Theoretical background

2.1. Basic concepts of equity and equality

This chapter will provide the basic definitions and concepts on health equity in order develop the understanding for the study.

Equity

The term equity refers to the absence of social, economic, demographical or geographical differences, that are unfair and avoidable, among the groups of people (WHO 2019). Or in other words, equity is understanding and providing people needs to promote happy and healthy life (SGBA 2019).

Equality

Equality refers to the condition where men and women can enjoy equal chances to access and control the resources, including social, economic and political resources and includes the laws to protect their rights for health, education and voting (WHO 2011). Or Equality is the provision of the same things to everyone so they can enjoy a full, healthy life (SGBA 2019).

Health equity

The term health equity reflects a situation in which every individual and community enjoys the equal right in health outcomes, accessibility and quality of health care without any racial, gender, age, nationality, ethnic, religious, migrants, sexual oriented, language, socioeconomic status, neighborhood or geographical location discrimination (WHO 2010). The WHO considers health equity as an ethical principle and acknowledges its close connection with the human rights principles. In order to ensure the UHC, the fundamental policy objective for all the countries is provision of equitable needed health services within the frame of financial protection (Kutzin 2013).

Health inequality

According to Kunst and Mackenbach (1995), health inequality is the difference in prevalence or incidence of health problems between individuals of different socioeconomic status, whereas Murray et. al. (1999) on the other hand defined inequality in health as the differences in the health status across individuals in a population.

2.2. Health care inequities

Health inequities are the systematically and socially produced unfair health inequalities and are treatable (Whitehead and Dahlgren 2007). Health inequities are the reliable social mean to measure how well the needs of the people are met in a society (WHO and UN 2010).

2.2.1. Measurement of inequality in health care utilization

To measure the inequality in health and health care utilization, there are several methods and techniques. These techniques can be as simple as Odds Ratio, Regression based inequality measures and or the relative index of inequality (RII) to more advanced techniques including Basic axioms, The Relative Mean Deviation and the Variance, Coefficient of Variation, Standard Deviation of Logarithms, The Lorenz curve and the Gini coefficient (Spinakis et al. 2011). Amongst these techniques, Concentration Index is widely adopted to measure the degree of income-related inequality in the health care utilization as it is directly linked to the concentration curve that depicts the share of the health service by cumulative proportion of the population ranked by income (Kakwani et al. 1997, O'Donnell et al. 2007).

2.2.2. Concentration curve

Concentration curve develops a graph of health variable against the population of interest ranked by the means of living standard. On the y-axis of a concentration curve graph is the cumulative percentage of health variables which is plotted against the cumulative percentage of population ranked by the living standards on the x-axis. The ranking starts with poorest ending with richest amongst the population on the x-axis. If the concentration curve settles above the 45-degree line, which is known as the line of equality, this indicates that health variable is concentrated among the poor and if the concentration index settles below the line of equality, this is the indication that the health variable is concentrated among the rich (O'Donnell et al. 2007).

Figure 1 is the example of concentration curve that measured the under-five mortality rate in India and Mali. The concentration curve of both the countries falls above the line of equality which means that under-five mortality rate in both countries is concentrated among the poor. However, the concentration curve of India dominates the concentration curve of Mali depicting more inequality in under-five mortality rates in India than Mali.

Figure 1. Concentration curves for under-five deaths in India and Mali

Image source: Owen O'Donnell, Eddy van Doorslaer, Adam Wagstaff, Magnus Lindelow, Analyzing Health Equity Using Household Survey Data, A Guide to Techniques and Their Implementation 2007.

2.2.3. Concentration index

Concentration curve can only identify if the inequality in a health variable exists or not but does not provide the magnitude of inequality for comparison across regions, countries and time periods. Therefore, concentration index is applied to measure the inequality in a health variable which is socioeconomic related (Wagstaff et al. 1989, Kakwani et al. 1997). Concentration index is directly proportion to the concentration curve and can be defined as twice the area between the concentration curve and the line of equality which is the 45-degrees line (O'Donnell et al. 2007). The concentration index is zero and socioeconomic equality of health variable exists if the concentration curve falls into the line of equality. Whereas, the concentration index is positive if the concentration curve falls below the line of equality which shows the disproportionate concentration of health variable amongst rich and vice-versa (O'Donnell et al. 2007). The detailed equation of concentration index is provided in methodology section 4.2.

2.2.4. Dimensions of health care equity distribution

According to Jan et al. (2005), health equity has two dimensions based on its distribution.

Vertical equity

Those with unequal needs get the unequal treatment. In terms of measurement and interpretation, vertical equity is an intricate matter, especially when accessing health is a challenge (Wang and Yaung 2013).

Horizontal equity

Those with equal needs get the equal treatment. Equal distribution of health care is of core importance in many countries regardless of individual characteristics such as rich or poor and ethnicity. Thus, the horizontal equity is mostly adapted which is relatively an easy tool for the measurement of equitable distribution of health in research and policy matters (Wang and Yaung 2013). The detailed equation of calculating horizontal equity is provided in methodology section 4.2.

Since horizontal equity is used to measure the distribution of health variables in this study therefore, set of need variables must be defined.

Need in health care – a set variable

There are several approaches used as a proxy for assessing population's health needs. They can be applied at macro level, including mortality rates, prevalence rates, socioeconomic status or service utilization, or at micro level, including doctor-patient relationship and patient's need at local health care center (Asadi-lari et al. 2003). In empirical analysis of health care utilization, age, gender and measures of health status are deployed as a proxy for health needs (O'Donnell et al. 2007).

2.2.5. Empirical examples of inequities in health care utilization

Human right approach enlighten that in order to maintain a healthy life, everyone should have access to effective health services for the treatment, protection and prevention of diseases. Without improved access to the health services, all other actions are unproductive (Whitehead and Dahlgren 2007). Social determinants contribute to the inequities in health care and inadequate access to the basic health service is one of the contributors that has acquired the attention in health sector

(Whitehead and Dahlgren 2007). Access is a complex concept and in terms of utilization, it depends not merely on adequate supply but also on affordability, accessibility and acceptability of the service (Gulliford at al. 2002). Thus, health care utilization is expressed as a proxy for health care access; and several empirical evidences are available highlighting the inequities in health care utilization.

Socioeconomic status

The key underlying factor in health inequities is the socioeconomic status. Lack of financial and social capital yields deficient status socioeconomically which in-turn limits the capabilities of an individual or population (Yoav et al. 1996). Career or job is the primary channel for both monetary and social prosperity, but still there is a huge gap between employment status and health equities research and prevention (Ahonen et al. 2018). The economic standing of a family affects their ability to seek treatment if they have no health sponsorship available (Scheppers et al. 2006 cited in the sources Weitzman and Berry 1992, Wallace et al. 1994, Cunningham and Cornelius 1995, Gray et al. 1995, El-Kebbi et al. 1996, Gornick et al. 1996, Morgan 1996, Smith et al. 1996, Flores and Vega 1998, Lipton et al. 1998, Panos and Panos 2000, Smith et al. 2000, Diaz 2002, Jirojwong and Manderson 2002).

The financial access to acquire the health care by paying OOP pushes people into the medical poverty trap with a bundle of debt. The existence of the medical poverty trap is evident not only in the developing countries, but also in the developed nations, including the United States and Eastern European countries (Whitehead et al. 2001, Whitehead and Dahlgren 2007). The burden of payments to acquire and access health services is a cumulative cause of poverty and is affecting specially the socially vulnerable groups thus swelling the responsibility over the health sector to effectively discourse it (Ziglio et al. 2003).

Education

Unequal income distribution also participates in poor health of population as a result of a low budget for public education and health care (Kawachi and Kennedy 1999). The socioeconomic status of an individual or a community is closely linked to the education and thus education is an important factor in health care utilization. If an individual is not aware of the value of the proper treatment, he/she may not seek the medical care (Banerjee et al. 2011). The educational level differences between the service provider and the patient can produce hitches in understanding and

thus can be a hindrance to access health care services (Whitehead and Dahlgren 2007). A study done in Tajikistan by Jane (2003) showed that the women with primary level education, consulted doctors at a low rate during the pregnancy than those with a higher level of education.

Physical access

Inadequate physical access to health care resources can result in inequities. Despite the health benefits, long distances can diminish the care seeking behavior (Banerjee et al. 2011). Individuals and communities connected to better resources tend to live longer (House et al. 1988). Rosero-Bixby (2004) found the existence of physical health inequities in 12-14% of the population living in the area where health care was in-accessible in Costa Rica. However, in his studies, he concluded that reforms done in the national health care program yielded a decreased inequity in some areas, whereas inequity increased slightly in areas where there was no health care reform coverage. Less income earning by the rural workers also hinders in accessing health care, thus producing malnutrition and poor hygiene (Zhao 2006). Jane Falkingham (2003) studied inequalities in maternal health care services in Tajikistan. She found that the primary factor in influencing the quality of maternal care is an inadequate physical access to the healthcare services and many pregnant women delivered at home without any medical supervision because of lack of access to the health care service.

Gender based disparities

Disease expression can be different between male and female genders and thus can influence the health care approaches (Zagrosek 2012). In non-western societies, males have an advantage over the females because of male dominance, binding females to early marriages, child bearings and domestic abuse (Fikree and Pasha 2004). Mortality rate for adult males is more than adult females as males suffer fatal disease more than the females (Barkar 2000). Kent et al. (2012) found that the males experience more invasive treatment from their physicians than the females.

In the United States, despite the higher average age span of females than males, females have relatively poor socioeconomic status and that hinders them in accessing the health care (Read and Gorman 2010). However, women in the US have better access to health care than many other countries (Vaidya et al. 2012). Hoffmann and Tarzian (2001) in their article mentioned that the physicians initially ignore or treat the female's complaint of pain less seriously than the males.

Ethnicity

History of the US showed a huge disparity in the health care access between different races which seems to continue to exist with latest evidences (Weinick et al. 2000). Schneider at al. (2002) found in their study that the quality of health care services is significantly affected by the race and it profoundly favors the whites. Insurance coverage also serves to limit the access to health care service. For example, ethnic minorities residing in America have limited access to regular medical care including preventive and ambulatory services because of limited medical insurance coverage (Weinick et al. 2000). A survey done by Bollini and Siem (1995) on five European countries including France, Italy, UK, Switzerland and Sweden found that only Sweden provided 100% translator access to those who needed, while the rest failed to provide this service and consequently compromising the health needs and decisions for non-native population. Cultural practices and language barriers also prevent several ethnic minorities and recent immigrants to benefit from the preventive and psychiatric care even when they are free (Whitehead and Dahlgren 2007).

Age-based health disparities

The differences in health status and life expectancy according to population level are well known (William et al. 1997). According to the WHO (2019), the population of people with age 60 or over is about 600 million worldwide, which is projected to be 1.2 billion by the year 2025 and two billion by the year 2050. Older people have a disadvantage in terms of accessing the health care that they need to acquire all the necessary information regarding their health. The health and quality of life of elderly people are affected by many complex factors. Majority of these factors revolve around environmental, sociocultural, behavioral and biological factors. Studying the inter-connection of these factors and their influence at population level health differences can lead to a further understanding on age related health disparities (Hill et al. 2015, NIA 2019).

Rogers (1997) conducted a study on socially vulnerable groups of people, including poor, homeless, those with chronic ailments, disabled, elderly, frail people, immigrants and refugees. He concluded that the socially vulnerable groups face financial and social barriers which limit their access to acquire the essential medical care. Broyles et al. (1999) conducted a study to assess the health and use of medical supervised care focusing on poor and elders with no medical insurance coverage. They concluded that these vulnerable groups are less likely to seek medical care despite their unmet medical requirements. With these findings, Broyles et al. conducted another study in

the following year (2000), focusing on elders, uninsured people and the poor who are beneficiaries of Medicaid with poor health status. They found that the vulnerable elders with poor health status are less likely to be hospitalized. Monod & Sautebin (2009) in their study found that the old people with low social integration have limited access to health care.

A study done by Johnstone and Kanitsaki (2008) found that the ethnic elderly people face discriminative health and social care in Australia. Brodie et al. (2000) highlighted numerous factors that limit the elderly people in America to access health care. These factors revolve around income related and physically inaccessibility. Because of the fixed income, elderly people in America face difficulties to acquire the medical care they need. Physical hindrance, including the lack of transportation and impaired mobility also makes it challenging for the elderly American people in accessing the health care. Additionally, over 85% of the elderly American people do not have access to IT or internet which limits them to acquire their health information.

According to the Lancet (2004), about one to three million elderly people in America suffer from mistreatment. These mistreatments include neglect, physical and psychological abuse, financial exploitation and their rights violated (Daniel et al. 1999). Physicians often show neglecting behavior to diagnose and treat the elderly people that can have a poor effect on their health (Williams 2007). Elderly people are seven times more prone to the adverse drug reactions than younger adults and one in six elderly patients admitted to hospitals are the cases of adverse drug reaction (Mannesse et al. 1997). According to Williams (2007), elder people are the largest consumers of medicines, yet disease management data and pharmacotherapy in elderly people is limited. In clinical trials and drug research, usually young white males are recruited, which has caused underrepresentation of elderly people in the clinical research (Rehman 2005, Williams 2007).

2.3. Sustainable Development Goals and Universal Health Coverage

In General Assembly meeting of the United Nation in 2015, the agenda for 2030 with 17 SDGs was adopted by Heads of States, emphasizing the need to “ensure no one is left behind” (WHO 2018). The 17 SDGs contain 169 targets that aim to promote sustainable development in a country through multidimensional and multisectoral policy interventions in the areas of addressing poverty, hunger, malnutrition and food insecurity, protection of environment, a better-quality

education, work opportunities and universal health coverage (UHC). The Equity framework is key to achieve targets in SDGs that are directly related to health. (Tangcharoensathien et al. 2015).

"To ensure healthy lives and promote well-being for all at all ages" is the 3rd goal of SDGs with prominence target 3.8 of the UHC (UN 2015). In order to improve the well-being of individuals and communities and to achieve equitable and sustainable health outcomes, the UHC is an important target that recognizes the importance of all the people and protects the rights of everyone to quality health service without any financial hardship (WHO 2008, WHO 2013, UN 2015).

2.4. Primary health care

According to the WHO (2019), PHC is the first level health service approach that focuses on the health and well-being of the whole society as per the preferences and needs of the people belonging to that society. The PHC sermons determinants of health in broader terms and focuses on interconnected aspects of health, including a comprehensive focus on physical, mental and social wellbeing (WHO 2019). The main purpose of PHC is to make sure that every person receives comprehensive care that prevents the people from the diseases, promotes health, wellbeing and accessible rehabilitation and palliative care (WHO 2019). Since, majority of the people who utilize the PHC belong to low income groups, that is why the PHC service utilization is vital to illustrate the political intentions in achieving pro-poor health outcomes and the UHC (WHO 2008, Limwattananon et al. 2012).

Importance of PHC

The WHO (2019) endorses the critical importance of PHC because it responds to the rapid variations of the factors that affect the public health including economic, technological and demographic shifts. PHC addresses the causes and risks that affect the health and help the stakeholders to examine and re-design the health policies for present needs and future preparedness very effectively and efficiently. Evidences prove that the total health expenditures reduced with an increase in efficiency through investing in the PHC. Public health emergencies, such as epidemics and antimicrobial resistance, can be tackled through the PHC by engaging and educating communities, coherent prescribing approach and surveillance. PHC brings resilience to the health

care system to withstand and share the burden. PHC helps to achieve not only health-related SDGs and UHC, but also helps to reduce poverty, inequality and economic growth (WHO 2019).

PHC and equity in health care utilization

Article 25 of the Universal Declaration on Human rights states "Everyone has the right to a standard of living adequate for the health and wellbeing of himself and of his family, including food, clothing, housing and medical care and necessary social services […]". This means that in order to achieve the social justice, equity and better health, PHC serves as an important root (WHO 2019). Evidences show that not only the better health is achieved through a stronger PHC, but a well-designed PHC is also associated with equitable health care services both within a country and cross-nationally (Starfield et al. 2005).

Inequities in PHC utilization

The WHO advocates that in order to close the equity gaps within population, the most important intervention is to focus on the health of the more disadvantaged ones and their healthcare needs (WHO 2008). Evidences show that a robust PHC reduces the risks of acute and chronic ailments, lower hospital admission and overall health care utilization and generate better health outcomes overall (Browne et al. 2012). However, ineffective or inaccessible PHC can result in people relying on emergency care, delaying their treatment and lose the benefit of continuity care (HCC 2007, Baum et al. 2009, CIHI 2012). Research on the PHC delivery highlights several disparities revolving around the limited access of the marginalized population with the greatest needs, division and under-resourcing for the marginalized people, lack of knowledge to address the problems of those with needs and inadequate policies and funding (WHO 2008).

2.5. Evidence on inequities in PHC utilization among the elderly people

A vast amount of data is available indicating inequities in the health care utilization at various in and out-patient levels of tertiary, secondary, primary level hospitals or private clinics. Most of the researchers and policy makers tend to focus on inequities at the PHC level because a well-designed PHC not only improves the overall health outcomes, but also promotes equitable allocations of health-related services among the population (Starfield et al. 2005).

Even after the Alma Ata declaration in 1978 with emphasis on “Health for All” through strengthening the PHC, elderly people face disparities in utilizing the PHC. Allin et al. (2006), after adjusting the need, found that the health care utilization is concentrated more among the higher income elderly people. A study of inequality in health care utilization was conducted by Wang et al. (2012). The target groups were the mid-aged and elderly people residing in two provinces Gansu and Zhejiang of China. They found that the health care utilization in both the provinces was clearly concentrated among the rich favoring those who have a better income. Yam et al. (2009) conducted a study on health care service utilization by the elderly people. They concluded that although lower-income elderly people consult the government clinics more than the rich, the total health care utilization by the low-income elderly people is low despite their higher needs. Fu et al. (2018) performed a cross-sectional study on elderly individuals in China based on a survey done in 2015. The conclusion of the study was a strong pro-rich health care utilization.

Jester et al. (1999) found that for the treatment of depression, elderly people prefer to visit their PHC physician more than a mental specialist. However, several researches indicate the incapability of the PHC physicians to diagnose and treat depression because of numerous hindrances (Willaims 2007). An intense research of over thirty years revealed a negative or prejudiced attitude of educators, medical students and residents towards the elderly people (Alford et al. 2001). A study done by Camacho and Reyes-Ortiz (2005) suggested that the PHC physicians have little knowledge regarding the concerns and needs of elderly people, while another study done by Burd et al. (2006) revealed that the PHC physicians feel uncomfortable when taking history from the elderly people patients regarding their sexual life. Clinical guidelines suggest a periodic vaccination for elderly people (Williams 2007). However, Hebert et al. (2005) in his studies found that many minority elders visited the PHC for their routine check-ups and despite the availability of flu vaccination, they did not receive the vaccination.

PHC - A key approach

In order to achieve the UHC and meet the health needs of the population, PHC is the key approach and a prime focus of all the member states of the United Nations (UN). Being a member state of the UN, Mongolia is also struggling to provide an equitable health service to its people and to achieve the UHC. However, some studies are available which unveiled the inequalities in the PHC

utilization in Mongolia (Dorjdagva et al. 2017, Jigjidsuren et al. 2019), but the investigation is limited to either a specific age group or a given geographical location, that has resulted in either insufficient or outdated evidence on inequalities among the elderly people in PHC utilization, which requires a thoughtful consideration to achieve long term health care objectives.

2.6. Mongolia - Country background

Mongolia is a lower-middle income country, which is landlocked between Russia from the north side and China from south, east and west side. The total land of Mongolian territory is 1566460 km^2 (WPRO WHO 2012, The World Bank 2019). According to The World Bank (2018), the total population of Mongolia is estimated to be 3.17 million, where males account for 49.52 % and females account for 50.47% of the total population. 2 million of the Mongolian population ages between 15-64 while around one-hundred thousand people are 65 years or older (UNDP 2017). The key development indicators are shown in table 1.

Table 1. Development indicators of Mongolia, year 2017

Key development indicators	**Measure**
Human Development Index (HDI)	0.741
Life expectancy (years)	69.5
Current Health expenditure (% of the GDP)	3.9
Mortality rate, infant (per 1,000 live births)	15.4
Mortality rate, under-five (per 1,000 live births)	17.9
Maternal mortality ratio (deaths per 100,000 live births)	44
Literacy rate, adult (% ages 15 and older)	98.3
Gross national income (GNI) per capita (2011 PPP $)	10,103
Gross domestic product (GDP) per capita (2011 PPP $)	11,841

Source: United Nations Development Program: Human development reports: Mongolia 2017

The major ethnic group is Mongol which constitutes about 85-95% of the total Mongolian population, while Kazakhs are 4-5% of the total population (WPRO WHO 2012). Although Mongolia is world's 18th largest country area wise, it is ranked amongst the top least population dense country of 2 persons per km^2 (The World bank 2018). About 67.6% of the total Mongolian

population reside in urban areas (ADB 2018) while one third of the population resides in the capital, Ulaanbaatar city (WPRO WHO 2012).

2.6.1. Health sector

Health policies

Mongolian health sector advocates an overall better health care provision towards its citizens. The Mongolian Constitution 1992 protects the right of its citizens towards healthy and safe environment, their health and medical care. The Mongolian health laws 1998, 2006, 2011 protect the rights of its citizens to free primary health services, maternal care and certain services to promote the public health at PHC level regardless of their socio-economic standings or health insurance coverage. The Citizen's Health Insurance Law (1993, 1997, 1998, 2002 and 2006) holds the MOH being the responsible authority for pricing and payment methodology in health services to ensure equitable access. The Health Sector Development Program 1998 and The Health Sector Strategic Master Plan 2005-2015 developed by the MOH also promotes the health service delivery, especially to mothers and children through multisectoral approach, universal access, responsive, equitable and client centered pro-poor quality services. (WPRO WHO 2012).

Goals and Objectives

In 1998, the Mongolian MOH devised "The Health Sector Development Program" in collaboration with the Asian development Bank (ADB). The main objectives of this program are to put primary focus on mothers and children and equitable quality services for all to improve their health status through a receptive multi-sectoral approach (GOM MOH 2005). The overall Mongolian health legislation's goals are to strengthen the PHC services, specialized and emergency care and improving the access and use of these services with primary focus on children, mothers and other vulnerable groups (WPRO WHO 2012).

2.6.2. Health service delivery network

Mongolian health services are aimed to provide a quality care to the Mongolian citizens which is both equitable and accessible. The health services in the urban areas resulted in an enormous migration of the people from rural to urbans areas, which compelled the government improvising and improving the health services in rural areas. The prevailing health delivery system in

Mongolian is a three-layer system but have some differences in the pathways between the urban and rural zones because of different geographical circumstances (Tsilaajav et al. 2013).

Tertiary level health care

At the aimags level, the health services at tertiary level are delivered through four Regional Diagnostic and Treatment Centers (RTDCs) while three are the central hospitals in Mongolia (MOH 2005). They provide highly specialized in and out-patient services and serve as training hospitals for health care personnel. These hospitals are state owned, staffed and managed by the central government. 30% of the total in-patient admissions in Mongolia are done at tertiary care hospitals (Tsilaajav et al. 2013).

Secondary health care

District general hospitals (Ulaanbaatar district hospitals) and aimag hospitals provide the secondary healthcare service in Mongolia (Tsilaajav et al. 2013). 10% co-payment model is in practice to acquire a service at the secondary health care (MOH 2005).

Aimag hospitals

There are 17 state owned aimag hospitals, staffed and salaried by the local government (Tsilaajav et al. 2013 and MOH 2005). They have 105 – 500 beds with 24 hours of services for 50,000 to 100,000 population (MOH 2005).

District hospitals/ Ulaanbaatar district hospitals

There are 12 district hospitals in Ulaanbaatar (Tsilaajav et al. 2013). Each district hospital is staffed with doctors, nurses and support staff and carries a capacity of 200-300 beds for patients (MOH 2005).

Primary health care

In Mongolia, the PHC is free for all Mongols and is financed by the government (Dorjdagva et al. 2017). PHC in urban areas is provided through family health centers (FHC) previously known as family group practice (FGP), whereas *soum* and *inter-soum* hospitals provide the PHC in rural areas (Tsilaajav et al. 2013). However, the utilization of the PHC services shows variations among the different population groups (Dorjdagva et al. 2017).

PHC in urban areas

For provision of family clinics, FGP were established in Ulaanbaatar and in the aimag centers in 2000 – 2003 which are now known as FHC (family health centers) (Tsilaajav et al. 2013). In terms of administration, FHC consists of an average of three to four doctors with equal number of nurses making an estimate of 2235 family doctors and nurses in FHC with their own offices and administration (Tsilaajav et al. 2013). In 2011, an average of 5.9 million patient consultations was made at the FHC (MOH health indicators 2011). A family doctor makes an average patient consultation of 8198.4 (Tsilaajav et al. 2013).

The main FHC services include outpatient examination, basic emergency services, disease prevention and promotion, basic prescriptions, child and maternal care and referrals to district hospitals (Tsilaajav et al. 2013).

PHC in rural areas

In rural areas, the state owned *soum* health centers provide both out and in-patient PHC services as-well as supportive care to secondary in-patient care before travelling long distances. The staff includes salaried doctors, nurses, support staff, midwives and feldshers. Most *soum* hospitals have 5 – 10 beds for before and after pregnancy mother and childcare, basic surgical procedures, referral to aimag hospitals, prevention and education activities and basic blood and urine tests. In order to provide primary health services to more remote areas, about 881 Bagh Feldsher posts (about 11 of these equipped with 1-2 beds) are attached with the *soum* health centers (Tsilaajav et al. 2013). The hospital is referred as *inter-soum* hospital if it is serving more than one district. The PHC in rural areas of Mongolia is provided through a total of about 274 *soum* health centers and 37 *inter-soum* hospitals (MOH 2005).

*Aimag – Meaning tribes which refer to provinces

* Ulaanbaatar – The capital and the largest city of Mongolia

**Soum* – refers to a district

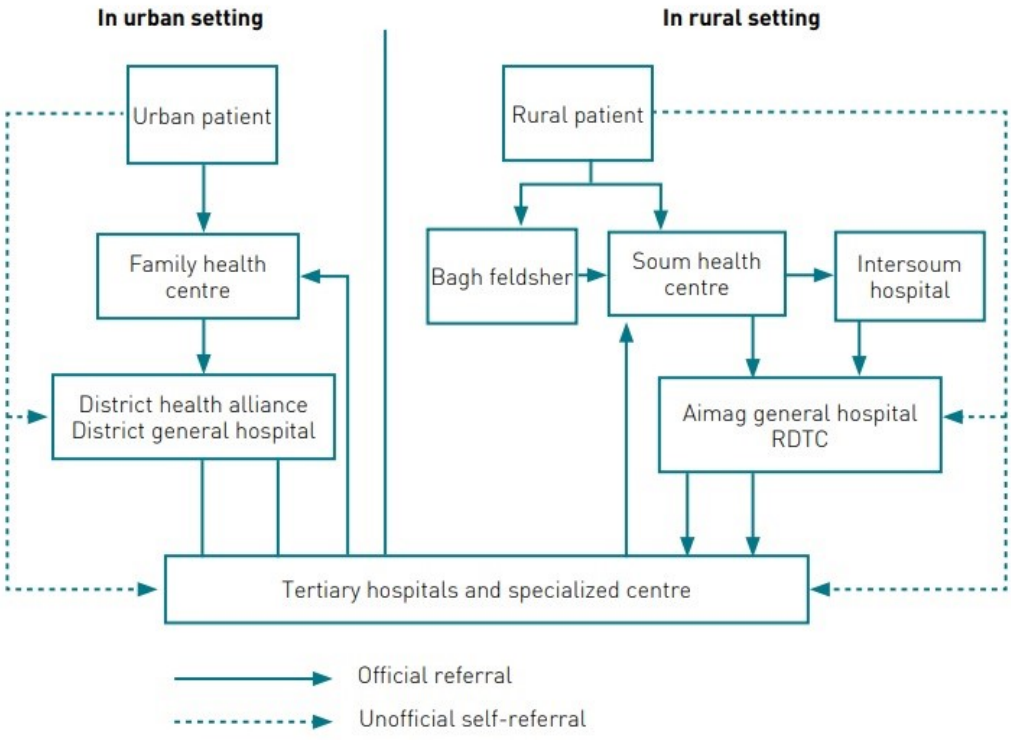

Figure 2. Patient's pathway of utilizing health care services in Mongolia

Source: Image taken from Tsilaajav et al. 2013; WHO Mongolia Health System Review; Health Systems in Transition, Vol. 3 No. 2 2013.

2.6.3. Financing of health care services

A centralized health system was ruling in Mongolia before 1990 where the financing and delivery of the health services were made by the government (Dorjsuren et al. 2005, GOM 2010). In 1990, a peaceful democracy overruled resulting in economic transition of the state towards market-based economy (Dorjdagva et al. 2015). Following the economic transitions, the government introduced a SHI in 1994 to protect the vulnerable groups financially, provision of quality and equitable services and to support the state burden on health budget (Dorjsuren et al. 2005, Tsilaajav et al. 2013).

At present, the healthcare financing is done at three major levels that include the central state budget, SHI and OOP (Tsilaajav et al. 2013, WHO 2019). The governmental budget share for the health financing accounts for 62.1%, SHI for over 24.9%, while 9.8% and 3.2% from other sources and user fees respectively (WHO 2017). In the health insurance fund, as low as 4 % of the contribution is from salaried people, whereas a minimal contribution from self-employed, herdsmen and students is compulsory. The PHC is financed by the government and is free for all Mongols while services at secondary and tertiary level are subsidized by the SHI with the co-payments of 10% and 15% respectively (WHO 2012).

In 2011, the SHI coverage observed in Mongolia was 98.6% which is quite distinct from the other developing countries (Dorjdagva et al. 2015). But despite government's budget for the health care and higher insurance coverage, OOP represent 41% and 42% in 2010 and 2014 respectively (Tsilaajav et al. 2013, WHO 2017).

A share of 60.8% of the total healthcare budget goes to the secondary and tertiary level hospitals, while the expansion of SHI to out-patient service, high cost diagnostics and treatments and medicine reimbursements have led a decline in in-patient care covered by SHI from 66.3% in 2011 to 47.1% in 2016 (WHO 2017).

2.6.4. Health inequities

After the economic transition in Mongolia, the government introduced the SHI system. The basic aims of introducing SHI were to share the burden of the state, to protect the people from catastrophic health expenditures and financial hardship, to improve the quality and equitable health services for all (Dorjsuren et al. 2005, Tsilaajav et al. 2013). In 2005, the MOH developed a ten years Health Sector Strategic Master Plan to improve and to promote the health service delivery, especially to the mothers and children through multisectoral approach, universal access, responsive, equitable pro-poor client centered quality services and developing the health resources (WPRO WHO 2012). Following the said plan, The National Strategy on Health Financing for the year 2010 -2014 was introduced by the government to protect people from financial hardship in acquiring the health care and ensure an equitable and accessible health care service. (GOM 2010, WHO 2012). But despite government's policies and strategies for equitable healthcare distribution, the evidence is scarce in implementation of those policies and their impact (Dorjdagva et al. 2015).

Inequities in PHC of Mongolia

A study done by Tsilaajav et al. (2012) reported that the disparities in the utilization of health care exist in Mongolia. The report quantified the concentration of rich people utilizing in-patient and out-patient at secondary and tertiary level service more while poor people tend to utilize out-patient service at FHC and *soum* hospitals more that are the primary level health care services. In their study, they also found that the government spending at the provincial and central level hospitals are clearly in favor of rich for both in-patient and out-patient services while at the primary level, the FHC and *soum* hospitals, in-patient distribution of government spending is pro-poor and at out-patient service, it was found as pro-rich when they applied proportional cost method. They also found that the immunization and treatment of acute RTIs are pro-rich. However, horizontal inequity was not measured in the study, which serve as an easy tool for measurement of equitable distribution of health in research and policy matters. Later in years 2015 and 2017, Dorjdagva et al. found that the inequities in health care utilization do exist in Mongolia, people pay OOP to acquire the health care they need that compels them to suffer catastrophic health expenditure, but there is no evidence of inequalities among the elderly people or the catastrophic sufferings among the elderly people in Mongolia.

Age-based health inequities

According to Mujahid et al. (2010), old people have a high incidence of falling into poverty because of declining income earning capacity as a result of physical incapability, poor health status and employment discrimination. Population aging is linked with extensive needs of social and welfare securities, disease and disability management among the elderly people with older women being more vulnerable than older men.

About 7.29% of the total population in Mongolia are the elderly people (Worldometers 2019). According to Mujahid et al. 2010, this number is expected to increase to 11% and 25% by 2025 and 2050 respectively. About one third of the Mongolian population is living below the poverty line and almost half of these households have elderly people members (Mujahid et al. 2010). The Government of Mongolia (GOM) has showed its concerns on income security in old age and introduced the measures in promoting the employment of elderly people who can and want. However, the impact of these measures is excluding making majority elderly people financially dependent upon their children (Mujahid et al. 2010). The social insurance system of Mongolia

covers elderly people men of age 60 or above and women of age 55 and above eligible depending upon their contribution during their employment (SSIGO 2006).

The measures taken by the GOM were not limited to financial aid but also to provide them with amenities to improve the quality of their lives. A report by Mujahid et al. (2010) mentioned that the assistance in actions by the GOM towards the elderly people included monetary assistance, concession in fuel, electricity and health treatments for extremely poor elderly people as well as some monetary assistance, care services, community based and employment support apart from free health insurance coverage. In that report, it was also mentioned that though elderly people in Mongolia were satisfied with the governmental policies however, their implementation was insufficient. According to that report, elderly people find the medical treatment inadequate because despite the state's health insurance, elderly people were supposed to pay huge amount for their treatment and diagnosis. Elderly people with any sort of employment status had more access to health services than the pensioners. Most of the retired elderly people who had to stay in a care facility never applied to the cost reimbursement. Those elderly people who receive or do not receive social pension never applied for reimbursement of their stay cost in a care facility. Community based health services were not readily available for the elderly people residing in rural areas while the poor to extremely poor elderly people never had access to community-based health service. Elderly people who participated in this study quoted that for elderly people, there was no desirable treatment in the hospitals, and they were never examined by a geriatric doctor.

This shows that although the GOM devised the policies and strategies for the provision of an equitable health care for the elderly people, it is evident that inequities do exist among the elderly people in Mongolia. A few studies have been conducted on accessibility and inequality in health service (Dashzeveg 2011, Lhamsuren 2012, Gan-Yadam et al. 2013) but are focused on specific group of the population or geographical locations. Therefore, there is a need to measure the inequities in health care utilization among the elderly people, which requires a thorough research, particularly at the PHC as the PHC is a close-to-client service which is supposed to permit an equitable access and a key to achieving the UHC (Tangcharoensathien et al. 2015).

3. Study objectives

The objectives of this study are:

- To analyze the inequality in PHC utilization among elderly people in Mongolia
- To measure the inequity in PHC utilization among elderly people in Mongolia.
- To explore the main contributors of income related inequality or inequity in PHC utilization among the elderly people.

4. Methodology

4.1. Data

The raw data of Household Socio-economic Survey (HSES) of Mongolia 2012, conducted by the National Statistical Office was obtained by my supervisor Dr. Javkhlanbayar in 2014 who gave me the permission to use this data for this study. The survey was designed to measure the poverty, map and monitor its basis, sharing the results to devise strategies in poverty reduction, evaluate the household income and the total expenditure, prompting the consumer price index and offering inputs to the national accounts (NSO 2013). The questionnaire deployed in the survey includes a comprehensive range of inquiries which revolve around the demographics, socioeconomic indicators, housing, educational levels, health status, welfare payments etc. The total number of households who participated in HSES 2012 are 12,811 households and the total number of individuals are 47, 908.

Inclusion and exclusion criteria

Our main criteria for the inclusion was individuals who were aged 60 or above. Those with age below 60, living away from home for 11 or more months or with missing data were excluded in our study.

Dependent variables

Dependent variables are the main factors that we are trying to understand or predict. Measurement of the PHC outpatient service utilization was based on, if the participating individual received the outpatient care by visiting any PHC that is delivered by FHC and *soum* health centers in the past 30 days. (yes/no).

Independent variables

Independent variables are the factors that we hypothesize that they have an impact on our dependent variables. Net monetary income of the household was used for the analysis of our study as the information regarding the household income is available in the Mongolian HSES 2012. Household net income was calculated based on sources of income, including work wage, self-employment, agriculture, any private income and pension. In the next step, we divided the household income among each household member as per the OECD modified equivalence scale.

Haagenars et al. (1994) proposed this scale for the first time and is adopted by the statistical office of the European Union. The values in the income equivalence scale are assigned as:

Household member	Equivalence value
Head of the household	1
Adult in the household (other than the head)	0.5
Child	0.3

Need and Non-need variables

The need variables in this study include age, gender and self-reported health. Age is a continuous variable, whereas gender and self-reported health are binary variables.

Through the questionnaire, the health variables were measured on the basis of four questions that were asked from individuals directly:

(i) Have you got any disabilities? (yes/no)
(ii) Did you have any health complaints in the past month? (yes/no)
(iii) Did you miss your work, school or daily activities due to the illness in the last month? (number of days)

Employment and marital status, education, location, household size and health insurance coverage were the non-need variables. In the questionnaire, employment status was subcategorized into employed, herder, self-employed and retired, whereas marital status was subcategorized into married/living together, divorced/separated, widowed and single/never married. Location was distributed into either rural or urban. SHI coverage depicts the health insurance of an individual and the household size is a continuous variable.

4.2. Measuring socioeconomic inequality in health care utilization

As discussed earlier in our literature, there are several techniques through which inequality in health care utilization can be measured. These techniques can be as simple as Odds Ratio, Regression based inequality measures and or the relative index of inequality (RII) to more advanced techniques including Basic axioms, The Relative Mean Deviation and the Variance,

Coefficient of Variation, Standard Deviation of Logarithms, The Lorenz curve and the Gini coefficient (Spinakis et al. 2011). But Concentration Index is the most commonly adopted method when the interest lingers around the calculation of the degree of income-related inequality in health care utilization (Kakwani et al. 1997).

In this study, Concentration Index technique is implemented because of its direct connection to the concentration curve as concentration curve provides a clear depiction between share of the health service by cumulative proportion of population ranked by income (O'Donnell et al. 2007).

The covariance of utilizing health care by the distribution of income into fractional ranks is indicated as:

$$CI = \frac{2}{\mu} cov_w \ (y_{it}, \mathrm{R}_i^t) \qquad (1)$$

Where the coefficients represent the followings: i = an individual

y_i = health care utilization

μ = mean of the health care utilization (y)

R_i = individual's fractional rank in the income distribution

t = year

Through the concentration index, the concentration curve is denoted by a single number which is the summary of inequality weights in health care utilization measured at different points in the income distribution into income ranks. The range of concertation index falls between -1 and +1. When the value of the concentration index is negative, this means that the utilization of health care is pro-poor, and the positive value of concentration index shows that the utilization of health care is pro-rich (O'Donnell et al. 2007).

According to Wagstaff (2005), concentration index depends upon the mean value of health care utilization (health variable) which he finds as a limitation when the utilization of health care is binary. This is because the concentration index becomes smaller when the mean increases. To solve this problem, Guido Erreygers (2009) introduced Erreygers' concentration index (EI). EI is applicable when the variables are binary.

$$E(h) = \frac{4\mu}{(b_n - a_n)} C(h) \qquad (2)$$

Where the coefficients represent the followings:

C(h) = standard concentration index (presented in equation 1)

μ = mean health care utilization in population

$b_n - a_n$ = upper and lower bound of health care utilization

As the nature of the variables in this study are binary thus, EI is used to calculate the inequality in health care utilization.

4.2.1. Horizontal inequity

Horizontal inequity is estimated which enables to assess the inequity in the health care utilization among the population which is avoidable. Related to income differences, utilizing health care service differs among and across the population as the health care needs vary due to differences in age, gender and health status. These differences in health care needs are thus unavoidable. So, in order to measure the equality in health care utilization among the population, the differences in the need variables must be controlled. Standardizing the differences in need rationalize the unavoidable inequity in health care utilization, whereas horizontal inequity expresses the avoidable inequity in health care utilization through the difference between the actual unavoidable inequity in health care utilization and the concentration index (O'Donnell et al. 2007).

4.2.2. Need standardization

To estimate the horizontal inequity in health care utilization, indirect standardization method is applied in this study. A non-linear method is preferred when the variables in the study are binary. However, the results showed no significant differences in the studies that applied both linear and non-linear methods. Therefore, ordinary least square (OLS) regression is adapted in this study (O'Donnell et al. 2007, Allin and Hurley 2009). Initially, we calculated the coefficient of OLS y_i which is the health care utilization (y_i) using the following formula.

$$y_i = \alpha + \beta \ln inc_i + \sum_k \gamma_\kappa \chi_{\kappa,i} + \sum_p \delta_p z_{p,i} + \varepsilon_i \qquad (3)$$

Where the coefficients represent the followings:

y_i = health care utilization of individuals

inc_i = log of household income per equivalent adult

χ_κ = a set consisting of need variables (age, sex and health variable)

z_p = a set consisting of non-need variables (location, insurance, activity status, household size, education and marital status

α, β, γ_κ, and δ_p = parameter vector; and ε_i = error term

Using equation 3, we generated values of health care utilization as need-predicted ($\hat{y}_i^x$). The equation of the need-predicted value is written as:

$$\hat{y}_i^x = \hat{\alpha} + \hat{\beta}\ln inc^m + \sum_k \hat{\gamma}_\kappa \chi_{\kappa,i} + \sum_p \hat{\delta}_p z_p^m \qquad (4)$$

Lastly, through the difference of equation 3 (actual health care utilization) and 4 (need-predicted health care utilization) and adding the sample mean (y^m), indirectly standardized health care utilization ($\hat{y}_i^{IS}$) is estimated (O'Donnell et al. 2007).

$$(\hat{y}_i^{IS}) = y_i - \hat{y}_i^x + y^m \qquad (5)$$

4.2.3. Decomposition analysis

With the help of decomposition analysis, various factors contributing discretely to income related inequality in utilizing health care can be obtained (O'Donnell et al. 2007). There have been many discussions on the inapplicability of decomposition analysis to linear regression models and that it generates an estimate error as well when applied in non-linear model for binary outcome. However, decomposition analysis only requires the OLC coefficients not the predicated values (Doorslaer et al. 2004).

After decomposing the concentration index and multiplying by it 4 and μ_h, we acquire the EI which is written as:

$$E = 4\ [\ \beta\mu_y C_y + \sum_j \gamma_j \mu_{zj} C_{zj} + \sum_k \delta_k \mu_{xk} C_{x,k}\ ] \qquad (6)$$

Where the coefficients represent the followings:

μ = the mean,

j and k = vectors of variables

zj and xk, γ and δ = the coefficients of the variable z and x variable coefficients.

C = concentration index (Erreygers 2009)

5. Results

5.1. Descriptive statistics

The descriptive statistics for all the variables of the study are provided in the table 2. The results show that about 59.9% of the study participants reside in urban areas and the rest 40.1% belong from the rural areas. Elderly people in the rural areas demonstrate higher disability, whereas elderly people from the urban areas tend to suffer more from sickness. However, the analysis of disability and sickness were not statistically significant (p-value > 0.05). A total of 8.1% of the elderly people in rural areas visited the PHC while 3.67% of the elderly people in urban areas visited the PHC in the past month which is statistically significant (p-value < 0.05). The SHI was observed to have a considerable coverage of 99.07% elderly people from urban and 98% elderly people from rural areas with p-value of 0.01. The education levels (p-value < 0.05). shows that 58.3% of the elderly people in rural areas have non or lower education while in urban areas, 26.7% of the elderly people have non or lower education. The employment status (p-value < 0.05) in table 2 indicates that 25.6% of the elderly people in rural areas are working with a majority of 20.2 % are working as herders. In contrast, only 9.8% of the elderly people in urban areas are working with a majority of 5.9% represent employed status. The distribution and generation of five income groups from poor to rich quantiles do not show huge differences in rural population. In urban population, 18% and 17% belong from poorest and the 2nd poorest income group while 22% of the elderly people in urban areas represent the 2nd richest and richest income groups. Tables 2 shows that the elderly people in urban areas are richer than the elderly people from rural areas (p-value < 0.05). Overall, the elderly people residing in rural areas dictated poor household income and higher utilization of the PHC.

***Important note**

The term PHC is used to refer the FHC and soum, inter-soum health centers

STATA 11.2 is utilized for the statistical analysis.

Table 2. Descriptive Statistics

Variables	Rural (n=1221); 40.1%	Urban (n=1826); 59.9%
	%	
Health Variables		
Disability (yes)	6.3	4.87
Any sickness (yes)	17.3	20
Gender		
Male	43.4	42.1
Female	56.6	57.9
Primary health care visit (yes)[a]	8.1	3.7
Marital Status [a]		
Married [b]	50.5	53.1
Divorced	2	2.1
Widowed	44.4	43.8
Never married	3.1	1
Insurance[a] (yes)	98	99.1
Education [a]		
Non or lower education [b]	58.3	26.7
Secondary	25.4	33.6
Vocational	10.7	18.4
Higher	5.7	21.3
Employment [a]		
Employed	3.5	5.9
Herder	20.2	1.7
Self employed	1.9	2.1
Retired	74.4	90.2
Income group		
Poorest	20.6	18.2
2nd poorest	19.3	17.4
Middle	19.5	19.9
2nd rich	19.8	22.3
Richest	20.8	22.2
Age mean, min and max	69.6 (60, 97)	69.2 (60, 99)
Log income per capita median, min and max [a]	14.8 (13, 18)	15.1 (12.3, 19)
Household size median, min and max [a]	2(1, 14)	3 (1, 13)

[a]^Statistically significant difference (p-value < 0.05) in 2012

[b]^reference group

Figure 2 shows the PHC utilization by the elderly people according to the income quintiles in Mongolia**.** As already evident in the descriptive statistics, elderly people in the rural areas tend to visit the PHC more (8.1%) than those in urban areas (3.7%) whereas the results at the national level demonstrate that 5.4% of the total elderly people utilized the PHC in Mongolia in 2012. However, in terms of the income quintiles at national level, 7.7% of the elderly people falling in middle-income quintile utilized the PHC the most, followed by the poorest at 6.9% and 2nd poorest at 5.7% whereas the 2nd rich and richest income quintiles utilized or visited the PHC the least as compared to the other income groups.

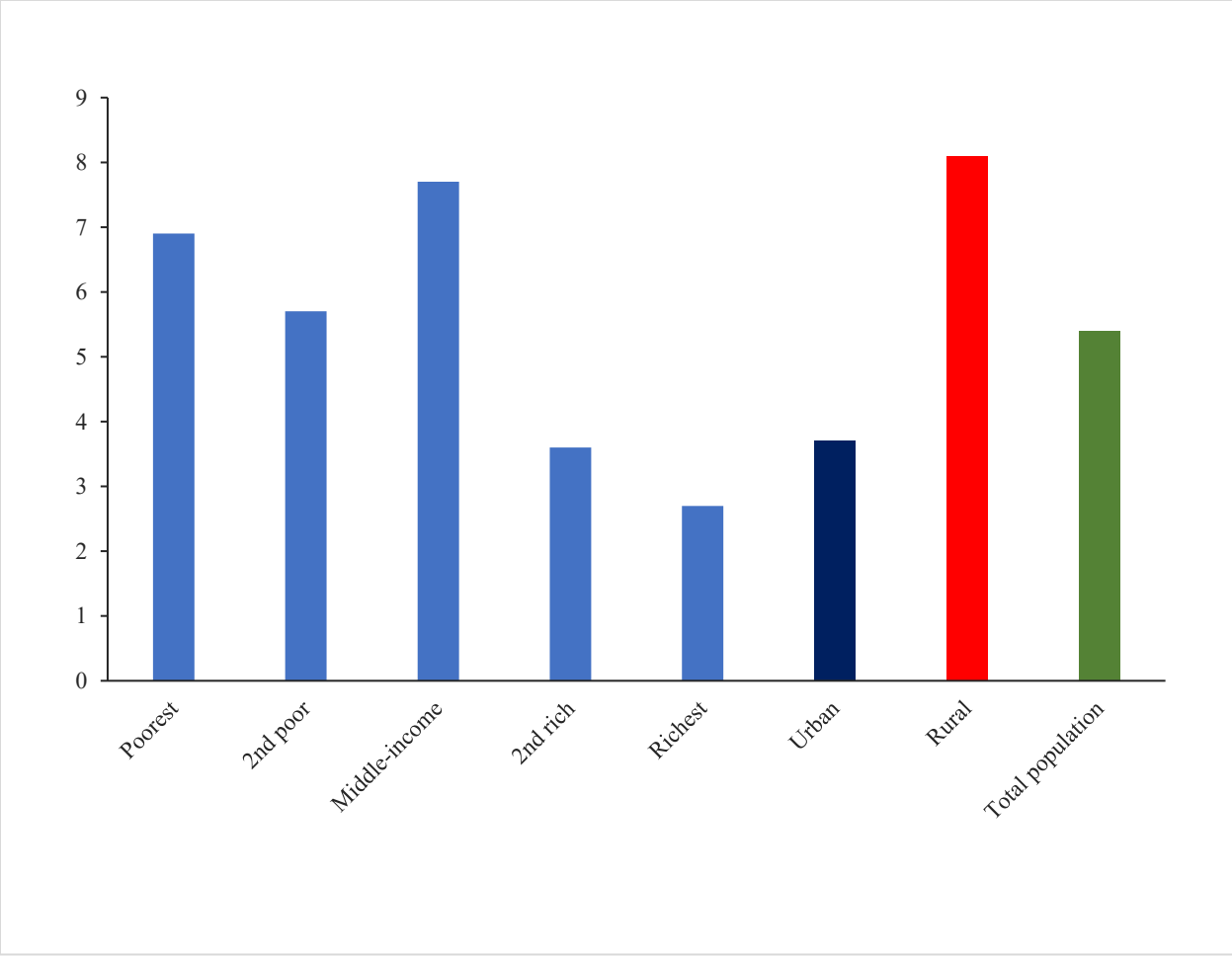

Figure 2. Distribution of PHC utilization among the elderly people across the income quintiles

5.2. Inequalities in PHC utilization among the elderly people in Mongolia

Concentration curves

Figure 3 shows the concentration curve of PHC utilization among the elderly people in Mongolia 2012 which is measured by using equation 1. On the x-axis is the cumulative share of individuals according to income quintiles whereas on the y-axis is the cumulative share of the PHC visit (health variable). The result shows that the concentration curve of PHC utilization among the elderly people in Mongolia lies above the line of equality which indicates that the PHC utilization by the elderly people in Mongolia is concentrated among the poor.

Figure 4 shows the concentration curve of PHC utilization among the elderly people in rural areas of Mongolia. In figure 4, the concentration curve crosses the equality line. Same is the case in urban areas shown in Figure 5. Since the concentration curve of PHC utilization among the elderly people crosses the line of equality when measured on the basis of geographical distribution, hence it cannot be suggested if the PHC is concentrated among the poor or rich in such cases.

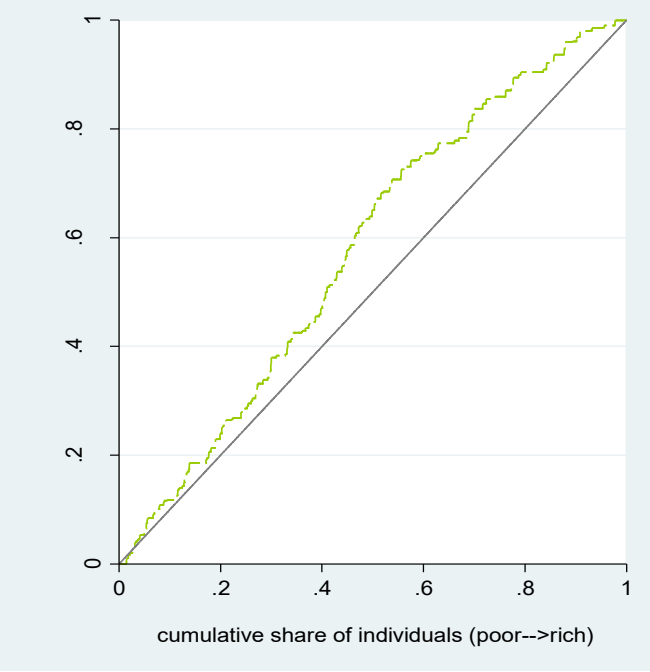

Figure 3. Concentration curve of PHC utilization among the elderly people at national level in Mongolia, 2012

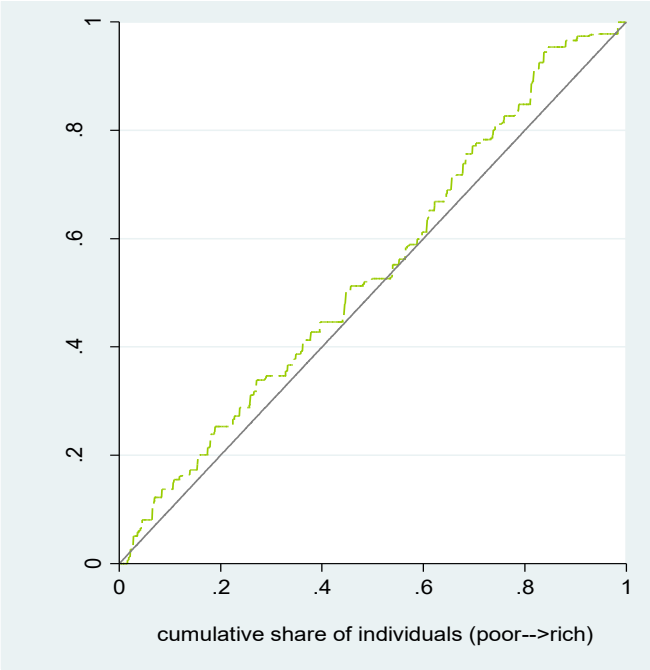

Figure 4. Concentration curve of PHC utilization among the elderly people in rural areas of Mongolia, 2012

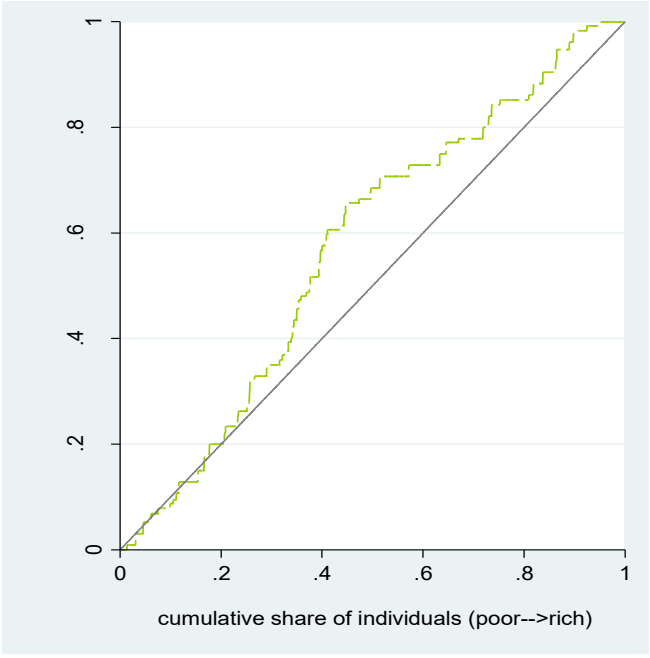

Figure 5. Concentration curve of PHC utilization among the elderly people in urban areas of Mongolia, 2012

Concentration Index

As discussed earlier in the literature chapter (2.2.3), the concentration curve against the line of equality may give an impression, whether the inequality exists or not, but this visual inspection is not sufficient to provide the magnitude of inequality for comparison across many regions, countries and time periods. Therefore, the EI is applied to quantify the socioeconomic related inequality in a health variable (Wagstaff et al. 1989, Kakwani et al. 1997).

Results are provided in table 3. It shows that the EI of PHC utilization among the elderly people at the national level in Mongolia is -0.028 which is statistically significant (p-value < 0.05). It indicates that the PHC utilization among the elderly at national level is pro-poor in Mongolia. The EI of PHC utilization among the elderly people in rural areas of Mongolia is -0.022 which is statistically insignificant (p-value > 0.05). Whereas, the EI of PHC utilization among the elderly people in urban areas of Mongolia is -0.020 which is statistically significant (p-value < 0.05) indicating pro-poor PHC utilization among the elderly.

Table 3. Erreygers' concentration index of PHC utilization among the elderly people in Mongolia, 2012

	Concentration Index	**p-Value**
National	-0.028	0.00
Rural population	-0.022	0.24
Urban population	-0.020	0.04

It is worth mentioning here that the primary focus of this study is the elderly population at national level, therefore the results of PHC utilization on the basis of geographical distribution were omitted from the subsequent analysis.

5.3. Regression analysis of PHC utilization among the elderly people in Mongolia

Using equations 3 and 4, we performed indirect standardization of need and non-need variables to estimate the health regression. The results are presented in table 4.

Table 4. Regression analysis of the PHC utilization among the elderly people at the national level in Mongolia 2012

	Coefficient	Standard Error	t	P>t	[95% Conf.	
Disability	-0.0088	0.0153	-0.5700	0.5660	0.0388	0.0212
Miss work	-0.0040	0.0011	-3.6400	0.0000	0.0061	0.0018
Any sickness	0.2571	0.0098	26.1500	0.0000	0.2378	0.2764
Age	-0.0004	0.0005	-0.89	0.372	-0.0014	0.0005
Log of income	-0.0064	0.0057	-1.1100	0.2660	0.0176	0.0048
Divorced	0.0019	0.0248	0.0800	0.9400	0.0468	0.0505
Widowed	0.0102	0.0077	1.3300	0.1840	0.0049	0.0254
Never Married	0.0121	0.0266	0.4500	0.6500	0.0401	0.0643
Herder	-0.0277	0.0209	-1.3200	0.1860	0.0687	0.0133
Self employed	-0.0199	0.0285	-0.7000	0.4860	0.0757	0.0360
Retired	-0.0058	0.0163	-0.3600	0.7220	0.0377	0.0261
Secondary	-0.0178	0.0090	-1.9800	0.0480	0.0354	0.0002
Vocational	-0.0193	0.0110	-1.7600	0.0790	0.0408	0.0022
Higher	-0.0222	0.0114	-1.9500	0.0510	0.0445	0.0001
Location	-0.0434	0.0086	-5.0600	0.0000	0.0602	0.0266
Insurance	-0.0152	0.0291	-0.5200	0.6010	0.0723	0.0419
Household Size	-0.0042	0.0019	-2.2400	0.0250	0.0079	0.0005
Log of distance to health services	-0.0050	0.0025	-1.9900	0.0470	0.0100	0.0001

Where miss work, any sickness, secondary education group, location, household size and log of distance to health services were statistically significant (p-value < 0.05).

5.4. Erreygers' concentration index and horizontal inequity for PHC utilization among the elderly people in Mongolia

Table 5 summarizes the Erreygers' concentration index (EI) and horizontal inequity using equations 1-5.

Inequality in primary health care utilization by the elderly population in Mongolia

The EI of PHC utilization by the elderly population at the national level is -0.028 which is statistically significant (p-value < 0.05). These indices indicate that the PHC utilization is distributed in favor of the poor. The horizontal inequity index after need standardization remains negative, indicating that for given need, the poor elderly people make a great use of PHC in Mongolia.

Table 5. Erreygers' concentration Index and horizontal inequity 2012

Primary health care utilization	EI (*p*-value)	Horizontal Inequity
Total population	**-0.028**	-0.026

**bold numeric value indicates statistically significant (p-value < 0.05)*

5.5. Decomposition analysis

The decomposition analysis of PHC utilization among the elderly people for the year 2012 is presented in Figure 6. The inequality in the PHC utilization is decomposed into need variables (including age-sex and health factors), non-need variables and income. The decomposition of inequality in health care utilization can show the determinants that contribute to inequality in the health care utilization (details provided in table 5). If the PHC utilization among the elderly is distributed equally across the income, then the total amount of bars in figure 6 should is zero, whereas the sum of these bars is equal to the need bar if the distribution of health care services across the income groups is equitable. It helps to reveal the distribution of need across the income. While other bars appear in the graphical representation if there is a difference between actual and need adjusted distribution, that indicate the reasons for inequity.

The results show that the contribution of need variables in terms of age and sex is positive, indicating that the contribution of age and sex in utilizing the PHC is pro-rich whereas the health factors contribute negatively. This depicts that poor elderly people have higher health needs and they tend to utilize PHC more than those from rich income groups.

On the other hand, the contribution of non-need factors towards inequality are also evident. Income is found the major contributor of inequality in PHC utilization among the elderly people in Mongolia. The results of our study demonstrate that the contribution of income is negative, indicating its contribution as pro-poor in PHC utilization. This means that people from low-income groups utilize the PHC more than the rich. Education is found as a second major contributor to inequality in PHC utilization among the elderly people in Mongolia. The negative and pro-poor contribution of education indicates that those individuals who have higher levels of education do not utilize the PHC as much as those with low education. Location of the household with its

positive contribution to the concentration index contributes to the pro-rich inequality. The partial pro-poor contribution of household size, employment, marital status and household size are clear in inequality in the PHC utilization among the elderly, however their contributions are comparatively minor. The summary of the decomposition analysis is available in table 6.

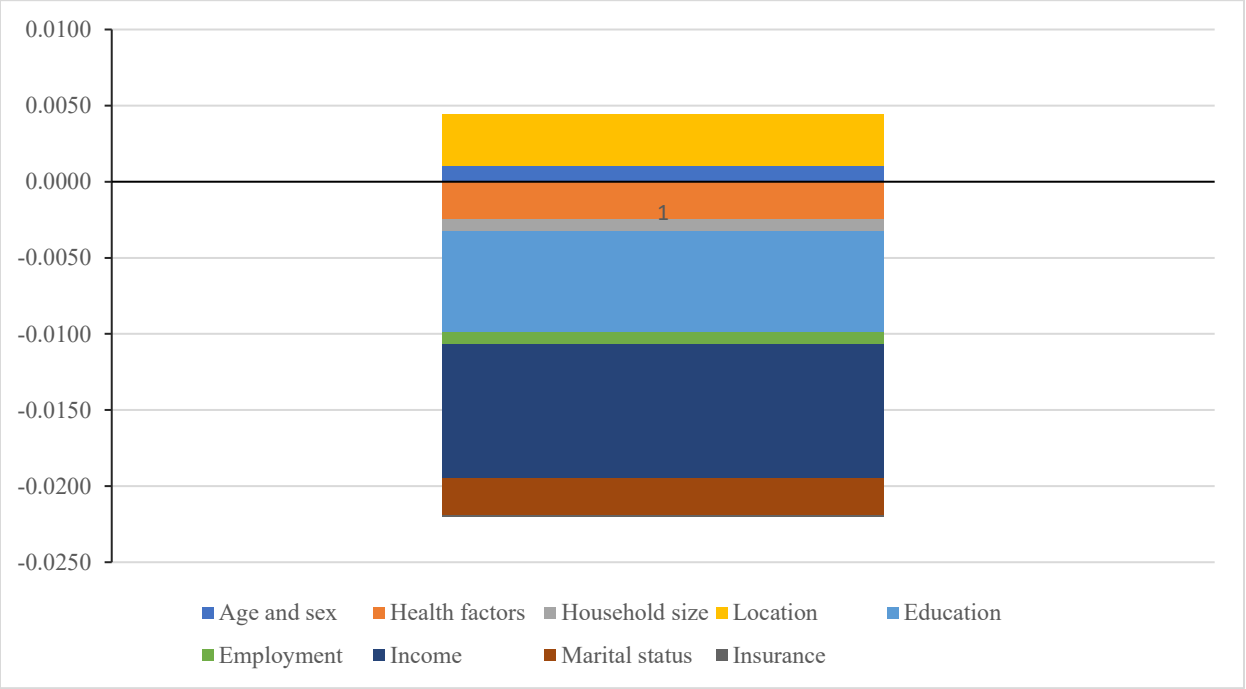

Figure 6. Decomposition analysis of the inequalities in PHC utilization among the elderly in Mongolia 2012

Table 6. Summary of the decomposition analysis of need variables, non-need variables and income

Variable	Elasticity	Concentration Index	Contribution	Percentage contribution
Disability	-0.0100	-0.1364	0.0002	-0.0087
Miss work	-0.0704	-0.0910	0.0011	-0.0408
Any sickness	1.0640	-0.0205	-0.0038	0.1389
Age group 60-64	0.0572	0.0758	0.0008	-0.0276
Age group 65-69	0.1360	0.0349	0.0008	-0.0302
Age group 70-74	0.0400	-0.0866	-0.0006	0.0221
Age group 75-79	0.0000	-0.1165	0.0000	0.0000
Age group 80-above	-0.0115	-0.0029	0.0000	-0.0002
Gender	0.0075	0.0542	0.0001	-0.0026
Log of income	-2.1796	0.0230	-0.0088	0.3188
Marital status - Divorced	0.0008	-0.1453	0.0000	0.0007
Marital status - Widowed	0.1041	-0.1249	-0.0023	0.0828
Marital status - Never married	0.0044	-0.1556	-0.0001	0.0044
Employment - Herder	-0.0470	0.0828	-0.0007	0.0248
Employment - Self employed	-0.0087	0.6638	-0.0010	0.0367
Employment - Retired	-0.1133	-0.0486	0.0010	-0.0351
Education - Secondary	-0.1264	-0.0354	0.0008	-0.0284
Education - Vocational	-0.0709	0.1214	-0.0015	0.0548
Education - Higher	-0.0900	0.3745	-0.0059	0.2146
Location	-0.6948	0.0702	-0.0086	0.3104
Insurance	-0.3414	0.0013	-0.0001	0.0029
Household size	-0.2953	0.0151	-0.0008	0.0285
Log of Distance	-0.0167	-1.1583	0.0034	-0.1234

6. Discussion

PHC is the first level health service approach that focuses on the health and well-being of the whole society as per the preferences and needs of the people belonging from that society (WHO 2019). PHC aims to not only achieve the health-related SDGs and the UHC, but also plays a role to improve the economic growth and reduce the poverty and inequalities (WHO 2019).

Considering the evident benefits of a well-designed PHC, the health sector of Mongolia has put its primary focus to strengthen and to improve the access and utility of the PHC in the past two decades, which is clear through their legislations and amendments for instance, "The Mongolian health laws 1998, 2006, 2011, The Citizen's Health Insurance Law (1993, 1997, 1998, 2002 and 2006), The Health Sector Development Program (1998) and the Health Sector Strategic Master Plan 2005-2015" (WPRO WHO 2012). The basic objective of these legislations and amendments are to protect the rights of the Mongols towards state funded free, equitable and quality PHC services with special attention towards the vulnerable groups (WHO 2012). However, lack of evidence revealing the equality of the PHC services towards the vulnerable groups limits to evaluate the progress and further improvements.

Inequalities in health care utilization in Mongolia have been documented in several studies (ADB 2010, Dorjdagva et al. 2015). A study done by Dorjdagva et al. (2017) revealed income-related inequalities in PHC utilization of Mongolia while another study done by Jigjidsuren et al. 2019 revealed inequalities in PHC of Mongolia in terms of its availability. But to my knowledge, there is no available study that focuses on the inequalities in the PHC utilization among the elderly people. Therefore, in this work I analyzed the inequalities in the PHC utilization among the elderly people and evaluated all the contributing factors causing those inequalities through estimating the inequality and horizontal inequity using the Household Socio-economic Survey (HSES) of Mongolia 2012.

The results of this study reveal several interesting findings. First, the distribution of PHC utilization which is almost twice among the rural elderly people than that of urban elderly people. Availability of the basic in-patient care services in rural PHC and long travel distances to secondary and tertiary health care services as a result of least dense population can make people rely on the PHC in rural areas of Mongolia which justifies the high utilization of the PHC among elderly in rural areas of Mongolia.

Second, the PHC utilization is higher among the middle-income elderly people followed by the poorest and second poorest income groups. This contradicts the study conducted by Tsilaajav et al. (2012) and a report published by the Mongolia MOH and ADB in 2010 and with some international studies (Doorslaer et al. 2004, Yiengprugsawan et al. 2011); which state that the poor tend to visit the PHC more than rich. However, our study focuses on the elderly people only and thus cannot subjugate their findings.

Third, the horizontal inequity in the PHC is negative, indicating that the PHC utilization is concentrated among poor elderly people. This means that poor elderly people tend to use the PHC more than the rich people. One possible reason could be the weak referral system at the PHC. For instance, several studies stated that the rich often bypass the PHC and tend to use secondary and tertiary level through paying self-referral fines (Dorjdagva et al. 2012, Tsilaajav et al. 2013).

Fourth, the contributing factors to pro-poor inequity in PHC utilization among the elderly people in Mongolia on decomposition analysis are profoundly the income and education. Low level of education generates less income than those with higher level of education. A possible explanation is the limited employment opportunities for those with low level of education and less share towards their health insurance. Since the PHC is free for all in Mongolia and co-payments models involved at secondary and tertiary level hospitals (MOH 2005, WHO 2012), so people from low income groups and low level of education rely primarily on the PHC.

The pro-rich distribution of the PHC utilization among elderly people were location, age and sex. The pro-rich contribution of location to the PHC utilization might be high travelling cost to reach to the higher health care level and financial dependency.

The results obtained from this study also highlighted some important notes for policy discussions. The main aim of PHC is to not only provide an accessible and quality care, but to also serve as the gatekeeper of health delivery system (ADB 2008). However, the utilization of PHC service is un-even among different income quantiles with rich elderly utilizing the PHC the least. Therefore, there is a need to rejuvenate the gate-keeping role of the PHC. A weak gate keeping at the first level of health care allows the affluent to bypass the system through self-referrals by paying a minimal fine. This not only depreciates the goal of PHC and equity but also would lead to possible escalation in the cost, wastage of resources and inefficiencies in the overall health care system of Mongolia.

Despite the free PHC and assistance packages for poor elderly including monetary assistance, fuel concession and special health care services by the GOM and, rich elderly people have more physical access to PHC services than the poor elderly people. Therefore, there is a need to devise policies to monitor and improve the assistance packages for poor elderly to improve their access to PHC.

With the findings in our study, it also shows that there is also a need to re-analyze, discuss and improve the health insurance policy for effective coverage and equal access in times of need. This will yield equitable access of low-income high need population at secondary and tertiary level hospitals. This intervention can play a vital role in the Mongolian health care system where the government's total health expenditure is low and trends of OOPs are increasing from 41% in 2010 to and 42% in 2010 and 2014 respectively (Tsilaajav et al. 2013, WHO 2017).

This thesis is a step forward to be the first study to analyze the inequalities in PHC utilization among the elderly people who constitute 7.29% of the total population in 2019 and are projected to represent 11% of the total population in 2025 and 25% by 2050 (Mujahid et al. 2010, Worldometers 2019). Therefore, in order to meet health care needs and a rapid progress towards the UHC, the main strategic direction for Mongolia will be a robust PHC with financial and physical risk protection to achieve equitable health care for all the elderly people belonging from different socio-economic class and for the future preparedness. There is also a need for a further research in this topic to improve the health care services towards the elderly people and to accomplish the long-term health care objectives.

As this study revealed the interesting findings, this study has some limitations. First, since the results obtained from the decomposition analysis are descriptive, so I was not able to perform the causality analysis.

Secondly, my study focused on the elderly people at national level rather than the geographical distribution. Since the PHC in Mongolia is provided at two different geographical levels that are the rural and the urban so, with a further study focusing inequalities in PHC utilization among the elderly people on the basis of geographical distribution will unveil the regional based inequalities. Lastly, this study revealed the inequalities in the utilization of out-patient PHC among the elderly people in Mongolia as the in-patient PHC is not available in the urban areas of Mongolia.

7. Conclusion

Ensuring equitable health care service distribution has been well documented in Mongolia. Several laws and regulations in the Mongolian health sector advocate a better and fairer health care provision towards its citizens, but the socioeconomic inequalities in the utilization of health care have increased especially at the PHC level. A clear pro-poor inequality observed in PHC utilization among the elderly people in Mongolia, indicates that the elderly people belonging to lower income groups rely on the PHC more than the higher income groups, despite their poor health status and complicated medical needs. This also reveals a weak gatekeeping role of the PHC in Mongolia. This has the tendency to increase inequalities in the distribution of health care services at all the delivery levels. Therefore, there is a need to refocus on the policies and implement the strategies for an equitable distribution of health services through strengthening the PHC to promote a systematic approach in utilizing the health care services, equity and to achieve the UHC.

8. References

- Ageing and Life-course. Older People and Primary Health Care., The World Health Organization. (Accessed 04.04.2019) https://www.who.int/ageing/primary_health_care/en/
- Ageism in America, supra note 12, at 59 (citing Mark S. Lachs & Karl Pillemer, Elder Abuse, 364 LANCET 2004, 1263-1264.
- Ahonen E.Q, Fujishiro K, Cunningham T, Flynn M, "Work as an Inclusive Part of Population Health Inequities Research and Prevention". American Journal of Public Health. March 2018, 108 (3): 306–311.
- Allin S and Hurley J. Inequity in Publicly Funded Physician Care: What is the Role of Private Prescription Drug Insurance? Health Economics 2009: 18(10):1218-32.
- Allin S, Masseria C and Mossialos E, Inequality in Health Care Use Among Older People in the United Kingdom: An Analysis of Panel Data. LSE health working papers. LSE Health, London School of Economics and Political Science. 2006.
- Asadi-Lari M, Packham C, Gray D. Need for Redefining Needs. Health and Quality of Life Outcomes 2003: volume 1, Article number: 34.
- Asian Development Bank, Key Indicators for Asia and the Pacific 2018. (Accessed 19.03.2019). https://data.adb.org/sites/default/files/mongolia-key-indicators-2018_0.pdf
- Asian Development Bank. Mongolia: Health Sector Development Program 2008. (accessed 30/10/2019) https://www.adb.org/sites/default/files/evaluation-document/35099/files/28451-mon-pper.pdf
- Balabanova D, Mills A, Conteh L, Akkazieva B, Banteyerga H, Dash U, et al. Good Health at Low Cost 25 years on: Lessons for the Future of Health Systems Strengthening. Lancet. Health Policy 2013, Volume 381, Issue 9883, P2118-2133.
- Banerjee A.V and Duflo E. Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty. Public Affairs, 2011.
- Barker G. WHAT ABOUT BOYS? A Literature Review on the Health and Development of Adolescent Boys. WHO/FCH/CAH/00.7. (Accessed 01.04.2019). https://apps.who.int/iris/bitstream/handle/10665/66487/WHO_FCH_CAH_00.7.pdf?sequence=1

- Baum FE, Bégin M, Houweling TAJ, Taylor S: Changes Not for the Fainthearted: Reorienting Health Care Systems Toward Health Equity Through Action on the Social Determinants of Health. Am J Public Health. 2009, 99: 1967-1974.
- Ben-Shlomo Y, White I.R, Marmot M. Does the Variation in the Socioeconomic Characteristics of an Area Affect Mortality? BMJ 1996; 312(7037):1013-4.
- Bixby L. Spatial Access to Health Care in Costa Rica and its Equity: a GIS-based study. Social Science & Medicine Volume 58, Issue 7, April 2004, Pages 1271-1284.
- Bollini P and and Siem H. No Real Progress Towards Equity: Health of Migrants and Ethnic Minorities on the Eve of the Year 2000. Social Science & Medicine 1995. 41 (6): 819 828.
- Brodie M, Flournoy R.E, Altman D.E, Blendon R.J, Benson J.M, and Rosenbaum M.D. Health Information, The Internet, And the Digital Divide. Health Affairs 2000. 19 (6): 255–65.
- Browne A.J, Varcoe C.M, Wong S.T, Smye V.L, Lavoie J, Littlejohn D, Tu D, Godwin O, Krause M, Khan K.B, Fridkin A, Rodney P, O'Neil J & Lennox S. Closing the Health Equity Gap: Evidence-Based Strategies for Primary Health Care Organizations. International Journal for Equity in Health 11, 2012, Article number 59.
- Broyles RW, McAuley WJ, Baird-Holmes D: The Medically Vulnerable: Their Health Risks, Health Status and Use of Physician Care. J Health Care Poor Underserved 1999, 10 (2): 186-200. 10.1353/hpu.2010.0498.
- Broyles RW, Narine L, Brandt EN: Equity Concerns with the Use of Hospital Services by the Medically Vulnerable. J Health Care Poor Underserved 2000, 11 (3): 343-360. 10.1353/hpu.2010.0752.
- Camacho M.E. and Reyes-Ortiz C.A, Sexual Dysfunction in the Elderly People: Age or Disease?, 17 Int'l j. Impotence Rs. 2005 S52, S52 (Supp. 1).
- Cunningham PJ, Cornelius LJ. Access to Ambulatory Care for American Indians and Alaska Natives; The Relative Importance of Personal and Community Resources, Soc Sci Med 1995, vol. 409 (pg. 393-407).
- Cyndie K. Mannesse C.K et al., Adverse Drug Reactions in Elderly people Patients as Contributing Factor for Hospital Admission: Cross Sectional Study, 315 BritRIT. MedED. J. 1997. 1057, 1058.

- Cynthia L. Alford et al., An Introduction to Geriatrics for First-Year Medical Students, 49 J. AM. Geriatrics Soc'v 2001. 782, 782.
- Daniel L. Swagerty D.L, Jr. et al., Elder Mistreatment, 59 AmM. Fam Physician. 1999, 2804, 2805.
- Dashzeveg C, Mathauer I, Enkhee E, Dorjsuren B, Tsilaajav T, Batbayar C, A Health Financing Review of Mongolia With A Focus on Social Health Insurance. Bottlenecks in Institutional Design and Organizational Practice of Health Financing and Options to Accelerate Progress Towards Universal Coverage. The World Health Organization 2011. (Accessed 02.04.2019) https://www.who.int/health_financing/documents/mongolia_oasis_health_financing_system_review.pdf?ua=1
- Dilip V. Jeste et al, Consensus Statement on the Upcoming Crisis in Geriatric Mental Health: Research Agenda for the Next 2 Decades, 56 ARCHWES GEN. Psychiatry 1999, 848.
- Doorslaer E.V, X.K, AM J. Explaining Income-related Inequalities in Doctor Utilization in Europe. Health Economics 2004: 13(7):629-47.
- Dorjdagva J, Batbaatar E, Dorjsuren B and Kauhanen J. Income-related Inequalities in Health Care Utilization in Mongolia, 2007/2008 2012. International Journal for Equity in Health 2015; 14:57.
- Dorjdagva J, Batbaatar E, Svensson M, Dorjsuren B, Batmunkh B, Kauhanen J. Free and Universal, But Unequal Utilization of Primary Health Care in the Rural and Urban Areas of Mongolia. International Journal for Equity in Health. 2017;16(1):73.
- Dorjdagva J, Batbaatar E, Svensson M, Dorjsuren B, Batmunkh B, Kauhanen J. Catastrophic Health Expenditure and Impoverishment in Mongolia. International Journal for Equity in Health. (2016) 15:105
- Dorjsuren B, Soonman K, Aviva R. Development of Social Health Insurance in Mongolia: Success, Challenges and Lessons. Int Soc Secur Rev 2005;58(4):27-44.
- El-Kebbi IM, Bacha GA, Ziemer DC, et al. Diabetes in Urban African Americans (V): Use of Discussion Groups to Identify Barriers to Dietary Therapy Among Low-Income Individuals with Non-Insulin-Dependent Diabetes Mellitus, Diabetes Edu 1996, vol. 22 pg. 488-492.

- Erreygers G, Correcting the Concentration Index, Journal of Health Economics, March 2009, Volume 28, Issue 2, Pages 504-515.
- Falkingham J. Inequality and Changes in Women's Use of Maternal Health-care Services in Tajikistan. Studies in Family Planning 2003. 34 (1): 32–43.
- Fikree F.F and Pasha O. Role of Gender in Health Disparity: The South Asian context. BMJ 2004; 328(7443):823–826.
- Flores G, Vega LR. Barriers to Health Care Access for Latino Children: A Review, FAM Med 1998, vol. 30 (pg. 196-205),
- Fu X, Sun N, Xu F, Li J, Tang Q, He J, Wang D, Changing Sun, Influencing Factors of Inequity in Health Services Utilization Among the Elderly People in China, Int J Equity Health. 2018; 17: 144.
- Gan-Yadam A, Shinohara R, Sugisawa Y, Tanaka E, Watanabe T, Hirano M, Tomisaki E, Morita K, Onda Y, Tokutake K, Mochizuki Y, Matsumoto M, Sugita C, Anme T, Factors Associated with Health Service Utilization in Ulaanbaatar, Mongolia: A Population-Based Survey, Journal of Epidemiology, 2013 Volume 23 Issue 5.
- Gender mainstreaming for health managers: A practical approach, The World Health Organization, 2011. (Accessed 19.03.2019). https://apps.who.int/iris/bitstream/handle/10665/44516/9789241501064_eng.pdf?sequence=2
- Gornick ME, Eggers PW, Reilly TW, et al. Effects of Race and Income on Mortality and Use of Services Among Medicare Beneficiaries, N Engl J Med 1996, vol. 335, pg. 791-799.
- Gray S, Lawrence S, Arregui A, et al. Attitudes and Behaviors of African-American and Mexican-American Women Delivering Newborns in Inner-City Los Angeles, J Natl Med Assoc 1995, vol. 87 pg. 353-358.
- Gulliford M, Figueroa-Munoz J, Morgan M, Hughes D, Gibson B, Beech R, Hudson M. 'What does "Access to Health Care" Mean?' Journal of Health Services Research & Policy 2002, 7(3), pp. 186–188.
- Hagenaars A, de Vos K and Zaidi M.A, Poverty Statistics in the Late 1980s: Research Based on Micro-data, Office for Official Publications of the European Communities. 1994, Luxembourg. (Accessed 20.05.2019).

https://publications.europa.eu/en/publication-detail/-/publication/9c787f17-acb6-4f4b-badc-49a2310e65f7.

- Health Council of Canada: Health Care Renewal in Canada: Measuring Up? Annual Report to Canadians 2006. 2007, Toronto, ON: Health Council of Canada.
- Health Sector Strategic Master Plan 2005: 2006 – 2015, Vol. 1. Ministry of Health, Mongolia.
- Health Sector Strategic Master Plan 2006 Ministry of Health, Government of Mongolia, 2015 Volume 1 Ulaanbaatar 2005. (Accessed 20.03.2019). http://www.wpro.who.int/health_services/mongolia_nationalhealthplan.pdf
- Health Service Delivery Profile, Mongolia. 2012. The World Development Report on Gender Equality and Development. World Bank 2012.
- Hebert P.L, Frick K.D, Kane R.L, and McBean A.M; Racial Disparities: The Causes of Racial and Ethnic Differences in Influenza Vaccination Rates Among Elderly people Medicare Beneficiaries, Health Serv Res April 2005; 40(2): 517–538.
- Hidden cities: Unmasking and Overcoming Health Inequities in Urban Settings (2010). The World Health Organization & The United Nations. Human Settlements program Geneva. (Accessed 26.03.2019). http://www.who.int/iris/handle/10665/44439
- Hill C.V, Pérez-Stable E.J, Anderson N.B, Bernard M.A. Original Report: Minority Men's Health. The National Institute on Aging Health Disparities Research Framework. Ethnicity & Disease 2015, Volume 25, Number 3.
- Hoffmann D.E and Tarzian A.J, The Girl Who Cried Pain: A Bias Against Women in the Treatment of Pain. Journal of Law, Medicine & Ethics. 2001. 28 (4_suppl): 13–27.
- Hospitalization Disparities by Socio-economic Status for Males and Females. Canadian Institute for Health Information. 2010, Ottawa, ON.
- House JS, Landis KR, Umberson D. Social Relationships and Health. Science July 1988: Vol. 241, Issue 4865, pp. 540-545.
- Irina D. Burd et al., Impact of Physician Gender on Sexual History Taking in a Multispecialty Practice, 3J. Sexual Med 2006. 194, 196.
- Jan S, Kumaranayake L, Roberts J, Hanson K and Archibald K. Economic Analysis for Management and Policy [e-book]. Open University Press; 2005. (Accessed 27.03.2019). (https://books.google.fi/books?id=fc3sAAAAQBAJ&printsec=frontcover&dq=Economic

+Analysis+For+Management+And+Policy&hl=en&sa=X&ved=0ahUKEwiD9Mjv6KHhAhWMlYsKHbhaDicQ6AEIJzAA#v=onepage&q=Economic%20Analysis%20For%20Management%20And%20Policy&f=false

- Jigjidsuren A, Byambaa T, Altangerel E. et al. Free and Universal Access to Primary Healthcare in Mongolia: The service Availability and Readiness Assessment. BMC 2019. Health Serv Res 19, 129.
- Jirojwong S and Manderson L. Physical Health and Preventive Health Behaviors Among Thai Women in Brisbane, Australia, Health Care Women Int, vol. 23 (pg. 197-206), 2002.
- Johnstone M.J and Kanitsaki O. Ethnic Aged Discrimination and Disparities in Health and Social Care: A Question of Social Justice. Australasian Journal on Aging Sep 2008. Volume 27, Issue 3. Pages: 110-167.
- Kakwani N, Wagstaff A and Doorslaer E.V, Socioeconomic Inequalities in Health: Measurement, Computation, and Statistical Inference, Journal of Econometrics 1997; 77, (1), 87-103.
- Kawachi I and Kennedy B.P. Income Inequality and Health: Pathways and Mechanisms. Health Services Research 1999, 34(1 Pt 2), 215–227.
- Kent J.A, Patel V, Varela N.A. Gender Disparities in Health Care. Mount Sinai Journal of Medicine 2012. 79 (5): 555–559.
- Kunst, Anton, Mackenbach, J. P and The World Health Organization. Regional Office for Europe Measuring Socioeconomic Inequalities in Health. The World Health Organization Regional Office for Europe, Copenhagen, 1995.
- Kutzin J. Health Financing for Universal Coverage and Health System Performance: Concepts and Implications for Policy. Bull World Health Organ 2013: 91(8):602-11.
- Lhamsuren K, Choijiljav T, Budbazar E, Vanchinkhuu S, Blanc DC, Grundy J. Taking Action on the Social Determinants of Health: Improving Health Access for the Urban Poor in Mongolia. Int J Equity Health March 2012; 11:15.
- Limwattananon S, Tangcharoensathien V, Tisayathicom K, Boonyapaisarncharoen T, Prakongsai P. Why has the Universal Coverage Scheme in Thailand achieved a Pro-Poor Public Subsidy for Health Care? BMC Public Health 2012; 12:S6.

- Lipton RB, Losey LM, Giachello A, Mendez J, Girotti MH. Attitudes and Issues in Treating Latino Patients with Type 2 Diabetes: Views of Health-Care Providers, Diabetes Edu 1998, vol. 24 (pg. 67-71).
- Marmot M. Global Action on Social Determinants of Health. Bull World Health Organ 2011; 89(10):702.
- Mongolia demographics, Worldometers 2019 (accessed 30/10/2019) https://www.worldometers.info/demographics/mongolia-demographics/#population-pyramid
- Mongolian Health Indicators 2000-2010, Ministry of Health 2001-2011, and Government Implementing Agency-Department of Health. Ulaanbaatar: Mongolia.
- Mongolian Health indicators 2014. Center for Health Development; Ministry of Health Mongolia 2015.
- Mongolia-–WHO Country Cooperation Strategy 2017–202. The World Health Organization WPRO/2017/DPM/005.
- Monique M. Williams M.M, Invisible, Unequal, and Forgotten: Health Disparities in the Elderly people, 21 Notre Dame J.L. Ethics & Pub. Pol'y 441 (2007). (accessed 01.04.2019). http://scholarship.law.nd.edu/ndjlepp/vol21/iss2/6.
- Monod S and Sautebin A. Aging and Becoming Vulnerable. Rev Med Switzerland 2009; volume 5. 2353 – 2357.
- Morgan M. Prenatal care of African American women in selected USA Urban and Rural Cultural Contexts, J Transcult Nurs 1996, vol. 7 (pg. 3-9).
- Mujahid G, Namdaldagva O.E, Banzragch O. Assuring Income Security in Old Age: Views of The Mongolian Elderly People; UNFPAnfpa Country Office, Ulaanbaatar, Mongolia. Ulaanbaatar 2010. (Accessed 08.04.2019). https://s3.amazonaws.com/academia.edu.documents/35183577/Mongolia-Pensionsprintversion-2010.pdf?AWSAccessKeyId=AKIAIWOWYYGZ2Y53UL3A&Expires=1554715871&Signature=0T4VtnEToOKEVU5vG0M5v551r9A%3D&response-content-disposition=inline%3B%20filename%3DAssuring_Income_Security_in_Old_Age_View.pdf

- Murray CJ, Gakidou EE, Frenk J. Health Inequalities and Social Group Differences: What Should We Measure? Bull World Health Organ 1999; 77(7):537-43.
- National Health Accounts Data. The World Health Organization. (Accessed 20.03.2019). https://www.who.int/health-accounts/en/
- National Institute in Aging F-1: Understand Health Disparities Among Older Adults. National Institute in Aging (Accessed 01.04.2019). https://www.nia.nih.gov/about/aging-well-21st-century-strategic-directions-research-aging/goal-f-understand-health
- National Statistical Office. Household Socio-Economic Survey 2012. Ulaanbaatar: NSO; 2013.
- O'Donnell O, Doorslaer E.V, Wagstaff A, Lindelow M, Analyzing Health Equity Using Household Survey Data, A Guide to Techniques and Their Implementation, The World Bank Group 2007 Washington DC.
- Oaxaca R, Male-Female Wage Differentials in Urban Labor Markets, International Economic Review 1973, Vol. 14, No. 3 (Oct 1973), pp. 693-709.
- Panos P.T and Panos A.J. A Model for a Culture-Sensitive Assessment of Patients in Health Care Settings, Soc Work Health Care 2000, vol. 31 pg. 49-62.
- Primary Health Care. Key facts. The World Health Organization, February 2019. (Accessed 24.06.2019). https://www.who.int/news-room/fact-sheets/detail/primary-health-care
- Read J.G and Gorman B.K. Gender and Health Inequality. Annual Review of Sociology 2010. 36 (1): 371–386.
- Regitz-Zagrosek V. Sex and Gender Differences in Health. Science & Society Series on Sex and Science. EMBO Rep. 2012;13(7):596–603.
- Rehman H.U, Under-Representation of the Elderly people in Clinical Trials, 16 EUR. J. Internal Med 2005. 385, 385.
- Rogers A.C. Vulnerability, Health and Health Care Journal of Advanced Nursing, July 1997. Volume 26, Issue 1.
- Scheppers E, Dongen E.V, Dekker J, Geertzen J, Dekker J; Potential Barriers to the Use of Health Services Among Ethnic Minorities: A Review, Family Practice June 2006, Volume 23, Issue 3, Pages 325–348.

- Schneider E.C, Zaslavsky A.M, Epstein A.M, Journal of the American Medical Association 2002, 287(10):1288-1294.
- Sex and Gender-Based Analysis (SGBA) e learning resource, Distinguish between Equity and Equality. (Accessed 03.2019). http://sgba-resource.ca/en/concepts/equity/distinguish-between-equity and-equality/
- Situational analysis of the access to health services of vulnerable population in UB city. Ulaanbaatar: Mongolian Ministry of Health. Asian Development Bank 2010.
- Smith GD, Chaturvedi N, Harding S, Nazroo J, Williams R. Ethnic Inequalities in Health: A Review of UK Epidemiological Evidence, Crit Public Health 2000, vol. 10 pg. 376-407.
- Smith MW, Kreutzer RA, Goldman L, Casey-Paal A, Kizer KW. How Economic Demand Influences Access to Medical Care for Rural Hispanic Children, Med Care 1996, vol. 34 (pg. 1135-1148).
- Social Determinants of Health, Key concepts. The World Health Organization. (Accessed 19.03.2019). https://www.who.int/social_determinants/thecommission/finalreport/key_concepts/en/
- Spinakis A, Anastasiou G, Panousis V, Spiliopoulos K, Palaiologou S, Yfantopoulos J. Expert Review and Proposals for Measurement of Health Inequalities in the European Union - Full Report. European Commission Directorate General for Health and Consumers. Luxembourg. 2011, ISBN 978-92-79-18528-1.
- Starfield B, Shi L, Mackinko J. Contribution of Primary Care to Health Systems and Health, Milbank Q 2005, vol. 83 (pg. 457-502).
- State Social Insurance General Office SSIGO (2006) – The Statistical Yearbook of Social Insurance, State Social Insurance General Office, Ulaabaatar 2006.
- Tangcharoensathien V, Mills A and Palu T, Accelerating Health Equity: The Key Role of Universal Health Coverage in the Sustainable Development Goals. BMC 2015, Medicine.13:101.
- The Constitution of Mongolia, 13 January 1992 Ulaanbaatar city /“State Bulletin”, No. 1, 1992/, Chapter One, Sovereignty of the Mongolian State, Article Sixteen. (Accessed 20.03.2019).

http://www.unesco.org/education/edurights/media/docs/6a6a23469e136afaa4860bf5869f6f8f659c6688.pdf

- The Government of Mongolia. National strategy on health financing for 2010 -2014. Ulaanbaatar 2010.
- The Tallinn Charter: Health systems for Health and Wealth. WHO European Ministerial Conference on Health Systems. "Health Systems, Health and Wealth." Talinn, Estonia, 25–27 June 2008. Copenhagen: WHO Regional Office for Europe; 2008. (Accessed 27.03.2019) http://www.euro.who.int/__data/assets/pdf_file/0008/88613/E91438.pdf
- The United Nations – Aging Older Persons and the 2030 Agenda for Sustainable Development. (Accessed 02.04.2019). https://www.un.org/development/desa/ageing/news/2017/07/ageing-older persons-and-the-2030-agenda-for-sustainable-development/
- The United Nations Data, Mongolia, Ulaanbaatar population 2017
- The United Nations Development Program: Human development reports: Mongolia 2017. (Accessed 19.03.2019). http://hdr.undp.org/en/countries/profiles/MNG
- The United Nations. Transforming Our World: The 2030 Agenda for Sustainable Development in Seventieth United Nations General Assembly, New York, 25 September 2015. New York: United Nations; 2015. (Accessed 27.03.2019). http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E
- The World Bank data, Mongolia 2019 (Accessed 07.11.2019). https://data.worldbank.org/country/mongolia
- The World Bank data, Population, Total, 2018 Mongolia 2018. (Accessed 19.03.2019). https://data.worldbank.org/indicator/SP.POP.TOTL?locations=MN&most_recent_value_desc=false
- The World Bank Mongolia's 2018 Poverty Rate Estimated at 28.4 Percent, Press release, June 2019. (Accessed 17.08.2019) https://www.worldbank.org/en/news/press-release/2019/06/21/mongolias-2018-poverty-rate-estimated-at-284-percent#targetText=According%20to%20these%20estimates%2C%20the,2016%20estimate%20of%2029.6%20percent

- The World Health Organization, Commission on Social Determinants of Health: Closing the Gap in a Generation: Health Equity through Action on the Social Determinants of Health. Final Report of the Commission on Social Determinants of Health. 2008, Geneva.
- The World Health Organization. Annual report on monitoring progress on UHC and the health-related SDGs. Seventy-first Session SEA/RC71/12, New Delhi, India, 7 August 2018.
- The World Health Organization. Health systems > Health systems topics > Equity. (Accessed 16.03.2019). https://www.who.int/healthsystems/topics/equity/en/
- The World Health Organization. Hidden Cities: Unmasking and Overcoming Health Inequities in Urban Settings, 2010.
- The World Health Organization; 2013. Arguing for Uuniversal Health Ccoverage. Geneva: (Accessed 27.03.2019). http://www.who.int/health_financing/UHC_ENvs_BD.PDF
- The World Health Rreport 2008: Primary Health Care now more than ever. The World Health Organization (Accessed 15.04.2019). http://www.who.int/whr/2008/en/
- Tsilaajav T, Ser-Od E, Baasai B, Byambaa G, Shagdarsuren O, Kwon S, Richardson E, Mongolia Health System Review, Health Systems in Transition, Vol. 3 No. 2, 2013, Asia Pacific Observatory on Health Systems and Policies. Geneva: World Health Organization Library Cataloguing in Publication Data. (Accessed 26.03.2019). https://apps.who.int/iris/bitstream/handle/10665/207531/9789290616092_eng.pdf;jsessonid=F346EDD87C0A93C25EE7AD568D19D308?sequence=1
- Tsilaajav T, Somanathan A, Buisman L, Bredenkamp C, Wagstaff A and Prencipe L. Health Equity and Financial Protection Report – Mongolia. Washington, D.C.: The World Bank 2012.
- Vaidya V, Partha G, Karmakar M. Gender Differences in Utilization of Preventive Care Services in the United States. Journal of Women's Health 2012 Vol. 21, No. 2.
- Wagstaff A, Doorslaer E.V and Paci P, Equity in the Finance and Delivery of Health Care: Some Tentative Cross-Country Comparisons. Oxford Review of Economic Policy 1989, 5(1), 89–112.

- Wagstaff A, Doorslaer E.V and Watanabe N. On Decomposing the Causes of Health Sector Inequalities with an Application to Malnutrition Inequalities in Vietnam. J Econ 2003; 112(1):207–23.
- Wagstaff A. The bounds of the Concentration Index when the Variable of Interest is Binary, with an Application to Immunization Inequality. Health Econ 2005; 14(4):429-32.
- Wallace SP, Campbell K, Lew-Ting CY..Structural Barriers to the Use of Formal in-home Services by Elderly People Latinos, J Gerontol 1994, vol. 49 (pg. 253-263).
- Wang SI and Yaung CL 2013. Vertical Equity of Health Care in Taiwan: Health Services were Distributed According to Need. International Journal for equity in health 2013: 12:12.
- Wang Y, Wang J, Maitland E, Zhao Y, Nicholas S and Lu M. Growing Old Before Growing Rich: Inequality in Health Service Utilization Among the Mid-Aged and Elderly People in Gansu and Zhejiang Provinces, China. BMC 2012, Health Services Research volume 12, Article number: 302.
- Weinick R. M, Zuvekas S. H, Cohen J. W "Racial and Ethnic Differences in Access to and Use of Health Care Services, 1977 to 1996. Medical care research and review". MCRR 2000. 57 (Suppl 1): 36–54.
- Weitzman BC, Berry CA. Health Status and Health Care Utilization Among New York City Home Attendants: An Illustration of the Needs of Working Poor, Immigrant Women, Women Health 1992, vol. 19 (pg. 87-105).
- Whitehead M, Dahlgren G. Concepts and Principles for Tackling Social Inequities in Health: levelling up part 1. Copenhagen, World Health Organization Regional Office for Europe, 2006 reprinted 2007. (Accessed 19.03.2019). http://www.euro.who.int/__data/assets/pdf_file/0010/74737/E89383.pdf
- WHO Representative office of Mongolia. Policy Brief 2019. (Accessed 03.04.2019). http://www.wpro.who.int/mongolia/topics/health_financing/moh_policy_brief_mognolia_eng.pdf
- Williams D.R, Yu Y, Jackson J.S, Anderson N.B. Racial Differences in Physical and Mental Health: Socio-economic Status, Stress and Discrimination. Journal of Health Psychology 1997 ;2(3):335-351.

- World Health Organization, Western Pacific Regional Office; Health Service Delivery Profile, Mongolia 2012. (Accessed 19.03.2019). http://www.wpro.who.int/health_services/service_delivery_profile_mongolia.pdf
- Yam H.K, Mercer S.W, Wong L.Y, Chan W.K, Yeoh E.K, Public and Private Healthcare Services Utilization by Non-Institutional Elderly People in Hong Kong: Is the Inverse Care Law Operating? Health Policy August 2009, Volume 91, Issue 3, Pages 229-238.
- Yiengprugsawan V, Carmichael G, Lim LY, Seubsman S, Sleigh A. Explanation of Inequality in Utilization of Ambulatory Care Before and After Universal Health Insurance in Thailand. Health Policy Plan. 2011;26(2):105–14
- Zhao Z. "Income Inequality, Unequal Health Care Access, and Mortality in China". Population and Development Review 2006. 32 (3): 461–483.
- Ziglio E et al., eds (2003). Health Systems Confront Poverty. Copenhagen, WHO Regional Office for Europe (Public Health Case Studies Series, No. 1. (Accessed 23.03.2019). http://www.euro.who.int/document/e80225.pdf