TOWARDS UNIVERSAL HEALTH COVERAGE: ACCESS AND UTILIZATION OF HEALTH CARE SERVICES IN BHUTAN

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A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Science Program in Health Economics and Health Care Management
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การไปถึงการครอบคลุมการบริการทางสุขภาพถ้วนหน้า: การเข้าถึงและการใช้บริการทางสุขภาพในประเทศภูฏาน

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วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต
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การวิจัยครั้งนี้มีวัตถุประสงค์เพื่อสำรวจการใช้บริการของบริการด้านสุขภาพในประเทศภูฏานโดยการวิจัยนี้พยายามศึกษาว่า แหล่งที่อยู่ทางภูมิศาสตร์และลักษณะพื้นฐานทางเศรษฐศาสตร์และสังคมของประชากรมีอิทธิพลต่อการใช้บริการด้านสุขภาพ และการเลือกสิ่งอำนวยความสะดวกด้านสุขภาพสำหรับทั้งคนไข้ในและคนไข้นอกหรือไม่ รวมถึงตรวจสอบผลกระทบของลักษณะพื้นฐานทางสังคมประชากรและลักษณะพื้นฐานทางเศรษฐศาสตร์ของสังคมประชากร ต่อการใช้จ่ายในเรื่องของยาและการเดินทางที่เกี่ยวข้องกับทางด้านการแพทย์ การวิจัยนี้จะช่วยให้เกิดความเป็นไปได้ในการที่ประเทศจะมุ่งสู่การครอบคลุมบริการด้านสุขภาพถ้วนหน้า

การวิจัยนี้ ใช้ข้อมูลภาคตัดขวางของการสำรวจมาตรฐานการครองชีพของชาวภูฏาน ปี 2555โดยในขั้นตอนแรกของการวิเคราะห์Binary Logit Regression และ Multinomial Logit Regression ได้ถูกใช้เพื่อพิจารณาว่าประชากรใช้บริการด้านสุขภาพสำหรับคนไข้ในและคนไข้นอกหรือไม่ และใช้สิ่งอำนวยความสะดวกด้านสุขภาพชนิดใด หลังจากนั้นจึงคำนวณหาMarginal Effect ของแต่ละปัจจัย เพื่อหาปริมาณของผลกระทบที่เกิดจากแต่ละปัจจัยของลักษณะพื้นฐานทางสังคมประชากร และลักษณะพื้นฐานทางเศรษฐศาสตร์ของสังคมประชากร ต่อความเป็นไปได้ของการใช้บริการและความเป็นไปได้ของการเลือกสิ่งอำนวยความสะดวกด้านสุขภาพ

ผลวิจัยระบุว่า แหล่งที่อยู่ทางภูมิศาสตร์เป็นปัจจัยสำคัญที่ตัดสินตัวเลือกในการใช้บริการด้านสุขภาพจากสิ่งอำนวยความสะดวกด้านสุขภาพต่างๆ ถึงแม้ว่ารายได้จะมีผลกระทบบ้างแต่ก็มีผลกระทบแตกต่างกันไปตามตัวเลือกของสิ่งอำนวยความสะดวกด้านสุขภาพ

สาขาวิชา เศรษฐศาสตร์สาธารณสุขและการจัดการบริการสุขภาพ ลายมือชื่อนิสิต .....

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5685588729 : MAJOR HEALTH ECONOMICS AND HEALTH CARE MANAGEMENT
KEYWORDS: UTILIZATION / CHOICE / HEALTH FACILITIES / SOCIO-ECONOMIC-DEMOGRAPHIC FACTORS / OUT-OF-POCKET PAYMENTS / UNIVERSAL HEALTH COVERAGE

TSHERING WANGDI: TOWARDS UNIVERSAL HEALTH COVERAGE: ACCESS AND UTILIZATION OF HEALTH CARE SERVICES IN BHUTAN. ADVISOR: KANNIKA DAMRONGPLASIT, Ph.D., 4 pp.

This study aims to explore utilization of health care services in Bhutan, specifically assess how geographical and socio-demographic-economic factors influence the use of health care services and choice of health facilities for outpatient and inpatient basis. The study also investigates the effect of socio-economic and demographic factors on the drug expense and transportation expense that are related to medical use. In essence, this study on utilization of health care services will be able to shed some light on the prospect of the country in moving towards universal health coverage.

A cross-sectional data, Bhutan Living and Standard Survey 2012, is used for the study. At the initial stage of the analysis, binary logit regression and multinomial logit regression are used to determine whether individuals use outpatient and inpatient services, and if used the type of health facilities visited. Thereafter, marginal effect corresponding to each factor is calculated to give the magnitude of the impact of each socio-economic and demographic factor on the probability of using services and the probability of choosing each health facilities.

The result indicated that geographical factors are the critical factors determining the choice of using health care services at different levels of health facilities. Although income has some effect, its impact varies across different facility choice. The socio-economic and demographic factors were not sensitive to the out of pocket health expense.

Field of Study: Health Economics and Health Care Management
Student's Signature .....
Advisor's Signature .....
Academic Year: 2013

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CONTENTS

Page

Page

Page

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ADB	Asian Development Bank
AHB	Annual Health Bulletin
BLSS 2012	Bhutan Living and Standards Survey 2012
JICA	Japan International Cooperation Agency
DANIDA	Danish International Development Agency
GAVI	Global Alliance for Vaccines and Immunization
GFATM	Global Funds for AIDS, Tuberculosis and Malaria
GNHC	Gross National Happiness Commission
NHA	National Health Accounts
NSB	National Statistical Bureau
MOH	Ministry of Health
RSTA	Road Safety and Transport Authority
SDF	South Asian Association for Regional Cooperation (SAARC) Development Fund
UN	United Nations
WHO	World Health Organization

CHAPTER I

INTRODUCTION

1.1. Problem and Significance

The use of health care services by the population is an important dimension in health care. It not only improves health of the people but also builds healthy community which is essential in human life. Many countries allocate more resources to enhance health status of the people and educate them on the benefits of using health care services. On the other hand, the use of health care services by the people provides information of the type of health services needed by people.

The study on utilization of health care services has gained prominence in all the countries since it provides information for planning of resources in consistent with the pattern of utilization of health services (Zemach, 1970). The utilization of health care services depends on the peoples' demand for services and the services provided by the health providers (J. C. Hershey, Luft, H.S., Gianaris,J.M., 1975). The use of health services are influenced by factors such as being sick, income, health facilities, socio-demographic, economic and location (Hulka, 1985). However, cost of financing health care services determines supply of services by the providers which become constraints for people from using health care services.

The trends in utilization of health care services are considered as the key element in understanding equitable distribution of health care services (Andersen, 1973). Specifically, the utilization of health care services explains health inequity. Despite experiencing economic growth, the gap between rich and poor has been widening as evidenced from the difference in utilization of health care services (Thoa, 2013). More cases of deaths and diseases occur with the poor people because they don't use services although they need it. Despite low utilization of health care services, poor people spend less on health than the rich (O'Donnell, 2008). It is important that people change their health seeking behavior to improve health with timely treatment.

The issues in any health system are concerned with moral hazards with the use of health care services. The mistrust of the people with the health providers and the social norms are likely to exacerbate underutilization of health care services in addition to the cost of seeking health care services. In other parts of the world racial discrimination has suppressed usage of health care services (LaVeist, 2003).

The utilization of health care services is an important dimension in human life. The use of health services maintains health of the people and increases life expectancy. Furthermore, it increases productivity at work which in turn leads to economic wellbeing (Luft, 1975). These economic benefits accrued through good health enables people to invest more for the use of health care services.

Recognizing the importance of having adequate accessibility of health care, many countries are reforming their health system to improve utilization of health services through enhancement of service delivery system. Thailand's 30-Baht scheme labeled as a "big bang" reform conveyed to the world that with low copayment by the people and subsidy from the government, it has achieved health coverage by establishing a level playing field for the people to use health care services (Hughes, 2007).

In the case of Bhutan, people are encouraged to use health care services despite providing free of cost by the government. The government also takes the responsibility of referring patients abroad for those specialized services which are not available in the country and ensures adequate financing. It is constitutionally mandated that health care services are provided free of cost to improve coverage and usage of health care services by the people. The utilization of health care services has gradually improved over the time. The National Health Survey 2000 indicated that 22 percent who were sick during the last one month prior of the survey did not use health services and treated themselves, and 78 percent who were sick used health services. The survey result demonstrated that health seeking behavior varied in the country. It was 84 percent in the South, 82 percent in the West, 80 percent in the Central and 75 percent in the east.

Thus, it is important to study in details about the pattern of health care utilization in Bhutan and the factors that affect utilization both on the outpatient and inpatient basis. With this knowledge, the Royal Government of Bhutan will be able to direct resources more efficiently and implement policy that can move country more towards universal health coverage.

1.2. Research Question

What are the factors that affect health services utilization in Bhutan? Does the use of health care services involve out of pocket payment?

1.3. Research Objective

1.3.1. General Objective:

Investigate that the socioeconomic-demographic and geographical factors that determine the decision to use health care and the choice of health facilities visited.

1.3.2. Specific Objectives:

I. To assess the effect of socioeconomic-demographic factors on the usage decision

II. To assess the effect of socioeconomic-demographic factors on choice of health services

III. To investigate the effect of geographical factors with usage decision

IV. To investigate the effect of geographical factors with choice of health services

V. To assess the effect of socioeconomic, demographic and geographic factors on out-of-pocket payments for medicines and transportation expenditure relating to health care use.

1.4. Scope of the Study

The study used secondary data, Bhutan Living and Standard Survey 2012 (BLSS 2102), conducted jointly by the National Statistical Bureau and Asian Development Bank. The unit of analysis for this study is at the individual level.

This study mainly focuses on the use of health care services within the country. However, informal consultations including local healers and traditional services are excluded from this study. Furthermore, use of health care services from abroad are omitted since only few individuals have accessed health care services from abroad with government financing and out of pocket payments.

The usages of health care services, outpatient and inpatient care, are studied from three-tier health service delivery system which consists of primary, secondary and tertiary levels. At the primary level of care, it consists of Basic Health Units, Out-Reach clinics, pharmacy and retail shops. The secondary level of care consist only the district hospitals, while the tertiary consists of 2 regional referral hospitals and 1 national referral hospital.

The out of pocket payments for the purchase of medicines and transportation are considered in this study among others since it was found that most of people spend on the purchase of medicines and transportation.

This study initially proposed to use distance as one of the variable for the decision to use health care services during sickness or injury for the last one month prior to the interview. However, data only consisted time and not distance. Therefore, this study computed distances using time and speeds of different modes of transportation. However, this study confronted problem determining average walking speed of a human. The average walking speed was assumed at 4Km/hr as followed in some of the studies. However, distance was dropped from the study since it does not fulfill objectives of this study and instead replaced it with categorical variable for remoteness.

The categorical variable severities of illness were controlled in the model of this study. Since it did not yield significant results, the study mainly focused on remoteness. However, detail results for the severities of illness after controlling with and without remoteness are provided in the appendix.

1.5. Possible Benefits

Most of the countries around the world are making concerted efforts towards undertaking health care reforms in order to provide quality health care services for all the people. Although health system varies between the countries, universal health coverage remains a common goal for every country. In order to move towards universal health coverage, it is important to understand factors influencing utilization of health care services. Some factors are outside the domain of the health sector which triggers utilization of health care services. The evidence from the study on utilization of health care services will foster partnership between health and external sectors to drive health system towards universal health coverage.

This study would provide more information for policy-makers to improve access to care for the population by targeting certain policy to alleviate barrier to access. For example, if rural areas have negative impact on usage of services, the government would consider improving transportation and road building to facilitate access to health services. The socioeconomic-demographic characteristics on usage of health services would provide information for the health planners and policy makers to

make targeted interventions through awareness and advocacy programs to enhance uptake of health services.

Bhutan is confronted with challenges on financing of free health care services due to cost escalation and emergence of new diseases. The study on utilization of health care services would encourage policymakers to make evidence-based decision for outsourcing health services in tandem with the Foreign Direct Investment. Furthermore, it would help pave the way forward for the government to explore alternate options for financing health care services in the country.

CHAPTER II

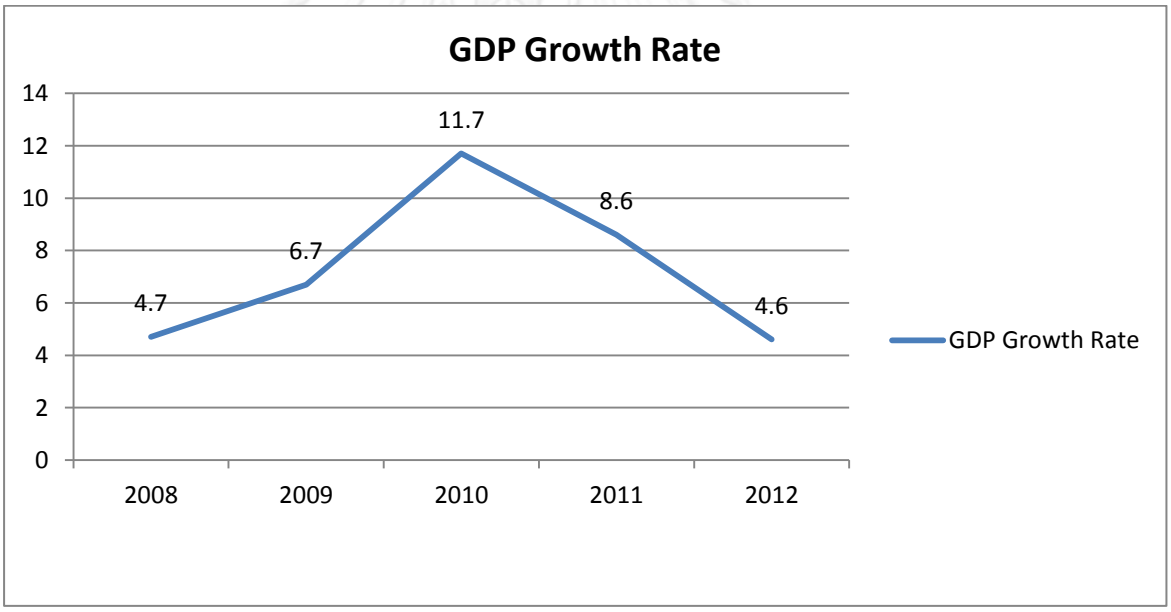
BACKGROUND

2.1. General Information

Bhutan is located in the South Asia with a population of 744,557 spread within 38,394 square kilometers (NSB, 2013). Most of the people live in rural which constitute 70 percent of the population and 30 percent in urban. It is the national objective to maintain at least 60 percent of land area covered with forest for all times to come.

The economy is mainly driven by the Hydropower project which is considered as an engine of growth. However, the GDP growth rate has declined sharply post 2010. As can be seen in figure 1, Bhutan experienced highest GDP growth rate of 11.70 percent in 2010 and it gradually declined.

Figure 1: GDP Growth 2013



The economic growth experienced over the years has improved living conditions of the people which in turn has improved health of the people in Bhutan. As a result of these developments, life expectancy at birth increased from 66.1 in 2000 to 68.1 in 2012 (AHB 2013).

Table 1: Selected Health Indicators

	Indicators	2000	2005	2010	2012
1	Population	-	634,982	695,822	744,557

2	Life Expectancy at birth (Years)	66.1	65.3	67.4	68.1
3	Crude birth rate (per 1000 live births)	34.1	20	19.7	18.5
4	Crude death rate (per 1000 persons)	8.6	7	7.8	7.7
5	Total fertility rate	4.7	3.6	3.1	2.8
6	Under-five mortality rate (per 1000 live births)	84	61.5	69	NA
7	Infant mortality rate (per 1000 live births)	60.5	40.1	47	NA
8	Maternal mortality ration (per 100,000 live births)	255	NA	NA	NA
9	Total health expenditure (THE) as a percentage of gross domestic products (GDP)	-	-	3.68	-
10	Public health expenditure (PHE) as a percentage of total health expenditure (THE)	-	-	88	-
11	Public health expenditure (PHE) as a percentage of total government expenditure (TGE)	-	-	6.27	-
12	Public health expenditure (PHE) as a percentage of gross domestic products (GDP)	-	-	3.23	-

Source: AHB, 2013.

The table 1 indicates that population has been increasing with the improvements in health of the people as indicated by the progressive indicators. The total health expenditure as a proportion of GDP was 3.68 in 2010 and the public health expenditure as a percentage of total government expenditure was 6.27.

As shown in the table 2, Bhutan's health system performance is reaching at the regional level. However, in comparison with the global trends, Bhutan is lagging behind despite some positive performance of health indicators relative to the global indicators.

Table 2: Comparison of selected indicators 2011

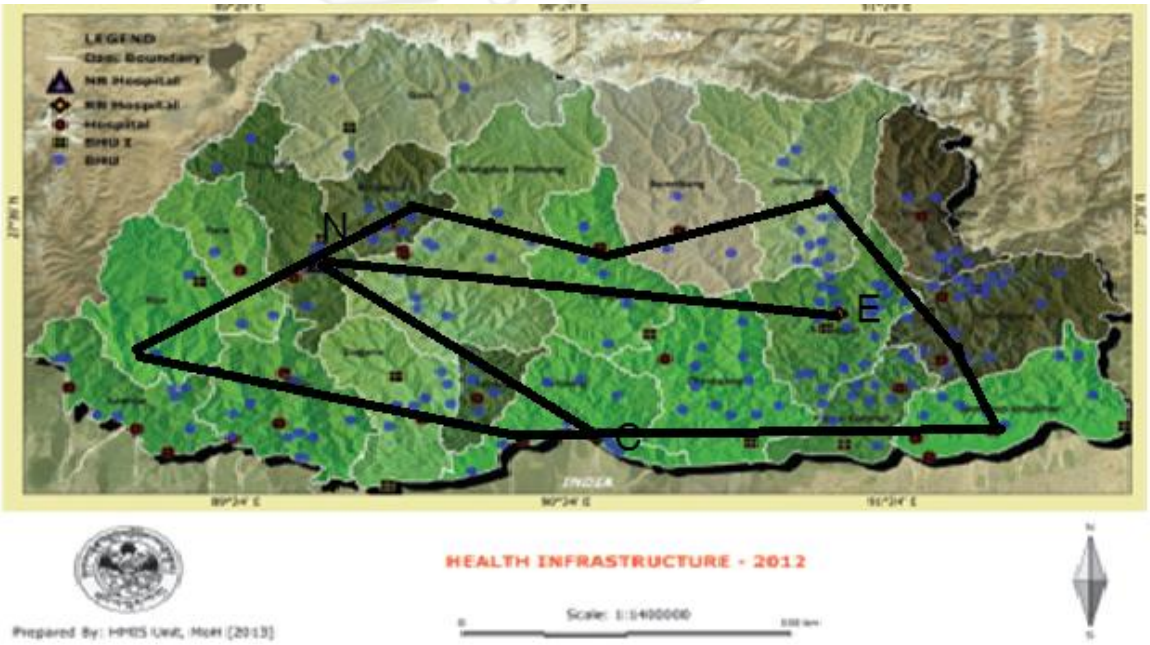
	Bhutan	Regional	Global
Total population (Thousands)	738	-	-
Population living in urban areas (%)	36	34	52
Gross National Income per capita (PPP int.$)	5570	3747	11536
Total fertility rate (per woman)	2.3	2.4	2.4
Life expectancy at birth (years)- both sexes	67	67	70
Life expectancy at age 60 (years)-both sexes	18	17	20
Under-five mortality rate (per 1000 live births)-both sexes	54	55	51
Adult mortality rate (probability of dying between 15 and 60 years per 1000 population Male Female	 210 157	 230 155	 190 129
Maternal mortality ratio (per 100 000 live births)	180	200	210
Prevalence of Tuberculosis (per 100 000 population)	230	271	170
Prevalence of HIV (per 100 000 population)	172	189	499
Incidence of Malaria (per 100 000 population)	104	1773	4082

Source: WHO

2.2. Health Care Service Delivery

The health services are delivered from three-levels of care. The primary level is composed of Out-Reach Clinics and Basic Health Units mostly in rural areas to provide services for the scattered population. At the secondary level, it consists of District Hospitals managed by the local administration but the Ministry of health provides technical support. At the tertiary level, it comprises network of two Regional Referral Hospitals and National Referral Hospital providing specialized services.

Figure 2: Distribution of health facilities



Source: AHB, 2013

As can be seen from the figure 2, referral hospitals are strategically located within the boundaries of the district hospitals. The distance from the Eastern Regional Hospital (E) to the National Referral Hospital (N) is approximately 460 Kms which would require about 15 hours by car. The distance to the National Referral Hospital from the Central Regional Referral Hospital (C) is approximately 266 Kms.

The table 3 suggests distribution of human resource and infrastructures in the span of five years. The doctors density has remained evenly distributed throughout the years while the density for nurses and health assistants has improved. The ratio of nurses per doctor has progressed in proportion to the bed per nurses. Bhutan has been expanding health facilities in order provide services to all people.

Table 3: Selected human resource and infrastructures indicators

	Indicators	2008	2009	2010	2011	2012
1	No. of Doctors and density (per 10,000 population)	171 [2.8]	176 [2.6]	187 [2.6]	181 [2.6]	194 [2.7]
2	No. of Nurses and density (per 10,000 population)	567 [8.4]	556 [8.1]	556 [8.0]	723 [10.2]	736 [10.2]
3	No.of Pharmacists and density (per 10,000 population)	14 [0.2]	12 [0.2]	11 [0.2]	11 [0.2]	11 [0.2]
4	No. of Health Assistant/Basic Health Worker and density (per 10,000 population)	425 [6.3]	505 [704]	535 [7.7]	572 [8.1]	578 [8.0]
5	No. and distribution of health facilities (per 10,000 population)	209 [3.1]	212 [3.1]	212 [3.1]	215 [3]	222 [3.1]
6	Ratio of bed per Nurses	2.1	2.1	2.3	1.8	1.7
7	Ratio of Nurses per Doctor	3.3	3.2	3.0	4.0	3.8

Source: AHB, 2013.

The Ministry of Health provides policy and legal supports for well-functioning of the health system. With a goal to reach services to the underserved areas through cost effective approach, the deployment of human resources and distribution of drugs and supplies are managed by the Ministry of Health. The financing and reimbursements for referral abroad falls within the purview of Ministry of Health, and oversees the operation of National and Regional Referral Hospitals.

The district health services consist of District hospitals, BHUs and ORCs which are managed by the local administration. In an effort to improve uptake of health

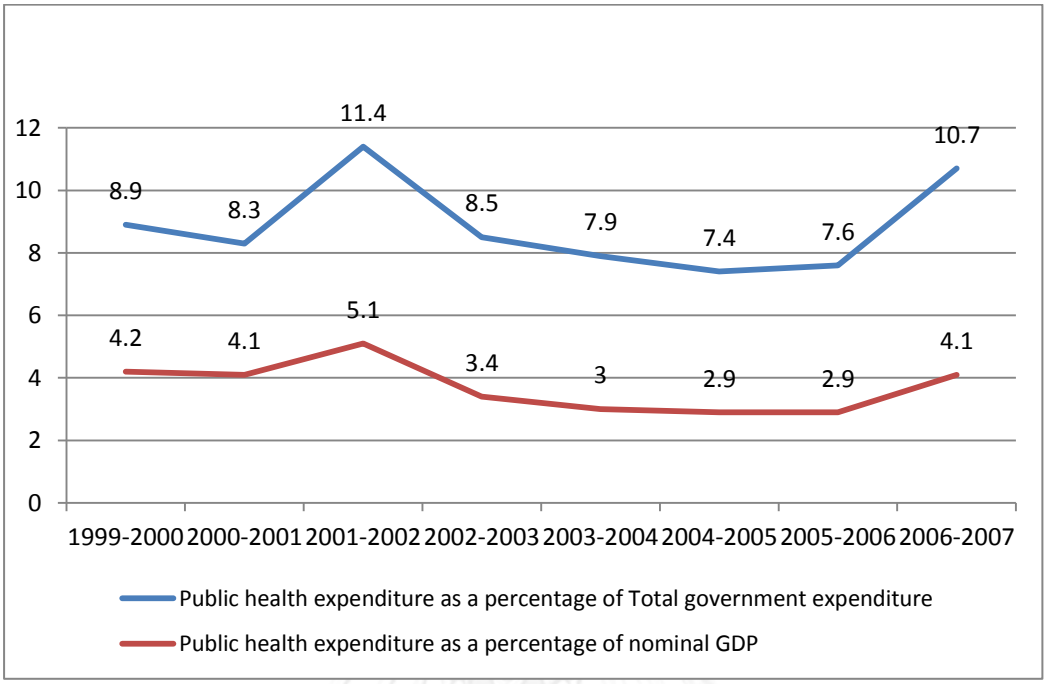
services, Village Health Workers plays a significant roles for the delivery of health services.

2.3. Health Care Financing

Bhutan's health system is mainly driven with financial support from the government revenue. Although several taxes are imposed on goods and services which have detrimental to effect on health, these collections however are not dedicated for use in health alone but pooled as general revenue. Besides government financing, donors such as WHO, UN, World Bank, JICA, DANIDA, GFATM, GAVI, SDF and other key partners provides supports to the health sector. As one of the important social sector, health sector remains priority of the government in budgetary allocation. As a testimony of its commitment, the government spending on health has been within 7.4 to 11.4 percent of the total government expenditure as indicated in the National Health Accounts 2009-2010.

The figure 3 portrays similar trends although public health expenditure as a percentage of total government expenditure is greater than public health expenditure as a percentage of nominal GDP. In 2001-2002 both the expenditures increased to 11.4 percent and 5.1 percent and gradually declined over the years, and started to rise again from 2005-2006.

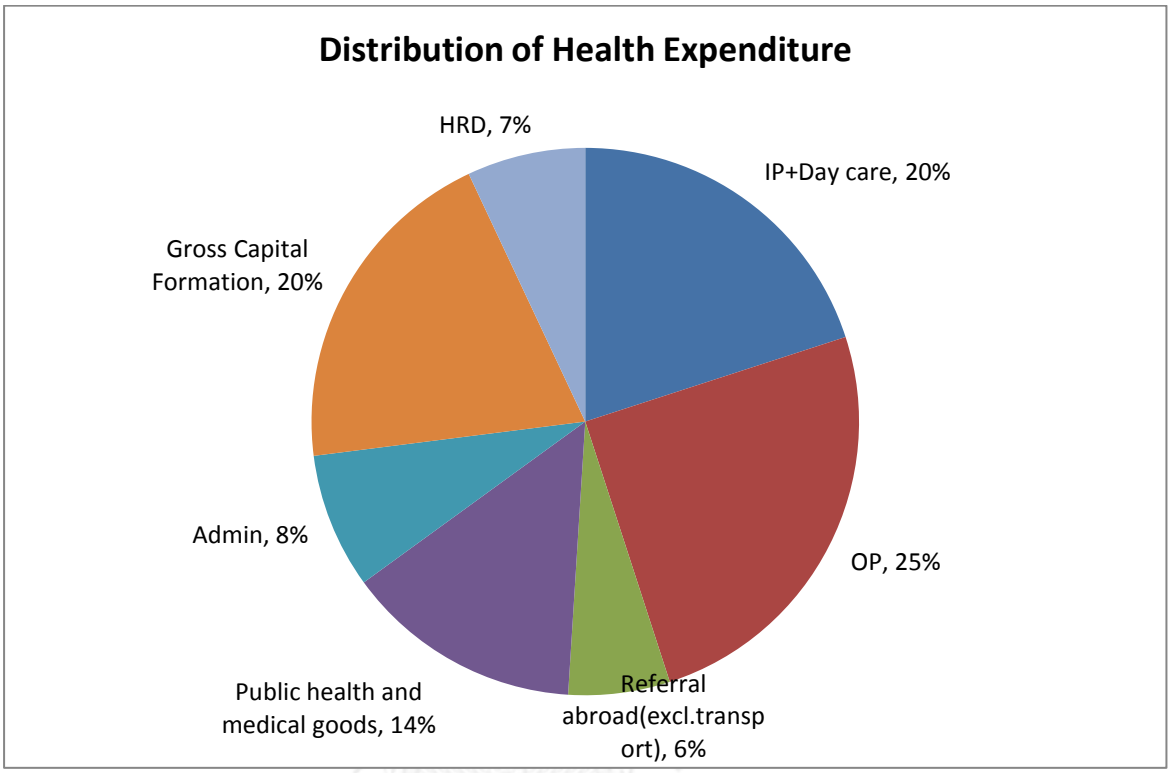
Figure 3: Public Health Expenditure



Source: WHO

The Gross National Happiness Commission monitors whether donor funds are optimally utilized and evaluates performance of the plans and programmes. It is the responsibility of the Ministry of Health to finance health since other ministries do not partake in financing health. The funds are released from the GNHC based on approved work plans of the Ministry of Health.

Figure 4: The National Health Accounts estimated distribution of health expenditure for 2009-2010.



Source: NHA 2009-2010

The figure 4 shows composition of government health expenditure for the provision of health care services in the country. The government health expenditure on outpatient was recorded as the highest with 25 percent, followed by inpatient and gross capital formation each with 20 percent. The government spending on public health and medical goods reached 14 percent while for human resource and administration it was 7 percent and 8 percent, respectively. In the case of expenditure for referral abroad it was only 6 percent after excluding transportation.

Bhutan provides health care services which are free of cost since the introduction of modern health care system in the country. Furthermore, patients are also referred abroad for treatment for which such services are not available in the country. In the formal sector, 1 percent of the gross salary is deducted at source as a voluntary contribution for the health services. Again, these collections are not earmarked for health sector but pooled in as government revenue.

Bhutan is experiencing changing pattern of diseases and life style related diseases that demands quality services which drives up the cost. Now the challenge is on the sustainability of free health care services in the country. As a part of the measure to bridge financing gap in health, Bhutan Health Trust Fund was established as an autonomous agency to finances essential drugs and vaccines which are not supported under the government budgetary support.

2.4. Universal Health Coverage in Bhutan-Comparison

The goal of the universal health coverage is to ensure that all people obtain health care services they need without suffering from financial hardship. The World Health Organization measures universal health coverage from three dimensions; services coverage, accessibility and financial protection (WHO, 2010). These dimensions are subjected to trade-offs among each other depending on the priorities of a country. For instance, a country may opt to increase health coverage with high out of pocket payment for health care services.

Bhutan has attained more than 90 percent health coverage with less than 3 hours walking distance to the nearest health facility (MOH, 2011b). However, due to difficult geographical landscape and scattered nature of settlement, accessibility has been a concern to the government. In order to reach out health care services in these underserved areas, government invested in expanding health infrastructures with deployment of health personnel. Although each facility is designed with specific health service packages, people living in the rural areas are referred to secondary and tertiary health facilities for advance treatment.

Unlike any countries with active participation of markets in health care services, Bhutan provides free health care since the introduction of modern health care system in the country. Although some incidental costs are borne by the people, all major treatment services are provided free of cost. The government also ensures that patients requiring specialized treatment abroad are covered under the government financing.

The health resources are mainly composed of the financing by the government and contribution from the households. It was estimated that about 11 percent of health resources are contributed by the households (MOH, 2011a). Therefore, this study postulates that Bhutan has financial protection of 89 percent

CHAPTER III

LITERATURE REVIEW

3.1. Health Care Utilization: Socio-Demographic and Economic Characteristics

3.1.1. Health Care Utilization

The study on utilization of health care services has gained prominence across the health systems since it provides information on the distribution of health care services and enables policy makers and planners to undertake appropriate measures for enhancing accessibility and health seeking behavior of the people (J. C. Hershey, Luft,H.S., Gianaris,J.M., 1975). It shed lights fundamentally on equities for the use of health care services (Shaikh, 2004).

Accessibility is considered as one of the preconditions for utilization of health care services and health equities. It is articulated that distance and time taken to reach health service providers are critical factors which determines utilization of health care services (Stock, 1983). Besides distance and time factors, utilization of services depend on social, economic, demographic, geographic location and distribution of manpower and facilities (Aday, 1974).

However, some studies have emphasized that people must be willing to seek health care services as a result of change in behavior (Aday, 1974). The change in behavior is brought about by the education and knowledge about health. It is suggested that people should have obligation to consult health service providers and receive appropriate treatments during sickness. This behavior develops patient-provider relationship which improves utilization of health services (Parsons, 1975). It is pointed out that access into the health care system and making final contact with the provider appropriately explains utilization of health care services (Aday, 1974).

3.1.2. Health Care Utilization and Demographic Factors

Most of the countries have investigated the impact of socio-demographic and economic factors on utilization of health care services. Although different approaches and models are adopted for studying utilization of health care services, most common model includes demographic factors which consist of age, gender, education, occupation, rural and urban, and distance and time factors (Veugelers et al,2003; Van der Hyden et al,2002; Wilson et al,2004; Hibbard et al,1986; Cleary et al,1982; Fernandez et al,1999; Mustard et al,1998; Alberts et al,1997; Raghupathy et

al,1996; Price et al,2011; Stock,1983; Lovett et al,2002; Bhuyan et al 2014; Huanga et al,2006; and Liu et al,2007).

-Health Care Utilization and Age

A study in United States compared difference in utilization of health care services between older and younger adult. By using regression and factor analysis, the result indicated that the utilization of primary services of younger groups was 14.8 percent while it was 2.2 percent for the elderly group. In terms of consultations with doctor, it was 7.8 percent for younger adults which was higher than the elderly group with 3 percent (Hibbard, 1986).

Another study in Canada compared utilization of health care services between income groups particularly focusing on factors other than the income. By using binary logit regression on use of services, it was found that age and sex had a positive effect on the probability of utilizing general practitioners' services. The study found that people above 65 years used services 1.8 times more than those people between 15 to 64 years. In terms of gender the study found that female use general practitioner more than the male (Rosenberg, 1996).

A study in the United States recorded varying number of outpatient visits between different ages of the people. But the study points out the outpatient visit increase with additional rise in age. It was found that outpatient visit for older people were 161 as compared to 98 outpatient visits by the young age people (Odoroff, 1957).

-Health Care Utilization and Gender

A study in US compared utilization of health care services between men with women including those who gave birth. By using multivariate regression, the study found out that the outpatient visits by women including women who gave birth was higher than men by 1.34. After omitting women who gave birth, outpatient visits by women were found still higher by 1.08 visits (Cleary, 1982).

Further, one of the study in Canada found that women visited health professionals more than men (OR=1.20; 95 percent CI; 1.09, 1.31). However, in terms of

hospitalization, women were found lower at 6.6 percent than men at 7.7 percent (Fernandez, 1999). The study pointed out that differences in health and utilization of health care services are attributable to reproductive health of women and high probable of mortality in male (Mustard, 1998).

-Health Care Utilization and Marital Status

A study in Britain observed that single people had more length of stay in hospital than the married group. The study also found that discharge rate for single people were higher than those who were married. Irrespective of the types of admission, the bed occupancy rate of single people was 1.5 times higher than those married group. In general the study found that married people use less of hospital compared to the single people (Butler 1977).

-Health Care Utilization and Education

There is a consensus in the world of the positive impact of education on the utilization of health care services. A study conducted in Curaqao, Netherlands Antilles applied logistic regression and found that education was positively related with the use of specialist, dentist and physiotherapist. For use of specialist by the high educational group, odd ratio was 0.99 [0.78-1.24] (Alberts, 1997).

In another study conducted in Unites States, it was found that mothers with higher education used forceps during birth twice more than mothers with low education. The study also revealed that mothers with higher education was susceptible to smoke 10 times lesser than mother with low education. An interesting result generated from the study was that with 10 percent increase in education of women, smoking during pregnancy plummeted by 1.6 percent (Price, 2011).

-Health Care Utilization and Occupation

In one of the study in the United States it recorded differentials in outpatient visits within the occupational group. The numbers of outpatients by farmers were twice less than those people working in the income earning sector. In the case of the outpatient visits, farmers were twice as low as the people who work in formal sector and earn income. However, it was found that unemployed group and those who

were working for the households accounted highest outpatient visits with staggering 222 and 231, respectively (Odoroff, 1957) .

-Health Care Utilization and Rural-Urban

A study in China compared differences in utilization of health care services between rural and urban using multinomial regression. The study found that urban used less physician services of 43 percent as compared to rural with 52 percent at 1 percent significance level. Regarding usage of hospitals, urban used 11.1 percent which was more than rural with 7.6 percent (Liu, 2007).

It was found that place of residence in United States had a significant effect on the use of outpatient visits. The study found that people in urban areas made more outpatient visits of 232 while those from the rural as low as 69 visits (Odoroff, 1957).

3.1.4. Health Care Utilization and Economic Factors

One of the study in Bangladesh investigated health seeking behavior of the parents for their children in times of burn injuries. By using logistic regression, the result indicated that 48.6 percent of people with higher education and income sought qualified services, while only 33.5 percent of the poor consulted for qualified services. The high income group sought more qualified services than the poor (OR 1.88; 95% CI 1.45–2.45) (Mashreky, 2010).

Another study investigated impact of the rise in income due to economic growth on utilization of health care services in Vietnam. The study used panel data consisting of 11,260 households with 74.4 percent of the households that experienced income growth between 2003 and 2007. The study found that household with rise in income used more services than the household without income growth (Thoa, 2013).

A study in Canada compared utilization of health care services between lower income group and higher income. Initially when the age and gender were omitted, lower income group with which constituted 31 percent of the population were found using more services than the higher income group which represented 21 percent of the study population. After controlling for age and gender, it was found that higher income group was about 50 percent (odds ratio =0.51) more chances of using services than the lower income group. However, the study found out that higher

income group had fewer hospital stay than the lower income group (Veugelers, 2003).

Furthermore, a study undertaken in Belgium found out that lower socioeconomic status group use more health services than the upper socioeconomic status group. The study was analyzed by using logistic regression. However, it was found out that when the health status is taken into consideration there is no difference between lower and high groups (Van der Heyden, 2002).

Wilson and Rosenberg investigated the health seeking behavior of the Canadians using frequencies and cross tabulations including Chi-square. The study found out that the lowest income and education levels utilized health care services lower than the higher income and education levels (Wilson, 2004).

A study on access to health care services through Medicaid and Medicare in United States found out that low income group use more of outpatient visits and emergency rooms as compared to the higher income group (Aday, 1977).

3.1.5. Health Care Utilization and Geographic Factors

A study in Indonesia observed reduction in the use of postnatal care by the mothers with distance to the health care facility. The study also found high odds of not using postnatal care by the mother in the subsequent pregnancy. The mothers who confessed not using postnatal care were from the rural which consisted of 82 percent (Titaley, 1978).

A study conducted in Nigeria determined rates for utilization of health care services based on the distance between 2 Km up and 10 Km from the point of each health centers. By using negative exponential regression, the results indicated that per capita utilization dropped at a rate of 25 percent per Km in the local dispensaries, 20 percent per Km for outpatient services at the hospitals, and 9 percent per Km for inpatient services at the hospitals (Stock, 1983).

Distance is a decisive factor for the utilization of health care services. A study undertaken in Indonesia compared utilization of health care services with insurance coverage between the urban and rural. The study revealed that the utilization of health care services in urban was more dependent on the fee than the distance. On contrary, rural was found more responsiveness to the distance than fee for the health care services (Erlyanaa, 2011)

The effect of distance on hospitalization discharge was compared between those living near the hospital and people who travelled more than 15 minutes in the United States. It was found that people who reside near the hospital had the highest discharge rate of 80.7 percent. Due to cost and time factors to make a follow up visits, the discharge rate was 62.3 for those travelling more than 15 minutes. However, the study found that rate of use of hospital was declining with more travel time to reach hospital (Goodman, 1997) .

In contrast with the aforementioned studies on the impact of distance on utilization of health care services, a study in United Kingdom used time taken while travelling on car and bus for using health care services. The study found that people from the rural areas who own cars used more services than people travelling on buses. About 13 percent of the population could not access health services with bus services due to inadequate bus services during the daytime and absence of public transport (Lovett, 2002)

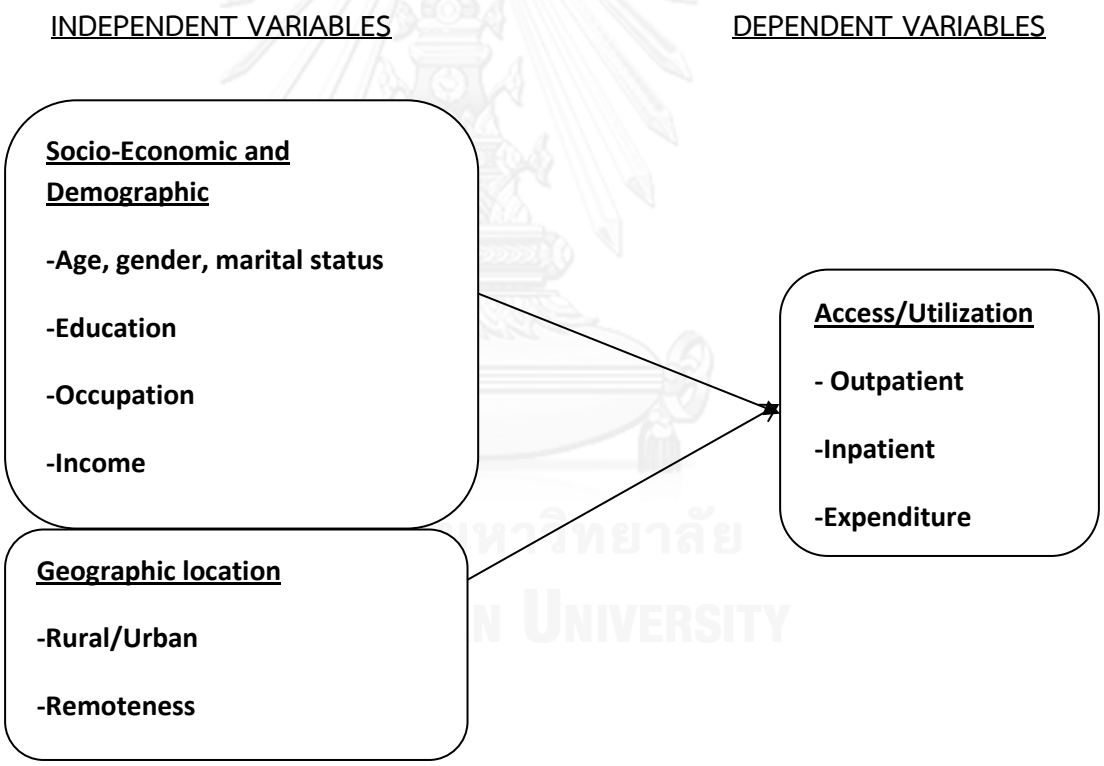
CHAPTER IV

RESEARCH METHODOLOGY

4.1. Conceptual Framework

The utilization of health care services is expected to depend on factors such as age, gender, marital status, occupation, income, rural and urban, level of education and remoteness place of residence. Subsequently, the use of health care services is expected to confront health expenditure although health care services are provided free of cost in the country.

Therefore, UHS= f (age, gender, marital status, occupation, income, rural and urban, level of education and remoteness).



4.2. Hypotheses

I. Geographical factors should negatively affect the decision to utilize outpatient and inpatient care when ill.

II. Due to provision of free health care services, income should not affect the decision to utilize outpatient and inpatient nor the choice of health care facilities visited.

4.3. Data Source and Main Definitions

The Bhutan Living Standards Survey 2012 (BLSS 2012) was conducted for 3 months (March–May 2012) by the National Statistics Bureau (NSB) in collaboration with the Asian Development Bank. The methodology for the BLSS 2012 is based on the World Bank's Living Standard Measurement Study. The BLSS 2012 consist of 8968 households with a total of 39825 persons. BLSS 2012 is the third household survey and the earlier surveys were conducted in 2007 and 2003.

As highlighted in Table 4, this study found that 1499 individuals were sick in the last one month prior to the interview. However, the decision of using outpatient care comprised of 1007 sick individuals and 492 sick individuals did not consult for outpatient care. The choices of health facilities for the outpatient care were determined based on 1007 sick individuals. Among 1007 sick individuals, 485 of them consulted primary health facilities, 342 for secondary health facilities and 180 for tertiary health facilities for the outpatient care. This study found 442 individuals used health care services on inpatient basis from the health facilities. It was found that 97 individuals chose for primary health facilities, 152 for secondary health facilities and 193 for the tertiary health facilities for inpatient care.

Table 4: Samples for Outpatient and Inpatient Services

Total sick persons=1499

No.of persons for OP services=1007

Primary	Secondary	Tertiary
485	342	180

Total inpatient care=442		
Primary	Secondary	Tertiary
97	152	193

The sample size was drastically reduced since the mode of transportation and time taken for visiting hospitals had many missing values. Furthermore, there were missing values for the income variable. In addition, individuals who consulted informal health care services and those who used health care services from abroad were omitted since it was not within the scope of this study.

The selections of rural households in BLSS 2012 are based on the Population and Housing Census 2005 (PHCB 2005) and the Bhutan Multiple Cluster Indicator Survey. The PHCB 2005 and household listing 2011-2012 were used for selection of households in the urban areas.

The Primary Sampling Units are constructed for ensuring that there are no variations of sizes between the rural and urban. This was done mainly to ensure that the probabilities of selection do not deviate significantly, and for stabilizing increase in variance estimates due to differences in survey weights. Some Chiwogs (block) in rural areas with less than 10 households are combined with the adjacent Chiwogs. This was applied to the urban areas as well (Bhutan Living Standards Survey 2012 Report). The primary sampling units were assigned scores (very accessible, accessible, hard to reach, and very hard to reach) and clubbed primary sampling units with similar scores.

Some PSUs are reclassified as an urban and some are moved to other districts due to boundary issue. Since rural and small towns has less intra-class correlation compared to the urban, 8-10 households were chosen in rural and small towns, whereas 12 households per PSU are selected in urban areas. The household members are identified on the basis of their "usual place of residence." The response rate is 93.1 percent overall, 91.6 percent in urban areas and 94.8 percent in rural areas.

The survey contains information on general health conditions of all the household members, excluding those outside Bhutan, in the past 4 weeks and during the last one year. For those who were sick or injured during the 4 weeks before the interview, information was obtained if they had any medical treatment and if so at which type of health facility. For those who were sick in previous year, information is obtained on hospitalization on inpatient basis at a certain type of medical facility. Information on the health expenditures for use of health services are also provided in the survey data. The BLSS 2012 contains both individual and household information.

- Individual information: age, sex, level of education, occupation and marital status

- Household information: income and time to the nearest health facility

- **Individual information on health care utilization:** The use of health care services on the basis of inpatient and outpatient from the out-reach clinics, basic health units, district hospitals, regional referral hospitals and national referral hospitals. Furthermore, treatments outside the country on referral or private financing are also available.

4.3.1. Main Definitions:

I. Outpatient services includes sick or injured person seeking medical treatment without staying overnight in the health facility

II. On contrary, inpatient services encompasses sick or injured person undergoing medical treatment which requires staying overnight in the health facility for monitoring and supervision.

III. Health expenditure constitutes out-of pocket payment for use of health care services including transportation costs.

IV. Out-Reach Clinics, Basic Health Unit, District hospitals, Regional Referral Hospitals and National Referral Hospital represent different tiers of health care delivery system which are managed and controlled by the Government.

4.3.2. Data Description

The choices of using health care services are segregated into primary, secondary and tertiary as can be seen from table 5. The primary health care services consist of outreach clinics, Basic Health Units, chemist and pharmacy, and the retail shop. For secondary health care services it includes only district hospitals. The tertiary health care services consist of 2 regional referral hospitals and National referral hospital.

Table 5: Classification of health facilities

	Type	Category for outpatient	Category for inpatient
1	Primary	Out Reach Clinics and Basic Health Units, Chemist and pharmacy, and retail shop.	Basic Health Units-grade I
2	Secondary	District Hospitals	District Hospitals
3	Tertiary	National Referral Hospital and 2 Regional Referral Hospitals,	National Referral Hospital and 2 Regional Referral Hospitals,

Table 6 shows the list of dependent and explanatory variables with their expected sign in line with the existing literature review. The dependent variable, Y_1, represents the decision to use health care services on outpatient basis if a person is sick during one month prior to the survey, where 1 stands for using and 0 if not. For choice of health care facility as represented by the Y_2 with 1 for primary, 2 for secondary and 3 for tertiary care for both outpatient and inpatient.

The explanatory variables include a dummy variable for gender (male and female), a continuous variable for age, categorical variable for marital status, categorical variable for education, categorical variable for occupation, a continuous variable for income, a continuous variable distance and a dummy variable for residence.

Table 6: Definition of Variables

	Variable	Description	Expected Sign
1	Dependent Variables		
	Y_1	1 if using outpatient during the past 1 month prior to the interview; 0 if otherwise	
	Y_2	1 if using primary health facilities. It is a reference category and omitted from the estimation. 2 if using secondary health facilities 3 if using tertiary health facilities	
2	Explanatory Variables		
a	Age	Continuous	(+)
b	Male	1 for male and 0 for female	(-/+)
c	Marital Status	1 if married; 0 if otherwise	(-/+)
d	Education No School Year 12 Above 12	 1 if No School, it is a reference category and omitted from the estimation 1 if completed 12 years of education; 0 if otherwise 1 if individuals have more than 12 years of education; 0 if otherwise	(+)
e	Occupation Formal Informal	 1 if individuals have formal employment; 0 if otherwise 1 if individuals have informal occupation; 0 if	(+/-)

		otherwise	
	Others	1 if individuals have neither formal nor informal employment. It is a reference category and omitted from the estimation.	
f	Income quartile	It is determined by adding income earned from wages/salaries, sale of agricultural products and non-agricultural activities. The income is calculated on yearly basis.	
	Quartile1	1 if individual's income belongs to the first quartile and 0 if otherwise. It is a reference category and omitted from the estimation.	
	Quartile2	1 if individual's income belongs to the second quartile and 0 if otherwise.	
	Quartile3	1 if individual's income belongs to the third quartile and 0 if otherwise.	
	Quartile4	1 if individual's income belongs to the fourth quartile and 0 if otherwise.	
g	Urban	1 if individuals reside in urban 0 if individuals reside in rural	(-)
	Remoteness dummies		
	Accessible	1 if individuals place of residence is accessible from their home and 0 if otherwise. It is a reference category and omitted from the estimation.	(-)
	Hard to reach	1 if individuals place of residence is hard to reach from their home and 0 if otherwise.	
	Very hard to reach	1 if individuals place of residence is very hard to reach from their home and 0 if otherwise.	

4.3.4. Remoteness

Initially, this study proposed to control for distance variable but it has to be dropped since the survey data do not have distance but only time variable. Furthermore, distance was computed with the assumption of average walking speed of 4 Km/hr for those who walk to the health facilities and do not use other mode of transportation. This computation was highly susceptible for measurement error and therefore a distance variable was eliminated from this study.

However, BLSS 2012 dataset consist information on geographical locations of the places in Bhutan which are classified as accessible, hard to reach and very hard to reach. Since distance was omitted from this study, the use of geographical locations was only the next best alternative to analyze its impact on the use of health care services.

4.3.5. Data Analysis

The model for the data analysis will be represented as:

$Y_{it} = 1 \longrightarrow$ use of certain type of health care services if $Y_{it}^{*} > 0$

$= 0 \longrightarrow$ not use of any services if $Y_{it}^{*} \leq 0$

i). Binary logit will be used for the decision to get formal treatment.

$$\text{Prob}(\text{Y1} = 1) = \frac{\text{e}^{\text{X??}}}{(1 + \text{e}^{\text{X??}})}$$

$$Prob(Y1 = 0) = \frac{1}{(1 + e^{X??})}$$

Where Y_1=1 if there is a use of outpatient service and Y_1 = 0 if not using outpatient service when sick.

ii). A Multinomial logit will be used for analyzing choice of health care facility visited. For choice J, we have

$$\Pr(y = j) = \frac{\exp(X\beta j)}{\sum_{r=0}^{j} \exp(X\beta r)}$$

Where Y=1 if a person visits primary health care facility

Y= 2 if a person visits secondary health care facility

Y= 3 if a person visits tertiary health care facility

Thereafter, marginal effects can be computed to obtain the effect of each socioeconomic-demographic and geographical variable on the probability of getting formal treatment and of choosing each type of health facilities.

iii). Choice of Health Care Facilities

The difficult geographical landscape and lack of sufficient health personnel are the setbacks among others to regulate gate-keeping system in Bhutan. However, people have the choice to visit any type of health care facilities depending upon the severity of illness. However, from the provider side, a critical patient admitted in primary health care facility would be referred to the secondary health facility based on the certain clinical conditions and then recommends for referral to tertiary health facilities on case by case basis. In the case of outpatient care, people would avail services from any type of health facilities. Even for the inpatient care, some people would seek admission in tertiary health facilities because of the location of residence.

Thus, in the context of Bhutan, it appears that patients have choice in great extent to choose the level of health care facilities to visit for both the outpatient and inpatient basis.

CHAPTER V

RESULT AND DISCUSSION

The BLSS 2012 have a total population of 39825 with 8968 households in BLSS 2012. Since the unit of analysis for the study is at the individual level, data were merged with many-to-one method using STATA (12). However, this study has a sample size of 1007 individuals. The sample size was drastically reduced since the mode of transportation and time taken for visiting hospitals had many missing values. Furthermore, there was missing values for the income variable. In addition, individuals who consulted informal health care services and those who used health care services from abroad were omitted since it was not within the scope of this study.

The study focuses on utilization of health care services within the country despite some individuals accessing health care services outside the country with government financing and out of pocket payment. The use of services from abroad has been eliminated from the study with the consideration that only few individuals have travelled outside the country for the health care services and expected to have a minimal impact on the overall utilization of health care services. The consultations with informal services were excluded from the study on the basis that it does not conform to the medical practices.

The use of health care services is segregated into outpatient and inpatient. Accordingly, the uses of outpatient and inpatient health services are further classified into primary, secondary and tertiary. The compositions of each level have been determined in conformity with the referral system established in the country.

The descriptive analyses and the main results are presented under the sections of outpatient and inpatient services. However, the decisions to use health care services are analyzed only for the outpatient services. As a gentle reminder to the readers, there were 1499 sick individuals during the past one month prior to the interview and 1007 of them made decision to use outpatient health care services from health facilities. Similarly, the study found that 442 individuals used health care services on inpatient basis during the past one year before the interview.

5.1. Individuals' Characteristics for Outpatient Service

As given in the table 7**, a**mong 1007 individuals who used outpatient services, female consisted of 55.91 percent and male 44.09 percent. For marital status, married made up to 81.43 percent, other 18.57 percent which consisted of those who were

separated, divorced and widow/widower. In terms of education, 74.38 percent did not have any formal schooling, 22.44 percent completed 12 years of schooling and 3.18 percent consisted of individuals who completed more than 12 years of schooling. Individuals in the urban areas were 83.71 percent compared to the rural area of 16.29 percent.

Table 7: Descriptive statistics for selected variables

Characteristics	Frequency	Percentage
Female	563	55.91
Male	444	44.09
Married	820	81.43
Other	187	18.57
No School	749	74.38
Till Year 12	226	22.44
Above year12	32	3.18
Formal Occupation	240	23.83
Informal Occupation	713	70.80
Others	54	5.36
Rural	164	16.29
Urban	843	83.71
Q1	256	25.42
Q2	250	24.83
Q3	249	24.73
Q4	252	25.02

The table 8 shows distribution of different occupational group according to the income quartile. The income is calculated on annual basic which comprises of wages and salaries, sale of agricultural products and income earned from performing non-agricultural activities. The cut off points of income for the first quartile was Nu.26000 per annum and Nu.125000 per annum for the highest quartile. The formal occupation includes regular paid employee, casual paid employee and the employer

since they perform economic activities for which they are paid wages and salaries, cash and in kind as well. The informal occupation comprises of unpaid family worker and own account worker. The proportion of individuals in the formal occupation is mostly concentrated in the highest income quartile of 46.67 percent and least in the second-quartile with 10.83 percent. On contrary, the proportion of individuals in the informal occupation is evenly distributed between first-quartile and second-quartile with 29.17 percent and 29.45 percent, respectively.

Table 8: Occupational group in different income quartiles

Occupational	Quartile1	Quartile2	Quartile3	Quartile4
Formal	13.75%	10.83%	28.75%	46.67%
Informal	29.17%	29.45%	23.42%	17.95%
Others	27.78%	25.93%	24.07%	22.22%

The individual's levels of education are classified with different income quartiles as shown in the table 9 given below. Individuals without formal schooling were seen mostly in the first- income quartile consisting of 30.57 percent and 16.29 percent of them were found in the highest income quartile. About 45.13 percent of the individuals who completed 12 years of schooling were in the highest income quartile and found least in the lowest income quartile with 11.06 percent. Individuals above 12 years of schooling were mostly distributed in the highest income group consisting of 87.50 percent, while evenly distributed between first and third quartile each with 6.25 percent. However, individuals having more than 12 years of schooling did not belong to the second income quartile.

Table 9: Education level in different income quartiles

Education	Quartile1	Quartile2	Quartile3	Quartile4
No Education	30.57%	27.64%	25.50%	16.29%
Year12	11.06%	19.03%	24.78%	45.13%
Above12	6.25%	0	6.25%	87.50%

The table 10 shows that in the formal occupation group 47.92 percent of the individuals did not have any education, while 40.42 percent had 12 years of education and 11.67 percent of individuals above 12 years of education. On the contrary, 78.93 percent of the individuals in the informal occupation had no education. In the informal occupation group, 82.89 percent did not have schooling, 16.69 percent of individuals with 12 years of education had 0.42 percent of them with above 12 years of education.

Table 10: Individual's education level with different occupational group

Occupation	No School	Year 12	Above 12
Formal	47.92%	40.42%	11.67%
Informal	82.89%	16.69%	0.42%
Others	79.63%	18.52%	1.85%

5.1. Overview of the Utilization at Different Level of Health Care Services

As evident from the table 11, the use of services from the primary health facilities which consists network of Basic Health Units, Out-Reach Clinics and private pharmacy were the most preferred choice of outpatient services which constituted 48.16 percent in comparison to 33.96 percent at the secondary and 17.96 percent at the tertiary level of health care services.

Table 11: Outpatient visits

Out-Patient Visit	Frequency	Percentage
Primary Level	485	48.16
Secondary Level	342	33.96
Tertiary Level	180	17.87
Total	1007	100

5.1.1. Health Care Utilization among Socio-Demographic Groups

The table 12 provided below suggests that primary health care services remain most preferred choice of using outpatient services by almost all the individual. Irrespective of the marital status, individuals used more of primary health care services than the secondary and tertiary health care services. The rate of outpatient visits by the married individual were 50 percent for primary level, 33 percent at the secondary level and 17 percent at the tertiary level of care. Similarly, individuals at all the levels of occupational group opted for primary health care services relative to the secondary and tertiary levels. Informal occupational group consisting of unpaid family workers and others used more 50 percent of primary, 33 percent of secondary and 17 percent of tertiary levels of care.

Interestingly, rural areas used more of tertiary health care services constituting 37 percent whereas urban used more of primary health care services with 48 percent. The actual households in urban consist of 34 percent while it is 66 percent for rural. In terms of population, 30 percent lives in urban and 70 percent in rural (NSB, 2013). In contrast, this study found high population in urban and low in the rural. This could

be one of the factors for unexpected result on the use of health care services. In terms of the impact of education on utilization of health care services, individuals having 12 years of schooling and above 12 years used less health care services.

Table 12: Utilization of outpatient services by different demographic groups

	Primary	Secondary	Tertiary
Gender			
Female (N=563)	48.31%	34.81%	16.87%
Male (N=444)	47.97%	32.88%	19.14%
Marital Status			
Married (N=820)	50.00%	32.93%	17.07%
Other (N=187)	40.11%	38.50%	21.39%
Education			
No School (N=749)	52.47%	32.98%	14.55%
Year 12 (N=226)	34.96%	38.94%	26.11%
Above 12 (N=32)	40.63%	21.88%	37.5%
Occupation			
Formal Occupation (N=240)	40.83%	33.33%	25.83%
Informal Occupation (N=713)	50.49%	34.08%	15.43%
Others (N=54)	50.00%	35.19%	14.81%
Rural (N=164)	26.83%	35.98%	37.20%
Urban (N=843)	52.31%	33.57%	14.12%

5.1.2. Health Care Utilization among Different Quartile Groups

Individuals in the higher income quartile evenly used all the level of health care services in comparison to the other income quartiles as given in table 13. But it also indicated that within high income groups individuals used primary health care services than secondary and tertiary level of health care services. However, those individuals in the lower income quartiles used more of primary health care services.

Table 13: Outpatient service utilization by income quartile

Income	Primary	Secondary	Tertiary
Q1	60.55%	28.13%	11.33%
Q2	49.20%	36.80%	14.00%
Q3	47.39%	36.55%	16.06%
Q4	35.32%	34.52%	30.16%

5.2. Factors Affecting Utilization of Outpatient Services

It was observed that there were 1499 sick individuals, however only 1007 sick individuals used outpatient service while 492 individuals did not use outpatient services in spite of being sick. In terms of utilization of health care services, 32.82 percent did not use outpatient services in spite of being sick but more than double used the outpatient services which accounted for 67.18 percent.

5.2.1. Decision for Use of Outpatient Health Care Services

This study checked consistency of using weight and without weight to control for analyzing decision to use outpatient care during illness. Upon determining summary statistics with-and -without weight as can been seen in the appendix 1, it was found that data without weight were within the neighborhood of national representative data. Therefore, the decisions to use outpatient care were analyzed without weight.

A can be seen from table 14, married were statistically significant with preference for using outpatient services when they were sick. The predicted probability that outpatient services will be chosen during the illness would increase by 0.07 if a person is married assuming that other variables remains constant.

The study found that the third income quartile were significant with both coefficient and marginal effect positive indicating that by belonging to the third highest income quartile , the probability of using outpatient care would increase by 0.12 comparing to the poorest group, other variables remaining constant.

Table 14: Decision to use Outpatient Care

	Coeff	Std.Err	P-Value	95% Conf.Interval		Marginal Effect
Age	-0.00316	0.004193	0.450	-0.01138	50536	-0.0006528
Male	-0.19076	0.123052	0.121	-0.43194	0.05042	-0.0393522
Married**	0.329753	0.142483	0.021**	0.050491	0.60901	0.0680253**
Education						
Year12	0.066386	0.165376	0.688	-0.25775	0.39052	0.0136949
Above12	-0.3828	0.349988	0.274	-1.06877	0.30316	-0.0789694
Occupation						
Formal	0.071254	0.266564	0.789	-0.4512	0.59371	0.014699
Informal	0.366946	0.241811	0.129	-0.107	0.84089	0.0756981
Income						
Q2	0.085263	0.138525	0.538	-0.18624	0.35677	0.0175891
Q3*	0.760514	0.191054	0.000*	0.386054	1.13497	0.156888*
Q4	0.251375	0.217921	0.249	-0.17574	0.67849	0.0518566
Urban	0.14305	0.200182	0.475	-0.53539	0.2493	.0294348
Remoteness						
Hard to reach	-0.03901	0.183041	0.831	-0.39776	0.31974	-0.0080473
Very hard to reach*	-0.78913	0.150675	0.000*	-1.08445	-0.49381	-0.1627918*
Time(hr.)**	-0.08526	0.040241	0.034**	-0.16413	-0.00639	-0.0175887**
Constant	0.66464	0.383372	0.083	-0.08676	1.41603	

* Significant 1 at % significance level: ** Significant at 5% significance level;

*** Significant at 10% significance level: Number of observations = 1499

It was observed that very hard to reach categorical coefficient were statistically significant at p-value<0.05 with 95 percent CI. In particular, when it is very hard to

reach health facility, the probability that outpatient services will be chosen would decrease by 0.17, assuming other variables remain constant.

A time coefficient also demonstrated significant with negative coefficient and the marginal effect. This suggests that one addition travel time decrease the likelihood of using outpatient services during the illness by 0.02 holding other variables constant.

5.2.3. Factors Affecting Choice of Utilization of Outpatient Care at Secondary Health Facilities

Similar to the table 15, consistencies of weight and non-weight variables for determining choice of utilization of outpatient care were compared. Although most of the variables with weight and without weight were within the neighborhood of representing at the national level. The only contrast between weight and without weight was for urban variable as provided in appendix 4. Upon summary statistics using weight and without weight, urban were found at higher proportion with using weight. Since this study already has higher proportion of urban as compared to rural, the use of weight was eliminated.

At the beginning, this study attempted to control for severity of illness. However, after controlling for categorical dummies severity of illness variables and conducting for Wald test, model without weight resulted in chi2(8)=14.66 and Prob >chi2=0.0661 as can been seen in appendix 8. Furthermore, this study found that the coefficients of severity of illness were not significant after controlling for other regressors. Therefore, categorical dummies severities of illness variables were not controlled in the. However, remoteness will be controlled for the regression since the chi2(6) = 46.03 and Prob > chi2 = 0.0000 as provided in the appendix 7.

A Multinomial logit regression is employed to analyze the choice of outpatient services. The outpatient services are provided at primary, secondary and tertiary levels. The outpatient visits at the primary level was treated as a reference category in the multinomial logit model. The significances of coefficients each variable are tested at 5 percent level or 95 percent class interval. In addition, time factor was added as explanatory variable to evaluate its impact on the decision to use health care services.

Table 15: Estimated coefficients and marginal effects from the multinomial logit regression for the use of outpatient services at the secondary health facilities

	Coeff	Std.Err	P-Value	[95% C.Interval]		Marginal Effect
Age**	0.016301	0.005597	0.004**	0.005332	0.02727	.0032865**
Male	-0.14298	0.161644	0.376	-0.4598	0.17384	-0.0125702
Married**	-0.42442	0.194754	0.029**	-0.80613	-0.0427	-0.0536918**
Education						
Year12**	0.453852	0.207196	0.028**	0.047755	0.85995	0.0688491**
Above12	-0.4624	0.52121	0.375	-1.48395	0.55916	-0.0935248
Occupational Group						
Formal	0.166448	0.361203	0.645	-0.5415	0.87439	0.0181835
Informal	0.13016	0.3227	0.687	-0.50232	0.76264	0.0129728
Income Group						
Q2**	0.505221	0.20746	0.015**	0.098606	0.91184	0.0645056**
Q3**	0.523153	0.213309	0.014**	0.105075	0.94123	0.0686561**
Q4**	0.635054	0.235572	0.007**	0.173341	1.09677	0.0531863**
Urban	-0.28329	0.245703	0.249	-0.76486	0.19828	0.0297852
Remote						
Hard to reach*	-1.13503	0.253798	0.000*	-1.63247	-0.6376	-0.1421624*
very hard to reach*	-1.35589	0.253156	0.000*	-1.85207	-0.8597	-0.1697742*
Time Taken(hr.)	0.021488	0.062614	0.731	-0.10123	0.14421	.0058724
Constant	-0.76562	0.525383	0.145	-1.79535	0.26411	

* Significant 1 at % significance level: ** Significant at 5% significance level;

*** Significant at 10% significance level: No. of observations = 1007

In table 15, age was found significant at p-value<0.05 and at 95 percent CI [0.005332-0.02727]. The coefficient and marginal effect were both positive which indicates that

an additional year of age increases, the predicted probability of choosing secondary health care services would increase by 0.3 percent, assuming other variables remain constant.

Male had insignificant effect on utilization of secondary health care services. Although married were significant, the coefficient was negative which explains that individuals who are married use less outpatient health care services from the secondary health facilities and the predicted probability of choosing secondary health facilities would drop by 0.05 holding other variables constant.

Similarly, only individuals who completed 12 years of education were significant affecting the uptake of secondary level of care at p-value<0.005 at 95 percent CI [-0.5415-0.87439].

Remote Variable: Remoteness is a categorical variable consisting of accessible, hard to reach and very hard to reach. However, accessible was omitted as a reference category.

The coefficient of hard to reach were statistically significant at p-value<0.005 at 95 CI [-1.63247 -0.1421624]. This can be explained that as individual indicates health care facility as hard to reach the probability of using secondary health care services would decline by 14 percent, holding other variables constant.

Similarly, the coefficient of very hard to reach were significant at p-value<0.05 at 95 percent CI [-1.85207 -0.8597]. Both coefficient and marginal effect were negative which can be explained that as health care facilities becomes very hard to reach, the predicted probability of choosing secondary health care services would drop by 17 percent, other variables remaining constant. Comparing to table 15, it appears that remoteness dummies have even stronger impact on health care facility choice than distance.

Time variable: Time is a continuous variable. Time was found to be insignificant. This implies that travel time has insignificant impact on the probability of choosing secondary care once remoteness factors are controlled for.

In the postestimation in appendix 1, section 2 under 2.3.1, it was found that age, hard to reach and very hard to reach variables were statistically significant.

5.2.4. Factors Affecting Utilization at Outpatient Services at Tertiary Health Facilities

The tertiary health care services are provided through a network of 2 regional referral hospitals and national referral hospital. It provides both specialized treatments and primary health care services.

Multinomial logit regression was employed with use of tertiary health services as one of the choice variable. The significance of variables was tested at p-value <0.05 at 95 percent CI. Subsequently, marginal effect was applied to determine the impact of each factor on the likelihood of choosing tertiary health care services by the individuals.

As provided in table 16, age coefficient was insignificant implying that age has insignificant effect on tertiary care of choice. Married were significant at p-value<0.005 at 95 percent CI [-0.99509 -0.0731]. In spite of declining use of tertiary health services, the predicted probability of choosing tertiary health care services would fall by 0.05 if a person is married, other variables remaining constant. The education groups were not significant but the coefficients and marginal effects demonstrated positive trajectories on the use of outpatient services from the tertiary health facilities. Both formal and informal occupational groups were not significant but coefficients and marginal effect for the use of tertiary health services on outpatient basis remained positive.

The fourth income quartile was the only income quartile that was found significant at p-value < 0.05 at 95 percent CI. With increasing use of tertiary services as suggested by the coefficient, the predicted probability of deciding to opt for tertiary services would increase by 0.13 if a person belongs to the highest income group after holding other variables constant.

Table 16: Estimated coefficients and marginal effects from the multinomial logit regression on the use of outpatient services at the tertiary health facilities

	Coeff	Std.Err	P-Value	[95% C.Interval]		Marginal Effect
Age	0.00658	0.007119	0.355	-0.00737	0.02053	-.00002
Male	-0.02693	0.202343	0.894	-0.42351	0.36966	0.0025852
Married**	-0.53408	0.23521	0.023**	-0.99509	-0.0731	-0.0471166**
Education						
Year12***	0.450464	0.247555	0.069***	-0.03474	0.93566	0.0322872***
Above12	0.133886	0.491329	0.785	-0.8291	1.09687	0.0421739
Occupational Group						
Formal	0.206375	0.467613	0.659	-0.71013	1.12288	0.0222593
Informal	0.18773	0.43044	0.663	-0.65592	1.03138	0.0212272
Income						
Q2	0.441561	0.284978	0.121	-0.11699	1.00011	0.0400935
Q3	0.421857	0.287412	0.142	-0.14146	0.98517	0.0363633
Q4*	1.033406	0.290018	0.000*	0.46498	1.60183	0.1334248*
Urban*	-0.98509	0.26705	0.000*	-1.50849	-0.4617	-0.1939089*
Remote						
Hard to reach**	-0.85019	0.338858	0.012**	-1.51434	-0.186	-0.0929816**
very hard to reach**	-0.69641	0.299601	0.020**	-1.28361	-0.1092	-0.0641986**
Time (hr.)	-0.01779	0.082002	0.828	-0.17851	0.14293	-.0037616
Constant	-0.61581	0.645583	0.340	-1.88113	0.64951	

* Significant 1 at % significance level: ** Significant at 5% significance level;

*** Significant at 10% significance level: No.of observations= 1007

The result indicated significant for the use of tertiary services by the urban variable at p-value < 0.05 at 95 percent CI. The predicted probability of preference for the use of tertiary services would drop by 0.19 if a person resides in urban area, other variables remaining constant.

The coefficient of hard to reach and very hard to reach were significant at p-value < 0.05 at 95 percent CI. Both the coefficient and marginal effect were negative suggesting that the predicted probability of choosing for tertiary care would decline by 9 percent and 6.4 percent if a person indicates that health care facility is hard to reach and very hard to reach assuming other variables remain constant.

Although time variable was not found significant in the study, both of the coefficient and marginal effect were negative indicating that the probability of using tertiary services tends to decline with more time taken to reach health facility.

In the postestimation under appendix, the highest income quartile indicated significant for the use of outpatient care from the tertiary health facilities. Even after the postestimation, urban demonstrated significant but the result is not reliable since being in urban the result indicate that use of secondary health facilities are decreasing. This may be due to the fact that the sample size for urban is higher relative to rural in this study, which contravenes to the national representative sample.

5.2.5. Marginal Effects on the Use of Primary Health Care Services for Outpatient

In multinomial regression, the study based primary care level as reference or base category for estimation. Thus, there is no coefficient estimates associated with this choice being given in the rest. However, we can still compute marginal effect of the impact of each factor on the outcome, which are given in table 17 below.

The likelihood of the usage of outpatient services from the primary health facilities by the income quartiles still declines. In particular, the higher the income group a person belongs to the larger the magnitude of declining the usage of primary health facilities.

Table 17: Marginal effects of the variables on the use of outpatient services from the primary health facilities

	Variables	**Primary Services**
1	Age	-.0028015
2	Male	.009985
3	Married	.1008085
4	Year 12 Above 12	-.1011364 .0513509
5	Formal occupation Informal occupation	-.0404427 -.0342001
6	Income Q2 Q3 Q4	 -.1045992 -.1050194 -.1866111
7	Urban	.1641238
8	Hard to reach Very Hard to reach	.2351439 .2339728

In the postestimation as provided in appendix 1 that age, married, urban, year12, income quartile (Q2, Q3 and Q4), hard and very hard to reach were all statistically significant.

5.3. Out of Pocket Payment for Outpatient Services

By using summary statistics in table 18 the study found that on average Nu. 77 are spent on the purchase medicine and health accessories while on average Nu. 428 are expended on transportation. On contrary, the maximum spent on medicine is Nu.6000 while its Nu.20000 for the transportation.

Table 18: Summary statistics for purchase of medicine and transport expense

Variable	Obs	Mean	Std. Dev.	Min	Max
Medicine	1007	77.34856	418.2312	0	6000
Transport	1007	428.3366	1396.44	0	20000

5.3.1. Purchase of Medicines and Health Accessories

The purchase of medicines and health accessories were identified as the dependent variable and regressed with control variables such as age, male, married, formal occupation, informal occupation, urban, distance, 12 years of education, and income quartiles.

The categorical dummies for severity of illness were omitted since it does not influence on the purchase of medicine and transport expense as provided in appendix 2.6.

Table 19: Purchase of medicine and health accessories

	Coef.	Std. Err.	t	P>|t|	95% C.Interval	
Age	0.204191	0.986385	0.21	0.836	-1.73145	2.139832
Male	9.814804	28.65488	0.34	0.732	-46.4163	66.04594
Married	24.00388	34.31811	0.7	0.484	-43.3406	91.34831
Occupation						
Formal	-14.5758	65.52404	-0.22	0.824	-143.158	114.0058
Informal	26.7449	59.20938	0.45	0.652	-89.4451	142.9349
Urban	28.60812	41.68831	0.69	0.493	-53.1993	110.4155
Education						
Year 12	-4.65922	36.71335	-0.13	0.899	-76.704	67.38552
Above 12	-97.7649	82.80779	-1.18	0.238	-260.263	64.7337
Income						
Q2	15.52013	37.30773	0.42	0.677	-57.691	88.73125
Q3**	88.57138	38.09654	2.32	0.02**	13.81233	163.3304**
Q4**	135.3265	41.34856	3.27	0.001**	54.18581	216.4672**
Remote						
Hard to reach	-58.153	42.44775	-1.37	0.171	-141.451	25.14464
very hard to reach	-39.4516	40.18937	-0.98	0.327	-118.318	39.41429
Time	15.25655	10.87151	1.4	0.161	-6.07725	36.59035
Constant	-55.0589	92.79393	-0.59	0.553	-237.154	127.036

* Significant 1 at % significance level: ** Significant at 5% significance level;

*** Significant at 10% significance level: No. of observation: 1007

As can be seen from table 19, it was found the coefficients of the highest income quartiles, Q3 and Q4, were significant on the purchase of medicines and health accessories during the outpatient visit.

5.3.2. Transportation

Most people walk or use car to access health care services on an outpatient basis. Sometime individuals use both means of transportation for using outpatient health care services. The public transport is less preferred in Bhutan and depending on the proximity of the health facilities people either walk or hire car as per BLSS 2012.

Table 20: Transportation cost

	Coef.	Std. Err.	t	P>|t|	95% C.Interval	
Age**	-6.83339	3.298921	-2.07	0.039**	-13.3071	-0.35972
Male	102.1427	95.83497	1.07	0.287	-85.9198	290.2053
Married	-5.79318	114.7754	-0.05	0.96	-231.024	219.4373
Occupation						
Formal	-72.2153	219.1422	-0.33	0.742	-502.251	357.8203
Informal	123.5221	198.0231	0.62	0.533	-265.07	512.1144
Urban	145.4453	139.4247	1.04	0.297	-128.156	419.0465
Education						
Year 12	42.36586	122.7862	0.35	0.730	-198.585	283.3163
Above 12	-215.714	276.947	-0.78	0.436	-759.183	327.7555
Income						
Q2	93.21021	124.774	0.75	0.455	-151.641	338.0616
Q3	-22.9629	127.4122	-0.18	0.857	-272.991	227.0654
Q4	176.2034	138.2884	1.27	0.203	-95.168	447.5749
Remote						
Hard to reach	91.92271	141.9646	0.65	0.517	-186.663	370.5081
Very hard	-152.712	141.9646	-1.14	0.256	-416.476	111.0517
Time	49.08406	36.35929	1.35	0.177	-22.2659	120.434
Constant	393.5351	310.3452	-1.14	0.205	-215.473	1002.544

* Significant 1 at % significance level: ** Significant at 5% significance level;

*** Significant at 10% significance level: No.of observation= 1007

From table 20, age was found significant which can be interpreted as with increase in age by one more year, the transport expense would reduce.

5.4. Individuals' Characteristics of Inpatient Services

The descriptive analysis indicated that 442 individuals utilized health care services as an inpatient in the different level of health facilities in the previous year. As discussed earlier the sample size largely was reduced to 442 given that there were many missing values in the control variables more specifically with distance and occupation. The network of Basic Health Units grade-I, district hospital, referral hospitals and national referral hospital provides inpatient health care services.

As given in the table 21, out of 442 individuals who used health care services on inpatient basis female consisted of 54.50 percent and male with 45.50 percent. Married individuals who used the inpatient services made up to 82.13 percent. Most of the individuals in the study comprised of individuals having no formal schooling accounted 69.23 percent and urban with 83.26 percent.

Table 21: Descriptive statistic of selected variables

Characteristics	Frequency	Percentage
Gender		
Female	240	54.50
Male	202	45.50
Marital Status		
Married	363	82.13
Other	79	17.87
Schooling		
No School	306	69.23
Till Year 12	118	26.70
Above year12	18	4.07
Formal Occupation	111	25.11
Informal Occupation	302	68.33
Others	29	6.53
Rural	74	16.74
Urban	368	83.26
Income Quartile		
Q1	111	25.11
Q2	110	24.89
Q3	111	25.11
Q4	110	24.89

As highlighted in the table 22, individuals with no formal schooling was mostly found in the lowest income quartile comprising of 30.72 percent and less in the highest income quartile with 18.63 percent. However, the individuals who completed 12 years of education belong to the higher income quartile and least in the lower income quartile. Similarly, most of the individuals with above 12 years of education are found in the highest income quartile at 89 percent.

Table 22: Education level in different income quartile

Education	Quartile1	Quartile2	Quartile3	Quartile4
No Education	30.72%	26.47%	24.18%	18.63%
Year12	13.56%	24.58%	30.51%	31.36%
Above Year 12	5.56%	0	5.56%	88.89%

The table 23 given below shows that in formal occupation people with no schooling represents 40.54 percent, 45.95 percent with 12 years of education and 13.51 percent with above 12 years of education. However, more individuals with no schooling are mostly found in the informal occupation with 78.76 have and those with above 12 years of schooling are found less in the informal occupation.

Table 23: Occupational groups with different level of education

Occupation Group	No School	Year 12	Above 12
Formal Occupation	40.54%	45.95%	13.51%
Informal Occupation	79.80%	19.54%	0.66%
Others	68.97%	27.59%	3.45 %

The table 24 demonstrates distribution of individuals in different income quartiles with the occupational group. In formal occupation, most belong to the highest income quartile with 38.74 percent and least in the lowest income quartile comprised of 10.81 percent. On contrary, most individuals in informal occupation

belong to the lowest income quartile of 29.80 percent and less in the highest income quartile with 19.87 percent.

Table 24: : Formal occupation in different income quartile

	Quartile1	Quartile2	Quartile3	Quartile4
Formal Occupation	10.81%	15.32%	35.14%	38.74%
Informal Occupation	29.80%	27.81%	22.52%	19.87%
Others	31.03%	31.03%	13.79%	24.14%

5.4.1. Overview of the Utilization of Different Level of Inpatient Health Care Services

From table 25 it can be seen that most of the inpatient care services are used more from the tertiary level comprised of 43.67, followed by the secondary level of services with 34.89 percent and less at the primary level of care with 21.25 percent. This is what we expected since hospitalization usually occurs at higher level of care. The inpatient facilities at the primary level are offered only at the Basic Health Unit grade-I. At the secondary level of care, it consists of district hospitals, while tertiary health services are dispensed from 2 regional referral hospitals and national referral hospital.

Table 25: Inpatient services

Inpatient Service	Frequency	Percent
Primary Level	97	21.25
Secondary Level	152	34.89
Tertiary Level	193	43.67
Total	442	100

5.4.2. Health Care Utilization among Socio-Demographic Groups

The demographic groups highlighted in the table 26 demonstrate that the most common choice of seeking treatments on inpatients basis by each socioeconomic variable were from the tertiary health care services.

The study sample shows that majority of rural people hospitalize at primary health care facility with 68 percent. However, larger proportions of urban are hospitalized in secondary and tertiary hospital compared to rural residence.

Table 26: Utilization of inpatient services by different demographic groups

	Primary	Secondary	Tertiary
Gender			
Female (N=240)	19.17%	33.33%	47.5%
Male (N=202)	25.25%	35.64%	39.11%
Marital Status			
Married (N=363)	22.81%	35.26%	42.42%
Other (N=79)	20.25%	30.38%	49.37%
Education			
No School (N= 306)	26.14%	32.68%	41.18%
Year 12 (N=118)	14.41%	39.83%	45.76%
Above 12 (N=18)	0	27.78%	72.22%
Occupation			
Formal (N= 111)	17.12%	26.13%	56.76%
Informal (N=302)	24.17%	36.09%	39.74%
Others (N=29)	17.24%	48.28%	34.48%
Place of Residence			
Rural (N=74)	68.92%	21.62%	9.46%
Urban (N=368)	38.59%	36.96%	24.46%

5.4.3. Health Care Utilization among Different Income Quartile Groups

According to the table 27, lowest income quartile used more of inpatient care services mostly at the primary level of care with 43.24 percent. On contrary, the highest income quartile used more of tertiary health care services from the regional referral hospitals and national referral hospital which accounts to 45.45 percent.

Table 27: Inpatient service utilization by income quartile

	Primary	Secondary	Tertiary
Q1	43.24%	32.43%	24.33%
Q2	25.45%	33.64%	40.91%
Q3	24.32%	30.63%	45.05%
Q4	13.64%	40.91%	45.45%

5.5. Factors Affecting Utilization of Inpatient Services

The inpatient health care services are provided in Basic Health Unit grade-I, district hospitals, regional referral hospitals and national referral hospital. To serve the purpose of analysis the Basic Health Unit grade-I (i.e. primary care) is used as a base category in the multinomial logit model. The study mainly focuses on choices of seeking inpatient level of care by the individuals in 2012. The effects of demographic and socio-economic factors on the utilization of health care services are investigated by using a binary logistic regression. There are 442 individuals who utilized health care services on inpatient basis.

As can be seen from appendix 10, the use of explanatory variables without weight is more reliable than with weight. The use of weight increases high proportion of urban relative to rural and distorts distribution of income quartiles.

The categorical severities of illness when controlled for use of inpatient services were insignificant for both the secondary and tertiary health facilities. Therefore, it was omitted since its chi2 (8) =2.65 and Prob > chi2 =0.9545. The regression results after controlling for severities of illness are provided in the appendix 15. The remoteness chi2 (6) =19.18 and Prob > chi2 =0.0039.

5.5.1. Factors Affecting Utilization of Inpatient Services at Secondary Health Facilities

The study considered use of inpatient services at three different levels; primary, secondary and tertiary and applied multinomial logit regression. The significance of variables was tested at P-value of 5 percent and 95 percent CI. The marginal effect of each facility is used to analyze the impact of each factor on the likelihood of choosing secondary health care services by the individuals.

The table 28 controls for remoteness categorical dummy variables, hard to reach and very hard to reach, and time variable but excludes distance to the nearest district hospitals.

The result indicated significant for individuals who completed 12 years of education at p-value < 0.005 at 95 percent CI. Both the coefficient and marginal effect were positive which can be interpreted as people with 12 years of education have increasing chances of using the district hospitals for inpatient services.

Table 28: Estimated coefficients and marginal effects from the multinomial logit regression on the use of inpatient services at the secondary health facilities

	Coeff	Std.Err	P-Value	[95% C.Interval]		Marginal Effect
Age	0.012096	0.009996	0.226	-0.0075	0.03169	.0014186
Male	-0.29492	0.293363	0.315	-0.8699	0.28006	0.0154067
Married	0.081342	0.38243	0.832	-0.66821	0.83089	0.0383632
Education						
Year12**	0.874972	0.370773	0.018**	0.148271	1.60167	0.1336285**
Above12	12.72821	331.4999	0.969	-637	662.456	0.0361327
Occupational Group						
Formal	-0.95171	0.655719	0.147	-2.2369	0.33347	-0.2152096
Informal	-0.54486	0.567966	0.337	-1.65805	0.56833	-0.1262919
Income						
Q2	0.1064	0.375036	0.777	-0.62866	0.84146	0.0273755
Q3	0.018918	0.388278	0.961	-0.74209	0.77993	0.0320662
Q4***	0.731164	0.429351	0.089***	-0.11035	1.57268	0.1897735***
Urban	0.399061	0.577739	0.49	-0.73329	1.53141	0.3264732
Remote						
Hard to reach**	-1.4796	0.49871	0.003**	-2.45706	-0.5021	-.1672917**
Very hard**	-1.03439	0.347506	0.003**	-1.71549	-0.3533	-.0874032**

	Coeff	Std.Err	P-Value	[95% C.Interval]		Marginal Effect
Time (hr.)	0.002915	0.016982	0.864	-0.03037	0.0362	-.0000331
Constant	0.168238	0.956138	0.86	-1.70576	2.04223	

* Significant 1 at % significance level: ** Significant at 5% significance level

*** Significant at 10% significance level No. of observations= 442

The coefficients of hard and very hard to reach variables were found significant at p-value < 0.05 at 95 percent CI, with negative coefficients and marginal effects. This can be interpreted as the prevalence of using of inpatient services at the district level decline by 17 percent and 9 percent, respectively.

Both formal and informal occupational groups have negative coefficient but not significant. The income quartiles were not significant except for the highest quartile that is significant. People belonging to the highest quartile have on average 19 percent probability of choosing secondary care.

5.5.2. Factors Affecting Utilization of Inpatient Services at Tertiary Health Facilities

The table 29 given below found the coefficient of gender significant at 5 percent implying that male on average have lower probability of choosing tertiary care.

The urban coefficient demonstrated significant at p-value <0.05 at 95 percent CI. The prediction that inpatient services will be preferred from the tertiary level of care would decrease by 0.32 holding other variables constant.

A hard to reach coefficient showed significant at p-value <0.05 at 95 percent CI. The coefficients and marginal effects of hard and very hard to reach are negative. The predicted probability of opting for inpatient services from the tertiary hospitals would decrease by 5 percent and 9 percent, respectively.

Table 29: Estimated coefficients and marginal effects from the multinomial logit regression on the use of inpatient services at the tertiary health facilities

	Coeff	Std.Err	P-Value	[95% C.Interval]		Marginal Effect
Age	0.007755	0.009611	0.42	-0.01108	0.02659	-.0002704
Male**	-0.68166	0.286174	0.017**	-1.24255	-0.1208	-0.0504184**
Married	-0.15579	0.359007	0.664	-0.85943	0.54785	-0.0464773
Education						
Year12	0.393996	0.364161	0.279	-0.31975	1.10774	-0.039881
Above12	13.0614	331.4997	0.969	-636.666	662.789	0.2147863
Occupational Group						
Formal	0.035218	0.669361	0.958	-1.27671	1.34714	0.2152093
Informal	0.008229	0.601588	0.989	-1.17086	1.18732	0.1262917
Income Group						
Q2	-0.0256	0.357361	0.943	-0.72602	0.67481	-0.0273755
Q3	-0.13519	0.368432	0.714	-0.8573	0.58692	-0.0320662
Q4	-0.11899	0.431281	0.783	-0.96429	0.7263	-0.1897733
Urban**	-1.06214	0.530447	0.045**	-2.1018	-0.0225	-0.3264735**
Remote						
Hard to reach**	-0.98665	0.42448	0.02**	-1.81862	-0.1547	-.0480686**
Very hard **	-1.00187	0.345232	0.004**	-1.67852	-0.3252	-.0910207**
Time (hr.)	0.003923	0.018846	0.835	-0.03301	0.04086	.0004481
Constant	1.92448	0.925284	0.038	0.110957	3.738	

* Significant 1 at % significance level ** Significant at 5% significance level

*** Significant at 10% significance level No.of observations = 442

5.6. Marginal Effects on the Use of Primary Health Care Services for Inpatient

At the primary level the inpatient services are provided only from the Basic Health Unit grade I.

In table 30, hard to reach and very hard to reach have increasing likelihood of using primary health facilities for inpatient services. On the contrary, both second and fourth income quartiles shows decreasing trajectories for the use of primary health facilities for inpatient services. While the third income quartiles shows likelihood of increasing usage of primary health facilities.

Table 30: Marginal effects of variables on inpatient primary services

	Variables	Primary Services
1	Age	-.0011482
2	Male	.0350117
3	Married	.0081141
4	Education	
	Year 12	-.0937475
	Above 12	-.2509189
5	Formal occupation	0.0000003
	Informal occupation	0.0000002
6	Income	
	Q2	-0.0000002
	Q3	0.0000001
	Q4	-0.0000002
7	Urban	0.0000002
8	Hard to reach	0.0000013
	Very Hard to reach	0.000001

5.7. Out of Pocket Health Expenditures for Inpatient Services

Despite provision of health care services in the country, some costs are still incurred by the individuals while seeking for health care services. The major cost components left out of pocket payment are purchase of medicines and health accessories, and transportation. As per the National Health Account 2009-2010, out of pocket expenditure estimated on per capita basis was Nu.64.33 for consultation fee, Nu.206.46 for medicines, Nu.76.54 for transport and Nu. 76.54 for other health expenditure (NHA, 2009-2010).

On average the spending on purchase of medicines and health accessories amounted to Nu. 1265 while transportation cost accounted for 23 percent of the out

of pocket payment (BLSS 2012). It was estimated that over 45 percent of the out of pocket expenditure are incurred for transportation and 33 percent on the purchase of medicine (NHA, 2009-2010).

By using summary statistics as given in the table 31, it was found that on average people spends about Nu.583 on the purchase of medicine. While there are people who don't buy medicine due to availability of free health care services, the maximum expenditure of medicine was Nu. 62000. For transportation, people on average spends about Nu. 1119 while the highest expenditure on transport reached Nu.20000.

Table 31: Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Medicine	442	583.414	3916.781	0	62000
Transport	442	1119.382	2423.848	0	20000

5.7.1. Purchase of Medicine and Health Accessories

Only informal occupation was significant at 5 percent for the purchase of medicines and health accessories for the inpatient services in table 32. None of the remote dummies are significant.

Table 32: Purchase of medicine and health accessories with remoteness

	Coef.	Std. Err.	t	P>|t|	95% C.Interval	
Age	16.76293	13.93022	1.2	0.23	10.6174	44.14326
Male	565.0858	402.7924	1.4	0.161	226.617	1356.788
Married	125.8773	505.0602	0.25	0.803	866.836	1118.591
Occupational						
Formal * **	-1419.33	851.5422	1.67	0.096***	3093.07	254.4064***
Informal**	-2059.3	762.7545	-2.7	0.007**	3558.52	-560.083**
Urban	611.9509	630.4422	0.97	0.332	627.206	1851.107
Education						
Year 12	471.5259	485.9772	0.97	0.332	483.679	1426.731
Above 12	-626.866	1062.014	0.59	0.555	2714.29	1460.561
Income						
Q2***	-1009.56	529.4704	1.91	0.057***	2050.25	31.13548***
Q3	-874.662	541.7414	1.61	0.107	1939.47	190.1499
Q4	-59.6926	579.3638	-0.1	0.918	1198.45	1079.067
Remote						
Hard to reach	-347.541	701.7264	-0.5	0.621	1726.81	1031.727
Very hard	93.74191	526.5979	0.18	0.859	941.305	1128.789
Time	-17.9701	27.03485	0.66	0.507	-71.108	35.16787
Constant	1204.446	1196.742	1.01	0.315	1147.79	3556.684

* Significant 1 at % significance level ** Significant at 5% significance level

*** Significant at 10% significance level No. of observations= 442

5.7.2. Transportation Expense

Transportation represents largest health expenditure incurred by the individuals given the location of health facilities and difficult geographical terrain as reported in BLSS 2012.

In the table 33 variables such as formal and informal occupational group and travel time are statistically significant for the transportation cost for the use of inpatient services. Travel time explains that with an additional hour of travel time, the transportation cost for use of inpatient care services would increase by Nu.77. Individuals in both formal and informal, the transportation cost will decrease significantly by about Nu.1400.

Table 33: Transportation cost with controlled for remoteness

	Coef.	Std. Err.	t	P>|t|	95% C.Interval	
Age	-7.03504	8.449849	-0.83	0.406	-23.6435	9.573441
Male	-167.062	244.3275	-0.68	0.494	-647.296	313.1727
Married	204.1328	306.3615	0.67	0.506	-398.032	806.2971
Occupational						
Formal**	-1380.3	516.5319	-2.67	0.008**	-2395.57	-365.042**
Informal**	-1386.8	462.6747	-3.00	0.003**	-2296.2	-477.393**
Urban	263.1515	382.4162	0.69	0.492	-488.501	1014.804
Education						
Year 12	-428.357	294.786	-1.45	0.147	-1007.77	151.055
Above 12	300.3212	644.201	0.47	0.641	-965.879	1566.521
Income						
Q2	-97.4509	321.1683	-0.3	0.762	-728.719	533.8167
Q3	89.17901	328.6117	0.27	0.786	-556.719	735.0769
Q4	237.6257	351.4329	0.68	0.499	-453.128	928.3794
Remote						
Hard to reach	37.78222	425.6561	0.09	0.929	-798.86	874.4242
Very hard	-218.01	319.4259	-0.68	0.495	-845.852	409.8333
Time(hr.)*	77.10324	16.39891	4.7	0.000*	44.87062	109.3359*
Constant	2344.451	725.9244	3.23	0.001	917.6212	3771.281

* Significant 1 at % significance level: ** Significant at 5% significance level;

*** Significant at 10% significance level: No. of observations = 442

5.8. Discussion

This study aims to explore utilization of health care services in Bhutan, specifically on the decision whether to use or not use health care services and the choice of level of health facilities, in particular, we want to assess how socio-demographic-economic

factors influence the uptake of health care services. Furthermore, the study also investigates factors that affect out-of-pocket health care expenditure on drugs and transportation.

5.8.1. Health Care Utilization and Geographical Factors

The table 34 indicates that the use of outpatient care for sickness were declining when people resides in hard and very hard to reach places. Further, the results demonstrated that people from hard and very hard to reach areas showed declining use of secondary and tertiary health facilities for both outpatient and inpatient care. The primary health facilities are the preferred choice of using health care services for outpatient and inpatient care.

Table 34: Marginal effect of remoteness on each choice of probability

Type of services	Remoteness	Marginal Effects			Use of Outpatient
		Primary	Secondary	Tertiary	
Outpatient	Hard to reach	.2351439	-0.1422	-0.093	-0.01
	Very Hard to reach	.2339728	-0.170	-0.0642	-0.1714
Inpatient	Hard to reach	0.0000013	-0.1212	-.0480686	
	Very Hard to reach	0.000001	-0.008	-.0910207	

5.8.2. Health Care Utilization and Economic Factors

Bhutan recently graduated from lower income country to the lower-middle income country. A country mainly driven by the hydropower project and service sector has observed unprecedented economic development over the years which have trickle-down on the lives of the people. The living standards of the people in the country have dramatically improved which has brought about change in the pattern of health care utilization in the country.

a. Income

As provided in table 35, second income quartile showed decreasing usage of outpatient care during illness by 1.7 percent, for third and fourth quartiles the decision on the usage of outpatient care were increasing by 12 percent and 6 percent, respectively.

For choice of outpatient care, all income quartiles preferred secondary and tertiary health care facilities as compared to the primary health care facilities that showed decreasing choice of using outpatient care. Regarding choice of inpatient care, secondary health facilities consistently showed increasing usage while the tertiary health care facilities demonstrated declining trends.

This result is compatible with a study undertaken in United states where it found that lower income group used more of outpatient services that requires longer waiting time than the highest income group (Aday, 1977).

Table 35: Marginal effect of income quartiles on each choice of probability

Type of services	Remoteness	Marginal Effects			Use of Outpatient
		Primary	Secondary	Tertiary	
Outpatient	Q2	-.1045992	0.0645	0.0400	-0.0169
	Q3	-.1050194	0.0687	0.0364	0.1188
	Q4	-.1866111	0.0532	0.1334	0.0605
Inpatient	Q2	-0.0000002	0.0274	-0.0274	
	Q3	0.0000001	0.0321	-0.0321	
	Q4	-0.0000002	0.1898	-0.1898	

5.8.3. Health Care Utilization and Socio-Demographic Factors

With epidemiological transition and changing nature of diseases, there is more demand for quality health care services in the country. In the pursuit of providing quality and equitable access to health care services, the Royal Government of Bhutan has put in place policies and regulations as enabling conditions for enhancing utilization of health care services in the country.

However, socio-demographic factors play a key role in determining the utilization of health care services. The impact of economic growth on health has dramatically increased life expectancy at birth of the Bhutanese from 66.1 years in 2000 to 67.4 years in 2012 as reported in AHB 2013. Now the country is experiencing challenges on geriatric care given the rise in life expectancy of the people. Beside communicable diseases, the non-communicable diseases are creeping into the society claiming both lives and use of more resources.

a. Health Care Utilization and Age

This study found that with increase in one more year, the choice of using outpatient care when sick were declining as given in the table 36. Further, the result indicated that the preferred choice of using health care services by the age was from the

secondary health care facilities for both the outpatient and inpatient care. The use of outpatient and inpatient care from primary and tertiary showed a declining trend. Since age was a continuous variable this study could not assess which age groups had more influence on the utilization of health care services.

Table 36: Marginal effect of age on choice of probability and partial effect of age on use of outpatient

Type of services	Remoteness	Marginal Effects			Use of Outpatient
		Primary	Secondary	Tertiary	
Outpatient	Age	-.0028	0.0033	-0.00002	-0.00073
Inpatient	Age	-.0012	0.0014	-0.00027	

While some study have pointed out that younger age group use more health care services than the older group (Hibbard, 1986). In contrast to the aforementioned finding, another found that elderly people over 65 years old use more health services compared to the younger group (Rosenberg, 1996).

b. Health Care Utilization and Male

By being male, the predicted probability that outpatient care will be used during sickness would drop by 2 percent. On the choice of health facilities for the outpatient, male showed increasing usage of primary and tertiary health care facilities and demonstrated declining usage of secondary health care facilities. Regarding inpatient care, the result indicated increasing usage of primary and secondary health care facilities and declining usage of tertiary health facilities by being male. This finding is in consistent with one of the study which found that male outweigh female in terms of hospitalization (Fernandez, 1999). In one of the study it was found that women used more of outpatient services than men (Cleary, 1982).

Table 37: Marginal effect of gender on each choice of probability

Type of services	Remoteness	Marginal Effects			Use of Outpatient
		Primary	Secondary	Tertiary	

Outpatient	Male	.009985	-0.0123	0.003	-0.02
Inpatient	Male	.0350117	0.0154	-0.050	

c. Health Care Utilization and Married

As provided in the table 38, by being married the predicted probability of using outpatient care during sickness would increase by 7 percent. This study found that the choices of using outpatient care from primary health facilities were increasing while decreasing for secondary and tertiary health facilities. The predicted probability of using primary health facilities for outpatient services would increase by 20 percent while secondary and tertiary health facilities would drop by 5 percent and 4 percent by being married, respectively. Regarding the usage of inpatient care, by being married the predicted probability of using primary and secondary health care facilities would increase relative to the usage of inpatient care from tertiary health facilities which were declining.

Table 38: Marginal effect of married on each choice of probability

Type of services	Remoteness	Marginal Effects			Use of Outpatient
		Primary	Secondary	Tertiary	
Outpatient	Married	.1008085	-0.054	-0.0471	0.07
Inpatient	Married	.0081141	0.0383	-0.0465	

d. Health Care Utilization and Education

The study observed that those individuals with 12 years of education had increasing usage of outpatient care during illness by 3 percent while it was declining by 4 percent for those who had more than 12 years of education as demonstrated in table 39. For choice of outpatient care, those having 12 years of education used more of secondary and tertiary health care facilities and less of primary health care facilities. On the contrary, those with more than 12 years of education used more of outpatient care from primary and tertiary health facilities and less from secondary health facilities. Regarding inpatient care, those with 12 years of education showed increasing usage of secondary health facilities and decreasing usage of primary and tertiary health facilities. While individuals with above 12 years of education demonstrated increasing usages of inpatient care from secondary and tertiary health facilities and decreasing for the primary health facilities. Many studies have aligned their findings on the positive impact of education on utilization of health care services as compared to those without any education (Alberts, 1997) and (Price, 2011).

Table 39: Marginal effect of education on each choice of probability

Type of services	Remoteness	Marginal Effects			Use of Outpatient
		Primary	Secondary	Tertiary	
Outpatient	Year12	-.1011364	0.0688	0.0323	0.0289
	Above12	.0513509	-0.0935	0.0422	-0.0480
Inpatient	Year12	-.0937475	0.1336	-0.0399	
	Above12	-.2509189	0.0361	0.2148	

e. Health Care Utilization and occupation

As illustrated in table 40, this study found increasing usage of outpatient care during illness by both the formal and informal occupation groups with 3 percent and 9 percent, respectively. For outpatient care, persons in formal occupation used more of secondary and tertiary health facilities while informal occupation used more of tertiary health facilities. The usage of outpatient care from primary health facilities showed declining being in formal and informal occupational group.

Table 40: Marginal effect of occupation on each choice of probability

Type of services	Remoteness	Marginal Effects			Use of Outpatient
		Primary	Secondary	Tertiary	
Outpatient	Formal	-.0404427	0.0181	0.02223	0.0285
	Informal	-.0342001	-0.0935	0.02122	0.0897
Inpatient	Formal	-.0937475	-0.2152	0.2152	
	Informal	-.2509189	-0.1263	0.1263	

For inpatient, formal and informal occupational groups depicted increasing usages of tertiary health facilities and declining usage from primary and secondary health facilities.

f. Health Care Utilization and Urban

However, as highlighted in table 41, urban demonstrated increasing usage of primary and secondary health facilities and decreasing usage from the tertiary health facilities for both the outpatient and inpatient care.

Table 41: Marginal effect of urban on each choice of probability

Type of services	Remoteness	Marginal Effects			Use of Outpatient
		Primary	Secondary	Tertiary	
Outpatient	Urban	.1641238	0.0298	-0.1939	0.0295092
Inpatient	Urban	0.0000002	0.0265	-0.3265	

5.9. Limitation

The sample size of urban is dramatically larger than the rural area. The actual size of the population for urban area is 30 percent and 70 percent for the rural (BLSS 2012). However, this study has a lager sample size for urban as compared to the rural. Further, an interesting result surfaced during the descriptive analysis regarding usage of outpatient services in which it was found that rural used more of tertiary health care services and urban with more usage of primary services. This study only includes those who have reported as sick and used formal health services which make the final sample which differed from the national representative sample.

The distribution of heath service packages in Bhutan varies according to the type of health facility. The district hospitals and referral hospitals deliver health care services from the urban areas. Therefore, people residing within the proximity of these hospitals inevitably choose to use services from these hospitals. Similarly, the widespread of primary health facilities around the country are mostly used by those in rural areas. However, it is possible that people having a chronic illness would migrate to the urban areas to access secondary and tertiary health care facilities. Thus, endogeneity problem specifically measurement error may occur in this study due to peoples' outpatient location choice.

The study took into account only the first outpatient visit by the people who were sick in the last one month prior to the interview. Therefore, this study may not provide clear picture on the pattern of utilization of health care services in Bhutan.

There are no studies being conducted on health care utilization in Bhutan in the past to benchmark for comparison and generate more understanding of health seeking behavior in Bhutan.

CHAPTER VI

CONCLUSION AND RECOMMENDATION

6.1. Conclusion

The study investigated the geographic factors and socio-economic-demographic factors which influenced the decision on utilization of health care services and the choice of health facilities. The uses of services were broadly classified into primary, secondary and tertiary in conformity with the type of health facilities visited by the individuals. Accordingly the uses of services are discussed from outpatient and inpatient basis.

The study found that geographical factor is a decisive factor for making decision in the use of health care services. The time travelled and very hard to reach areas had significant effects on the use outpatient services during sickness. Similarly, the trajectories for usage of inpatient care from secondary and tertiary health facilities were declining given that fact that these facilities are located in the urban areas. The primary health facilities are the ultimate choice of using both the outpatient and inpatient care for the people in hard and very hard to reach areas.

Despite provision of free health care services, income to some extent influences usage of heath care services particularly the outpatient care. The purchases of medicine from the pharmacy shop and transportation expense were the main cost drivers for out-of pocket health expenditure in the country. Whether the out-of-pocket is being triggered by the impact of economic growth or the choice of quality services would be an interesting area for future discussion.

Despite difficult geographical landscape and scattered nature of settlements, Bhutan expanded health infrastructures across the country to enhance access and upscale utilization of health care services. Furthermore, to reach services for the underserved communities, Out-Reach Clinics were increased particularly in the rural areas which are cutoff from the road and transport facilities. However, mobile people comprising of seasonal migration by the people remains challenge in the provision of health care services.

Even though there are more health care facilities being expanded in remote and rural areas, people will still pay out of pocket to travel for the use health care services. However, it may become barrier for those who do not have the ability to pay out of pocket to use health care services. It is important that government initiate

mechanism such as travel coupon or travel subsidies to reduce differentials in the use of health care services by the people from different economic status.

6.2. Recommendations

In line with the findings of the study, I would like to propose few recommendations towards improving utilization of health care services in the country.

- Expansion of health facilities, especially Out-Reach Clinics, in the strategic location to facilitate access to health care services for the people from remote areas
- Cross-Sectoral approach for improving access to the health care services like enhancing connectivity to road and transport infrastructures in the country.
- Conduct study on equity in utilization of health care services for mainstreaming vulnerable and disadvantaged groups in planning for the improving utilization of health care services.

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APPENDIX

Appendix 1: Summary Statistics using weight and without weight for decision to use outpatient care when sick

Without Weight

Variable	Obs	Mean	Std. Dev.	Min	Max
Age	1499	45.01668	15.00971	13	85
Male	1499	.4563042	.4982532	0	1
Married	1499	.7991995	.4007328	0	1
Year12	1499	.2101401	.4075439	0	1
Above12	1499	.0326885	.1778793	0	1
Formal occupation	1499	.2401601	.4273231	0	1
Informal occupation	1499	.7031354	.4570288	0	1
IncomeQ2	1499	.2501668	.4332535	0	1
IncomeQ3	1499	.2501668	.4332535	0	1
IncomeQ4	1499	.2494997	.4328679	0	1
Urban	1499	.1447632	.3519793	0	1
Hard2reach	1499	.1180787	.322809	0	1
Very hard	1499	.1927952	.3946253	0	1
Totalhr	1499	1.657461	6.473351	.017	99.5
Severe	1499	.1534356	.3605272	0	1
Prevention	1499	.0273516	.1631601	0	1
Secondary prevention	1499	.0046698	.0681988	0	1
Rehabilitation	1499	.0140093	.1175683	0	1
Distance	1499	16.61339	40.35438	0.07	500

With Weight

Variable	Weight	Obs	Mean	Std. Dev.	Min	Max
Age	27323.1439	1499	45.39447	15.09319	13	85
Male	27323.1439	1499	.4483238	.4974884	0	1
Married	27323.1439	1499	.7996232	.4004159	0	1
Year12	27323.1439	1499	.1887551	.3914446	0	1
Above12	27323.1439	1499	.0257955	.1585777	0	1
Formal occupation	27323.1439	1499	.2102615	.4076303	0	1
Informal occupation	27323.1439	1499	.7343391	.4418319	0	1
IncomeQ2	27323.1439	1499	.2632338	.4405352	0	1
IncomeQ3	27323.1439	1499	.2543193	.4356232	0	1
IncomeQ4	27323.1439	1499	.2210986	.4151252	0	1
Urban	27323.1439	1499	.0766231	.2660813	0	1
Hard2reach	27323.1439	1499	.1266807	.3327259	0	1
Very hard	27323.1439	1499	.2070262	.4053097	0	1
Totalhr	27323.1439	1499	1.78428	6.94163	0.17	99.5
Severe	27323.1439	1499	.1496736	.3568703	0	1
Prevention	27323.1439	1499	.0267738	.1614755	0	1
Secondary prevention	27323.1439	1499	.0047666	.0688988	0	1
Rehabilitation	27323.1439	1499	.0121964	.1097986	0	1
Distance	27323.1439	1499	17.5482	41.8114	0.07	500

Appendix 2: Decision to use outpatient care when sick with controlled for distance

Logistic regression Number of obs = 1499

LR chi2(12) = 44.31

Prob > chi2 = 0.0000

Log likelihood = -926.57466 Pseudo R2 = 0.0234

Variable	Coeff	Std.Err	P>|z|	95% CI		Marginal Effect
Age	.0000227	.0040944	0.996	-.0080022	.0080476	4.87e-06
Male	-.2477204	.1209816	0.041	-.48484	-.0106007	-.0530178
Married	.2956157	.1393548	0.034	.0224854	.568746	.0632686
Year12	.1439212	.1609846	0.371	-.1716028	.4594452	.0308024
Above12	-.2898445	.3450678	0.401	-.9661649	.386476	-.0620334
Formal	-.0004451	2645392	0.999	-.5189325	.5180422	-.0000953
Informal	.263883	2397403	0.271	-.2059994	.7337653	.056477
Q2	.1055305	1524646	0.489	-.1932945	.4043556	022586
Q3	.3648636	.1590043	0.022	.0532209	.6765064	.0780892
Q4	.595655	.1788771	0.001	.2450623	.9462476	.1274838
Urban	.3467024	.1935938	0.073	-.0327345	.7261393	.0742023
Distance	-.0042051	.0013623	0.002	-.0068751	-.0015351	-.0009
_Cons	.1621483	.335687	0.629	-.4957861	.8200827	

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Wald Test

Variable	DF	Significance
Distance	chi2(1) = 9.53	Prob > chi2 = 0.0020

Appendix 3: Decision to use outpatient care when sick with controlled for remoteness

Logistic regression — Number of obs = 1499

LR chi2(14) = 90.33

Prob > chi2 = 0.0000

Log likelihood = -903.56745 — Pseudo R2 = 0.0476

Variable	Coeff	Std.Err	P>|z|	95% CI		Marginal Effect
Age	-.0029026	.0041951	0.489	-.0111248	.0053195	-.0006017
Male	-.2031089	.1230458	0.099	-.4442741	.0380564	-.0421018
Married	.3193105	.141843	0.024	.0413033	.5973177	0661889
Year12	.0746828	.164655	0.650	-.248035	.3974006	.0154808
Above12	-.4159554	.3478184	0.232	-1.097667	.2657562	-.0862221
Formal	.0757846	.2665977	0.776	-.4467373	.5983065	.0157091
Informal	.3748596	.2418579	0.121	-.0991732	.8488924	.0777035
Q2	-.0176868	.1558595	0.910	-.3231658	.2877922	-.0036662
Q3	.2333275	.1624382	0.151	-.0850455	.5517004	.0483657
Q4	.4918817	.1844725	0.008	.1303223	853441	.1019606
Urban	.1420001	.1991741	0.476	-.248374	.5323741	.0294348
Hard2reach	-.0437046	.1828997	0.811	-.4021815	.3147722	-.0090594
Veryhard	-.7733362	.150047	0.000	-1.067423	-.4792495	-.1603025
Totalhr	-.0828673	.0396475	0.037	-.160575	-.0051596	-.017177
_Cons	.507471	.3490451	0.146	-.1766447	1.191587	

Wald Test

Variable	DF	Significance
Remoteness	chi2(3) = 38.98	Prob > chi2 = 0.0000

Appendix 4. Summary Statistics using weight and without weight for choice of health facilities

Without Weight

Variable	Obs	Mean	Std. Dev.	Min	Max
Age	1007	44.75472	14.82477	18	85
Male	1007	.4409136	.4967432	0	1
Married	1007	.8142999	.3890577	0	1
Year12	1007	.224429	.417413	0	1
Above 12	1007	.0317776	.1754945	0	1
Formal occupation	1007	.2383317	.4262747	0	1
Informal occupation	1007	.7080437	4548882	0	1
Income-Q2	1007	.2482622	.4322194	0	1
Income-Q3	1007	.2472691	.4316389	0	1
Income-Q4	1007	.2502483	.4333712	0	1
Urban	1007	.83714	.3694213	0	1
Distance	1007	14.37603	33.20396	.07	500
Severe	1007	.2284012	.420011	0	1
Prevention	1007	.040715	.1977274	0	1
Secondary prevention	1007	0069513	.0831257	0	1
Rehabilitation	1007	.020854	.1429665	0	1
Hard2reach	1007	.1191658	.3241445	0	1
Veryhard	1007	.142999	.3502458	0	1
Totalhr	1007	1.120043	1.293338	0.02	12

Weight

Variable	Weight	Obs	Mean	Std. Dev.	Min	Max
Age	18164.663	1007	45.142	14.9386	18	85
Male	18164.663	1007	.43027	.49536	0	1
Married	18164.663	1007	.815012	.388481	0	1
Year12	18164.663	1007	.024336	.40420	0	1
Above 12	18164.663	1007	.024336	154168	0	1
Formal occupation	18164.663	1007	.20547	.40424	0	1
Informal occupation	18164.663	1007	.73996	.438875	0	1
Income-Q2	18164.663	1007	.26500	.441550	0	1
Income-Q3	18164.663	1007	.244933	.430261	0	1
Income-Q4	18164.663	1007	.223171	.416579	0	1
Urban	18164.663	1007	.913152	.28175	0	1
Distance	18164.663	1007	15.139	33.6468	.07	500
Severe	18164.663	1007	.225138	.417881	0	1
Prevention	18164.663	1007	.040273	.196696	0	1
Secondary prevention	18164.663	1007	.00717	.084413	0	1
Rehabilitation	18164.663	1007	.018346	.13427	0	1
Hard2reach	18164.663	1007	.131405	.338011	0	1
Very hard	18164.663	1007	.152352	.35954	0	1
Totalhr	18164.663	1007	1.18580	1.32083	0.02	12

Appendix 5: Choice of health care facilities for outpatient care controlled for distance

Multinomial logistic regression Number of obs = 1007

LR chi2(24) = 138.95

Prob > chi2 = 0.0000

Log likelihood = -964.10828 Pseudo R2 = 0.0672

Variable	Coeff	Std.Err	P>|z|	95% CI		Marginal Effect
1.Primary						
Age						-.0036688
Male						.0310779
Married						1111271
Year12						-.1458512
Above12						.0312928
Formal						-.018897
Informal						0058244
Q2						-.1094887
Q3						-.0962745
Q4						-.1782456
Urban						.2254074
Distance						-.0039583
1. Secondary facilities						
Age	.0179202	.0054781	0.001	.0071833	.0286572	0036438
Male	-.1676417	1594477	0.293	-.4801535	.14487	-.0363516
Married	-.4172289	.1905152	0.029	-.7906318	-.0438261	-.0616443
Year12	.600251	.2024098	0.003	.2035351	9969669	-.0868326
Above12	-.3405741	5211746	0.513	-1.362057	6809093	-.0868326
Formal	.0634731	3563189	0.859	-.6348992	.7618454	.0084034

Informal	-.0443928	.3189199	0.889	-.6694643	.5806787	-.0115274
Q2	.4699337	.2034762	0.021	.0711278	.8687397	.0847471
Q3	.4280602	.2099014	0.041	.016661	.8394593	.0806081
Q4	.6020716	.230985	0.009	.1493492	1.054794	.0680131
Urban	-.7071871	.2404346	0.003	-1.17843	-.2359438	-.0477574
Distance	.0146819	.0035445	0.000	.0077348	.0216291	.0022747
_cons	-.7810128	.5152931	0.130	-1.790969	.2289431	
2. Tertiary facilities						
Age	.0078374	.0071108	0.270	-.0060996	.0217744	.000025
Male	-.0332999	.2034047	0.870	-.4319658	.365366	.0052737
Married	-.5251392	.2353217	0.026	-.9863612	-.0639172	-.0494828
Year12	.5905873	.2468189	0.017	.1068311	1.074343	.0452363
Above12	.2264235	.5001861	0.651	-.7539233	1.20677	.0555398
Formal	.1019669	.4685504	0.828	-.816375	1.020309	0104937
Informal	.0222299	.4305639	0.959	-.82166	.8661197	.005703
Q2	.3882262	.2861568	0.175	-.1726308	.9490833	.0247415
Q3	.3054213	.2886973	0.290	-.260415	.8712576	.0156664
Q4	.990769	.2897617	0.001	.4228464	1.558692	.1102325
Urban	-1.382314	.2608899	0.000	-1.893649	-.8709789	-.17765
Distance	.0183955	.0037814	0.000	.010984	.025807	0016835
_cons	-.6674232	.6424812	0.299	-1.926663	.5918167	

Wald Test

Variable	DF	Significance
Distance	`chi2(2) = 23.80`	`Prob>chi2= 0.0000`

Appendix 6: Controlled for Distance and severities of illness

Multinomial logistic regression Number of obs = 1007

LR chi2(32) = 158.03

Prob > chi2 = 0.0000

Log likelihood = -954.5701 Pseudo R2 = 0.0764

Variable	Coeff	Std.Err	P>|z|	95% CI		Marginal Effect
1.Primary facilities						
Age						-.003625
Male						.0280039
Married						.1166845
Year12						-.148573
Above12						.0258762
Formal						-.015828
Informal						.009467
Q2						-.109336
Q3						-.097812
Q4						-.180600
Urban						.229671
Distance						-.004019
Severe						.0071162
Prevention						-.081973
Sec_preven						-.008615
Rehabilitation						-.128627
2. Secondary facilities						
Age	.0173266	.0055028	0.002	.0065414	.0281119	.003357
Male	-.160409	.1609532	0.319	-.475872	.1550534	-.034675

Married	-.422358	.1912337	0.027	-.79717	-.047547	-.058684
Year12	.5842168	.2032802	0.004	.1857949	.9826386	.0911055
Above12	-.322142	.5217472	0.537	-1.34475	.700464	-.080314
Formal	.06192	.3571722	0.862	-.638125	.7619647	.0100345
Informal	-.044424	.3194746	0.889	-.670583	.5817345	-.008508
Q2	4782171	.2039448	0.019	.0784927	.8779416	.0866289
Q3	.4119645	.2105416	0.050	-.000689	.8246184	.0716814
Q4	.5998099	.231684	0.010	.1457177	1.053902	.0671077
Urban	-.721265	.2408404	0.003	-1.19330	-.249226	-.054628
Distance	0149102	.0035528	0.000	.0079468	.0218735	.0022793
Severe	-.145614	.1808099	0.421	-.499995	.2087665	-.04249
Prevention	.29679	.3633625	0.414	-.415387	1.008967	.0414673
Sec_preven	-14.0639	755.0044	0.985	-1493.85	1465.717	-.358157
Rehabilitation	-.507375	.7075557	0.473	-1.89416	.8794086	-.188148
_cons	-.705680	.5196926	0.175	-1.72426	.3128984	
3. Tertiary facilities						
Age	.0089035	.0072026	0.216	-.005213	.0230203	.0002679
Male	-.017092	.2067678	0.934	-.422349	.3881658	.006671
Married	-.5665107	.2384525	0.018	-1.03387	-.099152	-.058000
Year12	.6422291	.2498135	0.010	.1526036	1.131854	.0574672
Above12	.2299418	.5073963	0.650	-.764537	1.22442	.0544377
Formal	.0661475	.4695956	0.888	-.854243	.986538	.0057938
Informal	-.024853	.4317529	0.954	-.871073	.8213671	-.000959
Q2	.3650872	.2886538	0.206	-.200664	.9308383	.0227066
Q3	.3576103	.2900172	0.218	-.210813	.9260336	.0261304
Q4	9866268	.2911946	0.001	.4158958	1.557358	.113492
Urban	-1.351101	.2629797	0.000	-1.86653	-.83567	-.175043

Distance	.0183851	.003801	0.000	.0109352	.025835	.0017393
Severe	.1834706	.2216553	0.408	-.250966	.617907	.0353734
Prevention	.3958996	.4810733	0.411	-.546987	1.338786	.0405057
Sec_preven	1.198504	.846886	0.157	-.461362	2.85837	.3667723
Rehabilitation	1.372724	.5511223	0.013	.2925437	2.452903	.3167745
_cons	-.8059423	.6542768	0.218	-2.08830	.4764167	

Wald Tests

Variable	DF	Significance
Severity of illness	chi2(8) =13.98	Prob>chi2 =0.0822

Appendix 7: Controlled for Remoteness

Multinomial logistic regression — Number of obs = 1007

LR chi2(28) = 158.03

Prob > chi2 = 0.0000

Log likelihood = -954.56886 — Pseudo R2 = 0.0764

Variable	Coeff	Std.Err	P>|z|	95% CI		Marginal Effect
1. Primary facilities						
Age						-.003267
Male						.0260501
Married						.1138428
Year12						-.111864
Above12						.0562837
Formal						-.044815
Informal						-.03726
Q2						-.119625
Q3						-.121018
Q4						-.188922
Urban						.1359177
Hard2reach						.2459047
Veryhard						.2614418
Totalhr						-.002111
2. Secondary facilities						
Age	.0163007	.0055966	0.004	.0053316	.0272698	.0032865
Male	-.142979	.1616444	0.376	-.459796	.1738381	-.030534

Married	-.424419	.1947544	0.029	-.806131	-.042708	-.061691
Year12	.4538518	.2071962	0.028	.0477547	.8599489	.0751601
Above12	-.462397	.5212104	0.375	-1.48395	.5591566	-.102780
Formal	.1664475	.3612025	0.645	-.541496	.8743914	.0251775
Informal	.1301603	.3227003	0.687	-.502321	7626413	.0185733
Q2	.5052212	.2074603	0.015	.0986064	.9118359	.0879437
Q3	.5231529	.2133088	0.014	.1050754	.9412304	.0935967
Q4	.6350537	.235572	0.007	.1733411	1.096766	.0708933
Urban	-.283292	.2457027	0.249	-.764861	.1982763	.0093406
Hard2reach	-1.13503	.2537976	0.000	-1.63247	-.637598	-.185515
Veryhard	-1.35589	.2531564	0.000	-1.85207	-.859712	-.225255
Totalhr	.0214875	.0626137	0.731	-.101233	.144208	.0058724
_cons	-.765621	.5253833	0.145	-1.79535	.2641113	
3.Tertiary facilities						
Age	.0065798	.0071191	0.355	-.007373	.020533	-.00002
Male	-.026928	.2023434	0.894	-.423514	.3696575	.0044837
Married	-.534085	.2352104	0.023	-.995089	-.073081	-.052152
Year12	.4504641	.2475553	0.069	-.034735	.9356636	.036704
Above12	.1338864	.4913291	0.785	-.829101	1.096874	.0464964
Formal	.2063751	.467613	0.659	-.71013	1.12288	.0196373
Informal	.1877297	.43044	0.663	-.655917	1.031377	.0186862
Q2	.4415613	.2849781	0.121	-.116986	1.000108	.031681
Q3	.4218567	.2874123	0.142	-.141461	.9851744	.0274212
Q4	1.033406	.2900184	0.000	.4649801	1.601831	.1180283
Urban	-.985086	.2670496	0.000	-1.50849	-.461679	-.145258
Hard2reach	-.850187	.3388584	0.012	-1.51434	-.186037	-.06039
Veryhard	-.696407	.2996011	0.020	-1.28361	-.109199	-.036187

Totalhr	-.017792	.0820019	0.828	-.178512	.1429291	-.003762
_cons	-.615806	.645583	0.340	-1.88113	.6495137	

Wald test

Variable	DF	Significance
Remoteness	chi2(6) = 46.82	Prob > chi2 = 0.0000

Appendix 8: Controlled for Remoteness and Severity of sickness

Multinomial logistic regression Number of obs = 1007

LR chi2(36) = 175.94

Prob > chi2 = 0.0000

Log likelihood = -945.61542 Pseudo R2 = 0.0851

Variable	Coeff	Std.Err	P>|z|	95% CI	Marginal Effect
1. Primary facilities					
Age					-.003304
Male					.02505
Married					.1186501
Year12					-.116769
Above12					.0515205
Formal					-.042561
Informal					-.033927
Q2					-.118676
Q3					-.124156
Q4					-.191197
Urban					.135929
Severe					-.013092
Prevention					-.051955
Sec_preven					-.086336
Rehabilitation					-.151901
Hard2reach					.2416094
Veryhard					.261399
Totalhr					-.001985

2. Secondary facilities						
Age	.0159659	.0056141	0.004	.0049625	.0269693	.0030451
Male	-.144903	.1628581	0.374	-.464099	.1742934	-.030654
Married	-.423637	.1952862	0.030	-.806391	-.040883	-.057275
Year12	4494272	.2080214	0.031	.0417127	.8571417	.0685422
Above12	-.443386	.5214659	0.395	-1.46544	.5786688	-.095442
Formal	1691607	.3619188	0.640	-.540187	.8785086	.0273765
Informal	.1255207	.3231723	0.698	-.507885	.7589267	.0189027
Q2	.5067823	.2077842	0.015	.0995327	.914032	.0879134
Q3	.5113033	.2137273	0.017	.0924056	.9302011	.08496
Q4	.6293014	.2358875	0.008	.1669703	1.091632	.0686963
Urban	-.293795	.2461043	0.233	-.776151	.1885604	.0016789
Severe	-.080269	.1832724	0.661	-.439477	.278938	-.033367
Prevention	.1753369	.3679701	0.634	-.545871	.8965451	.0224167
Sec_preven	-13.5789	768.9712	0.986	-1520.74	1493.577	-.344627
Rehabilitation	-.417781	.7097186	0.556	-1.80880	.9732416	-.176075
Hard2reach	-1.11703	.2544803	0.000	-1.6158	-.618253	-.175398
Veryhard	-1.3313	.2536766	0.000	-1.8285	-.834102	-.210877
Totalhr	.0225278	.0627557	0.720	-.100471	.1455266	.0060087
_cons	-.719872	.5294457	0.174	-1.75757	.3178229	
3.Tertiary						
Age	.0080459	.0072122	0.265	-.00609	.0221816	.0002587
Male	-.016896	.2059289	0.935	-.42051	.386717	.0056036
Married	-.577783	.2379063	0.015	-1.04407	-.111495	-.061375
Year12	.5097885	.2512846	0.042	.0172797	1.002297	.048227
Above12	.1318282	.4992302	0.792	-.846645	1.110301	.0439219
Formal	.1726509	.4689002	0.713	-.746377	1.091679	.0151849

Informal	.1553662	.4317538	0.719	-.690856	1.001588	.0150241
Q2	.4231314	.2872719	0.141	-.139911	.986174	.0307625
Q3	.4803027	.2892501	0.097	-.086617	1.047222	.0391962
Q4	1.036561	.291626	0.000	.4649847	1.608137	.1225007
Urban	-.93907	.2688212	0.000	-1.46595	-.41219	-.137608
Severe	.278335	.2193911	0.205	-.151664	.7083336	.0464589
Prevention	.267703	.4793145	0.576	-.671736	1.207142	.0295378
Sec_preven	1.47768	.8642199	0.087	-.21616	3.17152	.430962
Rehabilitation	1.442898	.5463245	0.008	.3721219	2.513675	.3279751
Hard2reach	-.873415	.3423724	0.011	-1.54445	-.202377	-.066211
Veryhard	-.783627	.3066109	0.011	-1.38457	-.182680	-.050522
Totalhr	-.019495	.0821525	0.812	-.180511	.1415211	-.004024
_cons	-.804365	.657916	0.221	-2.09386	.485127	

Wald Test

	Variable	DF	Significance
	Severity of illness	chi2(8) =14.66	Prob > chi2 = 0.0661

Appendix 9: Summary Statistics using weight and without weight for inpatient care

Without weight

Variable	Obs.	Mean	Std.Dev	Min	Max
Age	442	41.73303	14.90168	15	78
Male	442	.4570136	.4987132	0	1
Married	442	.821267	.4987132	0	1
Year12	442	.2669683	.442877	0	1

Above12	442	.040724	.197874	0	1
Formal occupation	442	.2511312	.4341552	0	1
Informal occupation	442	.6832579	.4657331	0	1
IncomeQ2	442	.2488688	.4328475	0	1
IncomeQ3	442	.2511312	.4341552	0	1
IncomeQ4	442	2488688	.4328475	0	1
Urban	442	.8325792	.3737742	0	1
Distance	442	17.75641	38.40888	0.07	398
Totalhr	442	1.706335	7.081064	0.02	99.5
Hard to reach	442	081448	.2738318	0	1
Very hard	442	.1719457	.3777608	0	1
Severe	442	.10181	.3027409	0	1
Prevention	442	.020362	.1413952	0	1
Secondary prevention	442	.0067873	.0821982	0	1
Rehabilitation	442	.0022624	.0475651	0	1

With Weight

Variable	Weight	Obs.	Mean	Std.Dev	Min	Max
Age	7834.00149	442	42.15844	15.19492	15	78
Male	7834.00149	442	.4438965	.4974054	0	1
Married	7834.00149	442	.820275	.3843933	0	1
Year12	7834.00149	442	.2451438	.4306599	0	1
Above12	7834.00149	442	.0292753	.1687683	0	1

Formal occupation	7834.00149	442	.2054555	.4044919	0	1
Informal occupation	7834.00149	442	.728954	.4450035	0	1
IncomeQ2	7834.00149	442	.2562692	.4370669	0	1
IncomeQ3	7834.00149	442	.2520752	.4346962	0	1
IncomeQ4	7834.00149	442	.2199928	.4147109	0	1
Urban	7834.00149	442	.9101956	.2862253	0	1
Distance	7834.00149	442	19.1359	40.9028	0.07	398
Totalhr	7834.00149	442	1.89991	7.749094	0.02	99.5
Hard to reach	7834.00149	442	.0899647	.2864554	0	1
Very hard	7834.00149	442	.1860953	.3896246	0	1
Severe	7834.00149	442	.1059565	.3081307	0	1
Prevention	7834.00149	442	.0216324	.145645	0	1
Secondary prevention	7834.00149	442	.00594	.0769293	0	1
Rehabilitation	7834.00149	442	.0021815	.0467083	0	1

Appendix 10: Choice of health facilities with controlled for Distance

Multinomial logistic regression Number of obs = 442

LR chi2(24) = 65.53

Prob > chi2 = 0.0000

Log likelihood = -436.51575 Pseudo R2 = 0.0698

Variable	Coeff.	Std.Err	P>|z|	95% CI	Marginal Effect
1. Primary facilities					
Age					-.001284
Male					.0626008

Married						.0039546
Year12						-.079719
Above12						-.217339
Formal						.0396483
Informal						.0314722
Q2						.0208895
Q3						.0200493
Q4						-.013413
Urban						.0934225
Distance						-.001163
2. Secondary facilities						
Age	.0134505	.009846	0.172	-.005847	.0327484	.0015533
Male	-.299732	.2879571	0.298	-.864118	.2646531	.0551139
Married	.1049806	.3767103	0.780	-.633358	.8433192	.0483564
Year12	1.041098	.3645384	0.004	.3266157	1.75558	.1502053
Above12	13.44241	393.5877	0.973	-757.975	784.8602	.026938
Formal	-.957294	.636682	0.133	-2.20517	.2905797	-.216748
Informal	-.595111	.5559961	0.284	-1.68484	.4946215	-.141986
Q2	-.128978	.3672021	0.725	-.848681	.5907247	.006533
Q3	-.088512	.3796568	0.816	-.832626	.6556012	.0198902
Q4	.5353493	.419476	0.202	-.286809	1.357507	.1813486
Urban	-.08469	.5642581	0.881	-1.19062	1.021236	.2374411
Distance	.0107012	.0056406	0.058	-.000354	.0217565	.000848
_Cons	.1198029	.9476746	0.899	-1.73761	1.977211	
3. Tertiary facilities						
Age	.0087727	.0095191	0.357	-.009885	.0274299	-.00027
Male	-.692489	.2818239	0.014	-1.24485	-.140124	-.117715

Married	-.13325	.3526111	0.706	-.824355	.5578554	-.052311
Year12	.5208949	.358643	0.146	-.182032	1.223822	-.070486
Above12	13.72768	393.5876	0.972	-757.69	785.1452	.1904013
Formal	.0665799	.6564297	0.919	-1.22	1.353159	.1770999
Informal	-.001216	.5940542	0.998	-1.16554	1.163109	.1105137
Q2	-.203556	.3502695	0.561	-.890072	.4829594	-.027423
Q3	-.224668	.3618154	0.535	-.933814	.4844768	-.039939
Q4	-.282326	.4242109	0.506	-1.11376	.549112	-.167936
Urban	-1.49639	.5160228	0.004	-2.50778	-.485008	-.330864
Distance	.0090988	.0056294	0.106	-.001935	.0201322	.0003149
_Cons	1.868354	.9192196	0.042	.0667164	3.669991	

Wald Test

Variable	DF	Significance
Distance	chi2(2) = 3.60	Prob > chi2 = 0.1649

Appendix 11: Choice of health facilities with controlled for Distance and severities of illness

Multinomial logistic regression Number of obs = 442

LR chi2(32) = 73.71

Prob > chi2 = 0.0000

Log likelihood = -432.42829 Pseudo R2 = 0.0785

Variable	Coeff.	Std.Err	P>|z|	95% CI	Marginal Effect
1.Primary facilities					
Age					-.001022
Male					.0489173
Married					.0022419
Year12					-.067738
Above12					-.213536
Formal					.0379544
Informal					.0291514
Q2					.022244
Q3					.014853
Q4					-.014138
Urban					.0845418
Distance					-.001074
Severe					.0622304

Prevention						-.006936
Sec_preven						-.131082
Rehabilitation						.8805274
2.Secondary facilities						
Age	.0126586	.0098665	0.199	-.006679	.0319966	.0015918
Male	-.229768	.2920246	0.431	-.802125	.3425901	.0571656
Married	.1275424	.3776155	0.736	-.612570	.8676551	.0501625
Year12	1.005137	.36615	0.006	.2874959	1.722777	.1472957
Above12	15.82476	1274.256	0.990	-2481.67	2513.321	.0193022
Formal	-1.0001	.6373634	0.117	-2.24931	.2491134	-.214523
Informal	-.604694	.5573439	0.278	-1.69707	.4876797	-.137090
Q2	-.158127	.3686459	0.668	-.88066	.564406	.0049141
Q3	-.069922	.3831405	0.855	-.820863	.6810201	.0169395
Q4	.5782609	.4223603	0.171	-.249550	1.406072	.1849252
Urban	-.055643	.5673964	0.922	-1.16772	1.056433	2345064
Distance	0107227	.0056025	0.056	-.000258	.0217035	.0007428
Severe	-.586168	.4258113	0.169	-1.42074	.2484071	-.055492
Prevention	-.313097	.9537756	0.743	-2.18246	1.556269	-.112476
Sec_preven	-.322489	5166.809	1.000	-10127.1	10126.44	-.382169
Rehabilitation	-18.7637	13982.39	0.999	-27423.7	27386.21	-.362634
_Cons	.1709878	.9471819	0.857	-1.68546	2.02743	
3.Tertiary facilities						
Age	.0071405	.0095489	0.455	-.011575	.025856	-.00057
Male	-.59663	.286285	0.037	-1.15774	-.035522	-.106083
Married	-.116778	.3542925	0.742	-.811178	.577623	-.052405
Year12	.4672247	.3604536	0.195	-.239252	1.173701	-.079558
Above12	16.11926	1274.256	0.990	-2481.38	2513.615	.1942337

Formal	.0317687	.655358	0.961	-1.25271	1.316247	.1765683
Informal	-.028029	.5939646	0.962	-1.19218	1.13612	.1079388
Q2	-.225144	.3528944	0.523	-.916804	.4665165	-.027158
Q3	-.179042	.3652256	0.624	-.894871	.5367875	-.031793
Q4	-.247317	.426288	0.562	-1.08283	.5881918	-.170787
Urban	-1.45553	.5182078	0.005	-2.47120	-.439865	-.319048
Distance	.009306	.0055842	0.096	-.001639	.0202508	.0003313
Severe	-.435005	.4113873	0.290	-1.24131	.3712991	-.006738
Prevention	.2668828	.8942024	0.765	-1.48572	2.019487	.1194116
Sec_preven	16.60683	3866.608	0.997	-7561.81	7595.02	.5132504
Rehabilitation	-18.5803	12408.65	0.999	-24339.1	24301.92	-.517894
_Cons	1.902549	.9172214	0.038	.1048283	3.70027	

Wald Tests

Variable	DF	Significance
Severity of illness	chi2(8) = 2.53	Prob > chi2 = 0.9602

Appendix 12: Choice of health facilities with controlled for remoteness

Multinomial logistic regression — Number of obs = 442

LR chi2(28) = 78.29

Prob > chi2 = 0.0000

Log likelihood = -430.13548 — Pseudo R2 = 0.0834

Variable	Coeff	Std.Err	P>|z|	95% CI		Marginal Effect
1.Primary facilities						
Age						-.0011482
Male						0619057
Married						.006702
Year12						-.0661014
Above12						-.2133893
Formal						.042118
Informal						.0282262
Q2						-.0038899
Q3						.0080381
Q4						-.0329943
Urban						.0588766
Hard2reach						.1934955
Veryhard						.1523877
Totalhr						-.000415
2. Secondary facilities						
Age	.0120956	.0099963	0.226	-.007497	.031688	.0014186
Male	-.2949211	.2933628	0.315	-.869902	.2800595	0541657
Married	.0813424	.38243	0.832	-.668207	.8308914	.0469417
Year12	.8749724	.370773	0.018	.1482706	1.601674	.1347191

Above12	12.72821	331.4999	0.969	-637	662.4561	.0138495
Formal	-.9517147	.6557186	0.147	-2.2369	.3334701	-.2103509
Informal	-.5448594	.567966	0.337	-1.65805	.5683335	-.1314288
Q2	.1063999	.375036	0.777	-.628657	.8414569	.029818
Q3	.0189181	.3882775	0.961	-.742092	.7799279	.0291288
Q4	.7311637	.4293506	0.089	-.110348	1.572675	.1984781
Urban	.3990614	.5777394	0.490	-.733287	1.53141	.2538114
Hard2reach	-1.479601	.4987102	0.003	-2.45706	-.502147	-.1650283
Veryhard	-1.034388	.347506	0.003	-1.71549	-.353289	-.0722846
Totalhr	.0029152	.016982	0.864	-.030369	.0361993	-.0000331
_Cons	.1682377	.956138	0.860	-1.70576	2.042234	
3.Tertiary						
Age	.0077549	.0096111	0.420	-.011082	.0265923	-.0002704
Male	-.6816594	.2861744	0.017	-1.24255	-.120768	-.1160714
Married	-.1557898	.3590069	0.664	-.859431	.5478508	-.0536437
Year12	.3939956	.3641614	0.279	-.319748	1.107739	-.0686177
Above12	13.0614	331.4997	0.969	-636.666	662.7889	.1995398
Formal	.0352181	.6693608	0.958	-1.27671	1.347141	.1682329
Informal	.0082291	.6015883	0.989	-1.17086	1.18732	.1032026
Q2	-.0256044	.357361	0.943	-.726019	6748104	-.0259281
Q3	-.1351897	.3684323	0.714	-.857304	.5869244	-.037167
Q4	-.118993	.4312807	0.783	-.964288	.7263017	-.1654838
Urban	-1.062144	.5304474	0.045	-2.10180	-.022486	-.312688
Hard2reach	-.9866489	.4244803	0.020	-1.81862	-.154683	-.0284672
Veryhard	-1.001873	.3452317	0.004	-1.67852	-.325232	-.0801031
Totalhr	.0039234	.0188456	0.835	-.033013	.0408601	.0004481
_Cons	1.92448	.9252843	0.038	1109566	3.738004	

Wald Test

Variable	DF	Significance
Remoteness	chi2(6) =17.62	Prob > chi2 = 0.0073

Appendix 13: Choice of health facilities with controlled for remoteness and severities of illness

Multinomial logistic regression — Number of obs = 442

LR chi2(36) = 88.00

Prob > chi2 = 0.0000

Log likelihood = -425.28278 — Pseudo R2 = 0.0938

Variable	Coeff	Std.Err	P>|z|	95% CI	Marginal Effect
1.Primary facilities					
Age					-.000845
Male					0476415
Married					0041545
Year12					-.056536
Above12					-.208991
Formal					.0419001
Informal					.0273549
Q2					-.001488
Q3					.0022189
Q4					-.036147
Urban					.0504266
Hard2reach					.2020771
Veryhard					.1545642
Totalhr					-.000286
Severe					.0646185
Prevention					.0329042
Sec_preven					-.136323
Rehabilitation					.8750711

2.Secondary facilities						
Age	.0106467	.0100422	0.289	-.009036	.0303291	.0014777
Male	-.207623	.2981958	0.486	-.792076	.37683	.0558836
Married	.1147109	.3852771	0.766	-.640418	.8698401	0504295
Year12	.8348474	.3741128	0.026	.1015997	1.568095	.1340213
Above12	13.95357	614.88	0.982	-1191.19	1219.096	.0082208
Formal	-.997431	.6556344	0.128	-2.28245	.2875894	-.209144
Informal	-.556889	.567656	0.327	-1.66947	.5556966	-.127723
Q2	.0842121	.377052	0.823	-.654796	.8232204	.0265777
Q3	.0549873	.3933483	0.889	-.715961	.8259358	.026356
Q4	.8052714	.4338094	0.063	-.044979	1.655522	.2023622
Urban	.4748381	.5830117	0.415	-.667844	1.61752	.2485835
Hard2reach	-1.53926	.5018125	0.002	-2.5228	-.55573	-.155357
Veryhard	-1.07106	.3507461	0.002	-1.75851	-.383612	-.064566
Totalhr	.0013398	.0170278	0.937	-.032034	.0347138	-.000314
Severe	-.594325	.4350508	0.172	-1.44701	.2583587	-.058277
Prevention	-.690345	.9749649	0.479	-2.60124	1.220551	-.134131
Sec_preven	.2323686	2237.957	1.000	-4386.08	4386.547	-.378128
Rehabilitation	-17.5097	5367.161	0.997	-10537	10501.93	-.361096
_Cons	.2073424	.9558183	0.828	-1.66603	2.080712	
3.Tertiary facilities						
Age	.0052952	.00967	0.584	-.013658	.024248	-.000633
Male	-.567940	.2916396	0.051	-1.13954	.0036628	-.103525
Married	-.135780	.362865	0.708	-.846983	.5754221	-.054584
Year12	.3310377	.3676879	0.368	-.389617	1.051693	-.077485
Above12	14.28969	614.8799	0.981	-1190.85	1219.432	.2007703
Formal	.0024827	.6675236	0.997	-1.30584	1.310805	.1672435

Informal	-.016664	.6003052	0.978	-1.19324	1.159913	.1003681
Q2	-.038124	.360761	0.916	-.745203	.6689544	-.025089
Q3	-.073761	.3734012	0.843	-.805614	.6580919	-.028575
Q4	-.053861	.4350297	0.901	-.906504	.7987815	-.166216
Urban	-.968776	.5348492	0.070	-2.01706	.0795098	-.299010
Hard2reach	-1.09388	.4344623	0.012	-1.94541	-.242345	-.046721
Veryhard	-1.06669	.3496583	0.002	-1.75201	-.381373	-.089998
Totalhr	.003389	.0188337	0.857	-.033524	.0403023	.0006006
Severe	-.432849	.4181572	0.301	-1.25242	.3867239	-.006342
Prevention	-.046549	.9101282	0.959	-1.83037	1.73727	.1012266
Sec_preven	15.48904	1634.757	0.992	-3188.58	3219.555	.514451
Rehabilitation	-17.2591	4763.079	0.997	-9352.72	9318.204	-.513975
_Cons	1.959578	.9240813	0.034	.1484119	3.770744	

Wald Tests

Variable	DF	Significance
Severity of illness	chi2(8) =2.65	Prob > chi2 = 0.9545

APPENDIX

VITA

Name	:	Mr.Tshering Wangdi
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Education	:	B.A.Economics (honors), 2004
		Economics Department
		Sherubtse College, Bhutan
Working Experience		
Feb 2006-Nov 2006	:	Assistant Economist
		Thimphu City Corporation
		Ministry of Works & Human Settlement
Nov.2006-Jan 2009	:	Planning Officer
		Thimphu City Corporation
		Ministry of Works & Human Settlement
Jan 2009-Sep 2010	:	Sociologist
		(For World Bank and ADB Project)
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		Ministry of Works & Human Settlement
Sep 2010-Present	:	Planning Officer
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